NHTV University of Applied Science Breda
IB Traffic and Transport Management

City Parking

Parking Garages in Context with Transport Strategies

Project Report

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Preface

This report is the result of the group assignment of the research project for Q-Park, the third project of the second study year for the students of the international tuition Traffic & Transport Management. It deals with an analysis of the Q-Park parking garage Park Lane/Marble Arch in Westminster, London. Furthermore, the parking strategy of three locations in Europe have been compared. Apart from London, Amsterdam and Berlin have been selected. In these cities, a parking garage similar to the one of Q-Park has been selected. After the comparison of strategies, recommendations have been given for future policies for Westminster.

The project group that performed these research tasks consist of five students of the international Bachelor-degree course 'International Traffic & Transport Management' at the NHTV University of Applied Science in Breda, The Netherlands.

The workload of the assignment has been carried out between March of 2015 and June of 2015 by the following students: Thomas Geier, Jelle Mertens, Charline Dielen, Mike Schroten and Thomas Coolen. During the process, the project group was supported and guided by supervisor Don Guikink.

Summary

In the first chapter, the project is introduced. The main goals are described, followed by a short review of our research trip to London, which took place on the 28th, 29th and 30th of April 2015. Thereafter, the term 'parking' is defined, followed by an assessment of what problems occur with and due to parking. The final section of chapter one introduces Q-Park, stating general facts that are of relevance to our further research.

The second chapter starts off with a description of London's West End followed by a short review of the traffic situation in Westminster, the area in which the Q-Park car park of our research is located. It is discussed how it is a high-density, relatively high-class area in which people are generally more concerned about comfort than price. Thirdly, the policy of transport – and more specifically, parking – is described and its success factors and improvement points are noted, such as the connection between the City of Westminster as an operator of on-street parking, and Q-Park as an operator of the majority of off-street parking areas within Westminster. In the fourth section of chapter two, the Marble Arch/Park Lane car park is introduced and assessed, stating facts and the results of our visual inspections, and meetings with Q-Park associates, and the information we got from them. This includes the organisation around the Olympic Games. The chapter finishes off by displaying and analysing the results from a small survey that was conducted in the Marble Arch/Park Lane car park, in which we found that there is quite a large amount of people travelling from outside London, all the way into the busy part of the city for their parking spot, mostly for the reason of it being closest to their destination. Another notable fact that we found was that a relatively high part of the people still does concern the congestion charge, even though it is such a high end area and people are generally not that worried about the cost of parking.

The third and final main chapter offers a detailed comparison of Westminster's parking policy (and specifically its cohesion with the Marble Arch/Park Lane car park). This entails explanation of the policy, and an exemplar car park from two different locations in Europe; Amsterdam's Museums Quarter and the Parking underneath Potsdamer Platz in Berlin. The Museums Quarter car park in Amsterdam serves a dual purpose of residential and casual parking, provided by the municipality of Amsterdam and run by Q-Park. In Berlin, a car par very similar to that of Park Lane/Marble Arch is investigated, which is run by one of Q-Park's main competitors. It is explained why these facilities were chosen, where they are located and how the policy supports them. We noted that the policy in both Amsterdam and Berlin is more cohesive in terms of the relationship between on- and off-street parking, whereas in London this is mostly separated. In the third section of this chapter, the two examples are compared with Park Lane/Marble Arch, after which the fourth and final sub-chapter discusses possible future strategies for city parking, both in London and elsewhere.

The report finishes with an overall conclusion of the research and a recommendation to the Stakeholders.

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1. Introduction

1.1. Goals

This report is part of an assignment by Q-park to investigate the performance of one of their parking garages in Westminster, London. In the first chapter the goal of the report will be described together with an explanation of the fact finding mission in London, and an introduction into the topic. In the second chapter the findings about the parking garage Marble Arched will be described. These findings are based on meetings in London with different stakeholders, a survey carried out and desk research. To give a brief comparison between different parking strategies in the third chapter parking strategies from both Amsterdam and Berlin will be described, together with an example parking garage. In the fourth chapter possibilities will be given how Westminster and Q-park can adapt their parking strategy.

The goal of this report is to give an insight into different parking strategies for both commercial parking and parking regulated by a municipally. Another goal is to formulate opportunities to increase the occupation degree within the Marble arch, Park lane parking garage. To reach this goal a fact finding mission in London has been taking place, where meetings with different stakeholders took place and a survey has been carried out, these finding are underbuilt with desk research.

1.2. First London trip

The first trip to London took place from the 28th of April to the 30th of April, 2015. The goal of this trip was to do research and to find possible reasons as to why the Q-Park parking garage was not functioning the way Q-Park intended to.

On the first day, the group made its first impressions of the Westminster area. Furthermore, a meeting was arranged with the Dutch embassy, located on 38 Hyde Park Gate, London. During this meeting the project group introduced themselves and the project to the embassy, while on the other hand the embassy gave a broad explanation about their daily business. After the meeting with the Dutch embassy, the group proceeded their trip to the office of the city of Westminster, where another meeting was scheduled. During this meeting the broad lines of the traffic strategy of Westminster and the region of London have been discussed. In the evening, the project group went to see the night-time parking conditions.

The second day included a visit to the Park Lane/Marble Arch parking garage in the morning. After walking through the garage and meeting with Mathew, the garage host, the group split up to carry out the survey. In the afternoon the project group explored Westminster and West End in order to get an impression of how the day-time traffic situation. After this, the group returned to the parking garage to get some more responses on the survey during the evening peak.

The third and final day began with a short visual research on whether the main roads towards the parking garage are congested. The group found out that Park Lane has high traffic intensities. After the visualisation of the traffic condition near the parking garage, the group took some final surveys during the morning peak in order to get a more reliable outcome of the survey. This was followed by a meeting with Adam Bidder, Managing Director of Q-Park Uk and Ireland. During this meeting, Q-Park UK and their policy as well as the parking garage Park Lane/Marble Arch were discussed. Furthermore, the project group obtained information about

the history of the parking garage. In the late afternoon the project group returned back to The Netherlands.

1.3. Parking – a definition

Parking can be defined as a stop or intermediate stop of a vehicle.
A division of parking categories is made between on-street and off-street parking. Next to basic car parking various types of serviced parking are: Park and ride, Valet Parking, Airport Parking, Meet and Greet Parking and Park and Fly Parking. Private parking is not taken into account concerning this report. Different regulations on parking are: free parking, paid parking and permit parking. A modern form of paid parking is "Performance parking" that makes use of electronic parking meters so that parking spaces in desirable locations and at desirable times are more expensive than less desirable locations. This push-strategy tends to influence the parking seeker. With the use of sensors and parking meters parking rates fluctuate in order to keep 85-90% of the spaces in use to ensure parking availability.[1] Mobile apps have been developed to steer parkers to desirable locations. The strategy of governments is usually based on minimizing traffic seeking for parking spots in urban centres in order to reduce congestion. Some authorities aim for a rise in public transport usage by increasing parking rates and stabilizing parking supply.

Particularly commuters that make use of private transportation face parking issues daily. To make distinction between parking problems the DESTEP (Demographic Economic Social Technological Ecological Political) Analysis is being used. This method is being used to address the broad division of parking problems. Parties directly and indirectly involved in the issues are: parking providers, politicians, parking lot users, providers of alternative modes, personnel in the parking garage and parking construction companies. This analysis covers off-street parking as well as on-street parking in urban areas.

1.4. Parking problems

In demographic perspective the facility has to be well adapted to the needs of specific target groups. Nowadays the baby boom has an increasing share of elderly as result. Thus if this large share of elderly makes use of the facility, the parking facility needs to be adapted in such a way that wishes and needs of this target group are being fulfilled. Customer service and user friendliness play a significant role in this matter as well. The causers of this problem are parking providers that are responsible for the specific parking site. Politicians are indirectly responsible for commercially operated parking garages and directly responsible for parking spots owned by the government. The parking policy created by politicians, functions as guideline for commercial and non-commercial parking.

Economic parking problems are the high fares in comparison to alternative parking facilities and other modes of transport. High fares can lead to a low occupation degree and thus a low turnover. In case of low fares the occupation degree can be high but revenues cannot be able to cover the costs due to too low rates. It is important to find a balance between supply of parking places and demand for parking spots by determining parking rates. Supply and demand are influenced by millions of different factors bound to a specific time and location. High fares, lack of parking supply and high parking demand are issues for parking lot users. Low profit, low

[1] City of Westminster, 2015.

occupation degree, high parking supply and low parking demand are characteristic for problems owned by the parking providers.

Parking issues in social point of view are for instance poor accessibility and poor implementation of elements that enhance the feeling of social safety. Poor accessibility can result in resistance that leads to a low occupation degree and therefore low revenues. And a lack of social safety can have the same results. Parking users will not park at the same facility again. Personnel in the parking garage can be dealing with the same feeling. Parking providers and construction companies are responsible for these problems. Using lights, light colours and daylight within the facility can enhance the feeling of social safety.

Technologically spoken three major issues can occur. These issues are technical failure of the parking facility, poor ease of use and a lack of information on-trip and at the parking facility. Lack of information concerning availability of parking places can for instance make the user decide to go elsewhere if regularly the parking facility is occupied. If the facility is not fully occupied the garage misses out on customers. If the parking garage is not easy to make use of, parkers can decide to go to alternative parking spots where the quality of ease of use is higher. Parking providers and the parking construction companies can prevent all of these problems. Personnel can be complained at by parking users and can be hindered during their work activities as a result of the technical failures.

Ecological issues as unsafe parking facilities and a lack of charging points for electric cars can occur. With the rise of electric car usage supply of charging points is on the rise. Parking facilities without installed chargers can loose revenues. Unsafe situations at the parking garage can lead to accidents and a damaged image that can reduce overall revenues. Parking providers and the construction company of the parking garage have to prevent those issues from occurring.

A political issue directly related to parking is the influence of politicians on the parking policy. In case of much influence and interventions a free parking market cannot be established. If laws and forces intervene the market excessively, rates will rise and less competition will occur. Consequently, the demand for parking spaces will drop. Parking providers' profit will decrease drastically. Authorities are the causers of this problem and in cooperation with parking providers the barriers for entering the market can be lowered.

1.5. Q-Park

Q-Park is an independent international parking organisation with a good to strong market position in 10 European countries. Some facts about Q-Park will be mentioned. The Q in Q-Park stands for the Quality Q-Park wants to provide its user. The company has about 2,500 employees. More than 6,000 parking facilities that provide more than 830,000 parking spaces are owned by Q-Park. Almost the half of all parking spaces are located in parking garages, 40% is located in the open air and the remaining part is on-street parking. 300,000 parking places are owned and long-leased by Q-Park and these spaces are located near bicycle parking and public transport and the facilities make use of car sharing systems and E-loading. Product propositions are Single tickets, Value cards, Season tickets, Parking permits and Control fee tickets. One third of Q-Park's income comes from short-term parkers. The remaining portion comes from Season tickets and Value cards. Pre-booking of parking places is a new parking product of Q-Park. Studies carried out concerning customer satisfaction states a 3,69 out of 5. The revenues in 2014 are €770 million of which 90% originates from parking. Lease and

Operational costs are 75% of the total expenses. The profit was €175 million. 1710 million tonnes of CO2 reduction is realized.[2]

Q-park aims to be the most preferred and recommended parking partner at strategic locations in Northwest Europe, based on quality, operational excellence, customer satisfaction and sustainable financial performance. Her mission is to enhance the quality of life by providing clean and safe parking facilities. Convenience, reliability and hospitality are the key fundamentals of the company. Corporate Social Responsibility (CSR) is the philosophy behind these fundamentals and Q-Park's CSR is evaluated in the form of a report annually. Cities are challenged to balance five aspects: mobility, facility, society, economy and environment. These aspects are explained below to clarify Q-Park's vision.

Parking is a fundamental part of the mobility chain. Regulated parking is a key instrument in regulating mobility and will improve accessibility of public amenities like universities, shops and hospitals. Well-regulated parking facilities improve traffic flows within cities due to a decrease in traffic seeking for available parking spots. Upgrading the quality of old parking garages concerns the improvement of services, products and operational processes. To maintain high quality of urban public spaces paid parking is required. Cities have to deal with three main issues: a lack of space, increase in traffic/congestion and more pollution. Paid and regulated parking is an essential part of an integrated mobility policy. Regulated parking policies lead to a decrease in carbon footprint and improved safety. [3]

[2] Integrated business model, Q-park, no date.
[3] Quintessence, Q-park, no date.

2. Parking in London's West End

In this chapter a brief introduction for the city of Westminster is given after which the parking situation and strategy will be described. Other than the parking policy the situation at the parking garage Q-park marble Arched will explained underbuilt with a survey.

2.1. London West End

West End is located in the centre of London and can be considered as the central business district, like "Midtown Manhattan" in New York City and the "8th arrondissement" in Paris. Apart from government building, several embassies are located in the area as well, making it a political hot spot. In the area one can also find cultural instances like theatres, high class restaurants and fancy shopping areas like Oxford Street, not only making it a popular area for local residents, but also for tourists.

The City of Westminster, in which the biggest part of West End is located, is one of the biggest borough of London with 219,600 inhabitants[4]. 600,000 vehicles drive in and through the city every day, while the local residents own only 36,000 cars.

Each borough used to make its own policy, however, in these days this is changing. Because nowadays-new developments in the political structure of the city mean that the Mayor of London and Transport for London now decides on the higher strategic level. Boroughs then implement these plans locally. This is why the City of Westminster created the 'Local Implementation Plan', in which the transport delivery plans up to 2031 are described.

2.2. Traffic situation in Westminster

The City of Westminster is partly located in the congestion zone. When the congestion zone was initially implemented, there was a decrease of car usage. However, nowadays car usage levels are back to the same levels. Road users have to pay an extra fee if they drive their motorised vehicle into this area. There are several roads crossing Westminster. An example of this is Park Lane, which is situated on the edge of the congestion zone. This road consists of three to four lanes in each direction. High intensities in addition to the relatively high maximum speeds on these roads make them very dangerous for slower traffic modes like cyclists.

2.3. Parking policy in Westminster

On-street parking

On most parking bays in Westminster the maximum parking time is four hours. However, this is hardly enforced. The average stay on kerb side parking is around 2.5 hours. Paying this fee is possible via calling or texting a specific number or via a parking app. Users can top up their balance remotely when they find out that they will not make it back to their vehicle in time.

Parking regulations differ from each other during day- and night-time. At night-time, one can park his/her car for free. Furthermore, the single yellow lining indicates that from 7pm-7am, road users are allowed to park their car on these spots. Double yellow lining indicates that one may never park his car on that designated kerb. During the day it is not allowed to parking on

[4] City of Westminster (2015).

single yellow lining in order to create more space for moving traffic. Parking fees range from £2.00-£4.00 per hour (€2.80-€6.14). There is a daily maximum fee of 40 pounds (€55.80).

Throughout Westminster there are more than 41.000 kerb side parking spaces available. The amount of parking permits issued declined slightly the last couple of years; from 37.154 in April 2011 to 36.569 permits in April 2014[5]. Profits, or parking surplus, on on-street parking increased to £47.861.000. The revenues from on-street parking contribute to PPRA (Parking Place Reserve Account). This budget is shared between the departments of City Management, Adults & Public Health and Transport & Environment. These departments use this money for for example social inclusion for the elderly and disabled people in the form of taxi cards[6].

Income and Expenditure (£'000)

Revenue	2009/10 Actual	2010/11 Actual	2011/12 Actual	2012/13 Actual	2013/14 Actual
Enforcement - PCNs	20,454	22,066	25,304	24,487	25,081
Paid for Parking	36,242	37,086	38,412	38,378	40,653
Suspensions	6,888	7,427	8,503	7,848	8,923
Permits and Dispensations	4,810	4,868	5,161	4,841	5,545
Car Clubs	177	235	346	467	395
Miscellaneous (Grants and Contributions)	730	87	35	1,849	31
Total Revenue	**69,301**	**71,769**	**77,761**	**77,870**	**80,628**

Expenditure	2009/10 Actual	2010/11 Actual	2011/12 Actual	2012/13 Actual	2013/14 Actual
Enforcement	26,242	24,840	18,462	18,142	16,340
Paid for Parking	4,127	3,756	3,352	3,050	3,009
Permits and Suspensions	1,876	2,543	685	868	768
Other Infrastructure	936	510	1,889	832	1,102
Transfer to Reserves	-	-	-	2,300	5,100
Overheads	5,950	6,606	16,276	16,365	6,448
Total Expenditure	**39,131**	**38,255**	**40,664**	**41,557**	**32,767**

	2009/10 Actual	2010/11 Actual	2011/12 Actual	2012/13 Actual	2013/14 Actual
Parking Surplus (Contributions to PPRA)	30,170	33,514	37,097	36,313	47,861

Prices are relatively on the same price level over the last years and are based on how the spaces are utilised in the area, historic rates. Furthermore, inflation is calculated into the price levels as well. Apart from these influences there is no real parking strategy in the City of Westminster.

The City of Westminster has set up "Fair Parking", which is ought to improve the parking situation for various road users. One of the goals is to improve the efficiency of parking space-usage in the City. Furthermore, it assures advantages for disables people. Westminster provides over 500 parking spaces where disabled people can park when they have a disabled badge. During daytime they can park for up to four hours on these reserved spaces. On top of this, when meeting the criteria, handicapped can also apply for a "white badge". These badges are reserved for disabled drivers and/or passengers who work or live in the city. With a White Badge, one can park in on-street parking spaces without charge or time limit[7].

Special parking spaces are provided for motorcycles. In Westminster there are over 6.000 dedicated parking spaces for motorcycles. Motorcyclists can park their motorcycle on an on-street motorcycle space for £1 per day. Furthermore, Q-Park offers free of charge parking spaces.

The City of Westminster provides over 180 special parking spaces for electric cars. On these spaces electric vehicles can park for free while they can charge their car via one of the charging stations.

[5] City of Westminster (2015).
[6] City of Westminster (2015).
[7] Westminster City Council (2012).

Parking Sensors

In this plan, seven "Westminster Local Implementation Plan objectives and their supporting actions" are explained. These objectives include, among other things, the smoothening of traffic flows and supporting the uptake of cleaner vehicles via for example on street electric charging points[8]. Motorists searching for a parking place are a big player in slowing down traffic flows. They drive slower and make more unexpected moves, resulting in more congestion and contributes to poorer air quality. Apart from this, there is a high demand for parking, loading and waiting kerb side space across the City of Westminster. Parking occupancy averages more than 70%, and in some cases exceeds 80% in some parts of the West End. The limited on-street capacity results in stress for the driver to find an available parking space.

These are a few of the reasons why the City of Westminster enrolled a dynamic parking system that includes parking sensors. These sensors are connected to an app called the ParkRight app, which helps drivers find a parking space. At the moment a live 'red, amber, green' status (meaning low, medium or low availability) has been created for over 3000 spaces next to the location of over 41.000 on and off-street parking spaces[9]. Next to a navigation feature to these spaces, one also gets information about the amount of spaces left in an area, operating hours and tariffs. The user can furthermore search and sort results by distance, rating and price.

The ParkRight app only contains on-street parking places, meaning that parking garages are not included in this feature. This shows the broad policy in Westminster; because while the strategy is to make on-street parking for short-term parkers and off-street parking for long-term stays, this is hardly worked out into the overall policy. Furthermore, the government of Westminster does not promote off-street parking.

The sensor technology is open source data, meaning that everybody can access it, because the purpose of the system is to provide information to road users. Apart from the app, people can also access the data via "Parkopedia", which is a service site which consists of parking information of over 6.308 towns in 52 countries.

Off-street parking

As was mentioned above, on- and off-street parking are mostly considered as two separate aspects of Westminster's transport policy. In this, off-street parking plays the role of providing a safe, usually underground parking facility, in which people can park their vehicle. Generally, this is aimed at the long-term users of parking in Westminster, but there is minimal cohesion in policy.

As of February 2011, Q-Park took over fourteen car parks from the city of Westminster in an overarching contract. This contract stated that Q-Park would lease the facilities for 25 years, during which they would invest a certain sum of money into renovations. Up until now, this has accounted to over ten million pounds (over 13.5 million euros). Complete overhauls took place in three of the fourteen facilities; Chinatown, Oxford Street and Park Lane. These consisted of

[8] City of Westminster (2013).
[9] City of Westminster (2015) in Wikipedia.

cleaning, repainting, modernizing and optimizing the car parks. This included painting all of the floors to create a cleaner look, and refurbishing all of the adjacent offices.

2.4. Q-Park Marble Arch/Park Lane

Located below London's largest park, Q-Park's Marble Arch/Park Lane car park offers a prominent parking service. Of all of Q-Park's nineteen – not counting airport car parks - facilities in London, it is the largest, with 981 parking spaces. Additionally, it stands out for its design, with all of its over nine hundred parking spots situated on one single level. This design originates from the previous function of the facility. Before the underground area became a parking garage, it was the compound where all towed cars from within Westminster were relocated to. In the area, people could come to one of the offices and pay a fee to reclaim their vehicle. After this was disallowed by new law, the area was repurposed into a parking garage, run by the city of Westminster until February 2011.

Because of the previous function of the facility, it is now the largest of all of Q-Park's car parks in London. However, there is simply not enough demand to fill all of the 981 parking spots, so Q-Park has to come up with solutions to increase the occupation degree of the car park. As they had previously done with other spacious car parks, Q-Park approached third party companies, which might be interested in utilizing some of the available parking spaces. Nowadays, there are several important partnerships, the largest of which is with the prominent BMW store – located on Park Lane. This store chooses to utilize the Park Lane car park as a storage area for their unsold cars, which are brought to the area directly from the BMW factory. This store is BMW's only store in the United Kingdom which is not governed by an indirect dealer. BMW previously rented 357 spaces in the Park Lane car park, and has now moved up to renting 405 spaces. This is a yearly increase in revenue for Q-Park of £400.000, and a guaranteed income source. Furthermore, there are smaller partnerships with Sixt, Enterprise, Posh Car Wash, Siyara Car Wrapping and ThriEv. Each of these provides an additional source of guaranteed income for Q-Park, as well as advertisements for the car park. Combined, these partnerships take care of 60 per cent of the parking spaces inside the Park Lane/Marble Arch car park. In the Westminster contract, Q-Park took over the facility with an additional 30 spaces reserved for surrounding residents – who are logically offered strong discounts. As this is not a prominent source of income (due to the discounts), this has not largely expanded over the past four and a half years, to a mere 40 in 2015. Lastly, there are currently 176 individual season ticket holders in the car park.

The Park Lane/Marble Arch car park is located directly below Hyde Park, in which many events are organised. As we are living in a car-bound society, these events attract high numbers of vehicles that need a parking facility. Using the experiences from other car parks in London, such as those near the theatre district – that offer discounted combination tickets for parking and visiting a musical, Q-Park sought partnerships with key stakeholders in the area, getting information on their websites, via which you can get pre-booking discounts of up to 10% on your parking fees, as well as a guaranteed parking spot (as the car park is often full during large events in Hyde Park).

A more exceptional situation occurred when the Olympic Games came to London in 2012. Q-Park was approached by LOCOG, the Olympic Committee, stating that they wanted to use the Park Lane/Marble Arch car park as a transport hub for all Olympic transport. This would span for a total of 70 days, providing athletes and supporting staff with vehicles for getting around

the city before, during and after the Olympic Games. However, this meant that the car park needed to be delivered completely empty on the 1st of June in 2012. In order to realise this, Q-Park had to undergo nine months of planning, to inform all of the users and be able to deliver an empty car park. It successfully did this, and by the 2nd of June 2012, the car park was completely filled with 1300 BMWs (sponsor of the Olympic Games). Note that even though there are less than 1000 parking spots available, BMWs were stored in connecting roadways to fill it up completely, leading to the total number of 1300. Remarkably, during the 70 days that these vehicles were available, only around 40% were used, as many athletes preferred using public transportation to get around London.

Prices for the car park of Marble Arch/Park Lane have risen over the past 4,5 years. When Q-Park took over the facility, the initial cost of parking was set at £4 (€5,50) per hour. Now, in 2015, it will cost users £5,50 (€7,60) to park their car 60 minutes, paying in intervals of an hour (parking 61 minutes will mean having an £11 expense), an increase of 37,5%. The hourly frequency shows that it is aimed at long-term parking, where one hour more or less will not make a large difference on the overall cost. We noticed during our survey and examinations that many people parked for multiple days. The rates are limited at £36 for a day, so as not to succeed the £40 limit that a parking fine in Westminster accounts to. This means that after 6,5 hours, parking will be free, until 24 hours are exceeded. Free electric vehicle charging is provided on over 40 parking spots, meaning that these vehicles park at the same rate of £5,50 with no extra expenses for the electricity they use, aimed at promotion of the use of electric vehicles.

As mentioned in the Westminster transport strategy description, the policy for on- and off-street parking is substantially separated. Upon speaking to managers of Q-Park, we discovered that their contacts with the City of Westminster are limited to annual meetings in which they discuss the contracts. There are no or minimal further supporting meetings for potentially looking at the optimal balance between on- and off-street parking. This is reflected in that even though the Marble Arch/Park Lane facility is aimed at long-term parkers, there are still people using it for less than an hour (this could be for short business meetings, etc.).

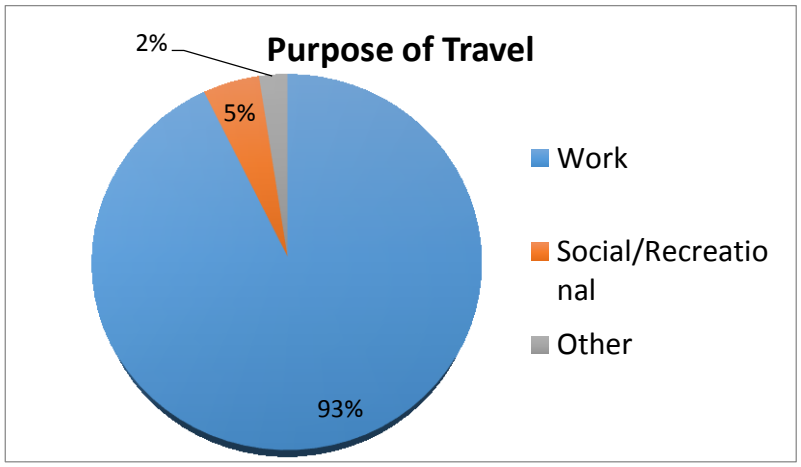
Despite this, we got the impression that since Westminster is such a high-end area of London, people will not be scared away by hourly rates rising from £4 to £5,50. The average vehicle in this garage has a price tag of six figures, meaning that users are more concerned about comfort and flexibility than price. Q-Park's management stated that it would be possible to augment the parking prices to over £100 per hour, and people would still park their vehicles in the locations, simply because they are right across the street from their destination.

2.5. Survey

A survey was conducted at the entrance/exit of the Q-Park Marble Arch and Park Lane. In advance a majority of work related parkers was expected. Thus to be able to ensure as much as possible respondents in the limited available time, the research was conducted during peak hours. Research was done on Wednesday the 29th of April from 9:30 till 10:00 and from 15:00 till 16:00 and on Thursday the 30th of April from 7:15 till 9:00. The results are based on about 50 respondents and are therefore not representative. The goal is to create on overview on the user ship of the parking garage. The outcome is utilized for further analysis and recommendations.

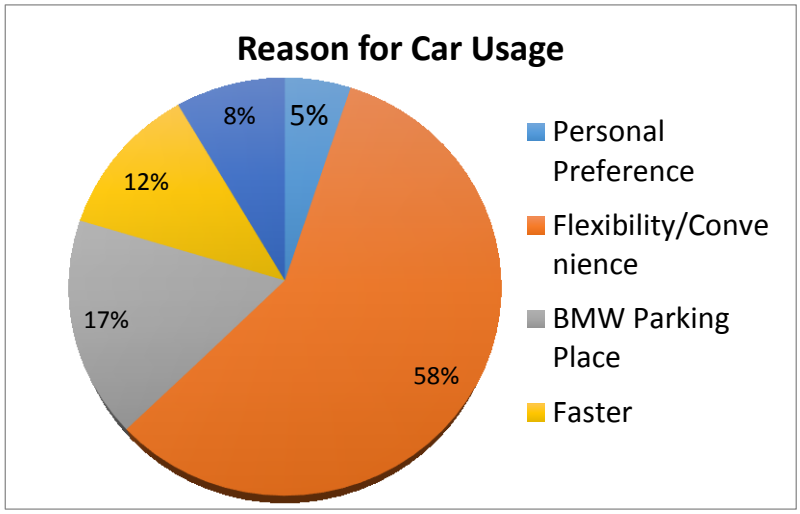
1. What is your purpose of travel?

The purpose of travel for the parking users is highly work-related. A large variety of shops, restaurants, cafes, companies, government and embassy buildings can be found in near proximity to the parking garage. The people working in that area make use of the parking garage. Despite the shopping district close by, only a minor share of the parking users has a shop-related purpose of travel. Less than 10% of the respondents have another purpose of travel.



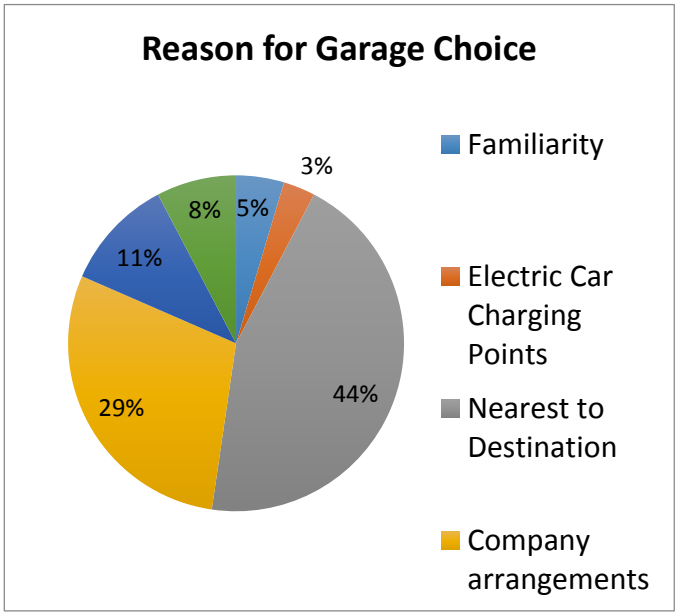
2. Why did you decide to come here by car?

Flexibility and convenience is the main reason to choose the car over any other mode of transport. Another reason for car usage is the company arrangements. BMW employees are offered a free parking space in the garage. This clearly incentivizes BMW employees to make use of it. Another reason is a faster trip compared to the usage of alternative modes



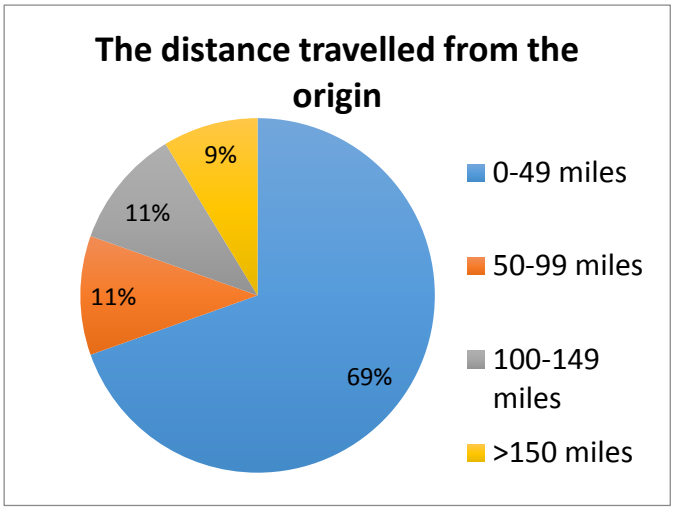
3. Why did you decide to park in this parking garage?

The share of company arrangements in the previous graph is projected in this graph as well. This particular garage is most often chosen because of the parking location that is nearest to the destination. The congestion charge plays a role in choosing this parking facility, because the charge is avoided by a decent amount of parking users. Tariffs of the parking garage are relevant for parking users that make choices based on parking rates. These users have a high price-elasticity.

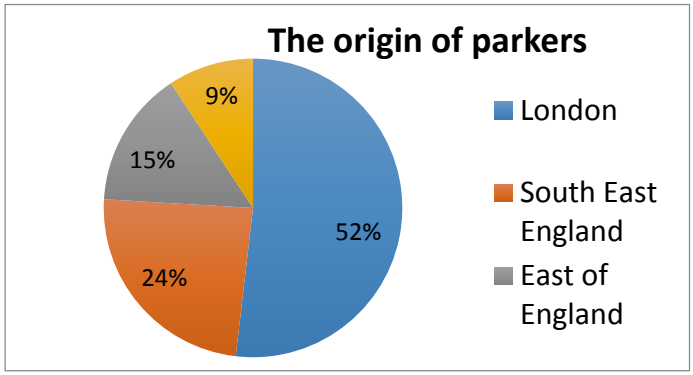


4. Where do you come from?

The majority of parking users comes from London and its direct surrounding area. Interesting is that one third of the respondents travels from outside London to park in this particular garage that is located in the heart of the city. These people do not travel the last miles into the city by another mode.



To conclude, work related purpose and company arrangements play a decisive role in choosing this garage. The congestion charge is an influence factor for few users. Half of the users travel longer distance.



3. Parking in European metropolis – a comparison

The following chapter shall provide a comparison between the situations of parking in London's West End and other European Capitals. The focus of this comparison lies on the affect that local authority plans and policy have on the business operation and usership of parking facilities managed by private corporations like Q-Park. The comparison tries to create a link between the above described findings, that have been made during the field research, in terms of usage and business strategy of the parking garage and the policy plans and measures taken by the Council of the City of Westminster by comparing the London situation with the local parking policy of the Cities of Berlin and Amsterdam, with respect to its impact on parking garage usership.

The City of Berlin has been chosen for the reason that Germany has, as well as the UK, a rather car oriented transportation system with low shares of cycling, while Amsterdam represents the more cycling friendly environment, which lets expect a different approach of the City of Amsterdam compared to London and Berlin. However, all three Cities suffer from congestion problems on their street systems. The location of the Q-Park parking lot Marble Arch/Park Lane is, as described previously, considered to be the centre of London, showing a high attractiveness of the location in terms of recreation, cultural and business activities and shopping. In order to create a rather fair comparison, parking lots in Berlin and Amsterdam have been searched for, that are located at a somehow comparable location with comparable attractiveness as London's West End.

Berlin, Amsterdam and London as European metropolis of course differ a lot, starting with the size of the City: London could for example accommodate Berlin approximately three times. However, all three Cities suffer from congestion problems on their road systems and elaborated strategies to tackle these problems, which makes a comparison somehow possible.

3.1. Berlin - Potsdamer Platz

Potsdamer Platz (Potsdam square) is located in the political borough of Berlin-Mitte and forms the centre of the neighbourhood Mitte-Tiergarten. It is one of Berlins major inner-city traffic junctions, were several arterial roads meet. Road system wise, Potsdamer Platz can be considered the South western corner of the ring road around the very central neighbourhoods of Berlin, which are consolidated in the borough Berlin-Mitte.

Before the German reunification in 1990, Potsdamer Platz was situation directly at the Berlin Wall. This dead-end location on the edge of West-Berlin towards the eastern sector let the area become a rather fallow piece of inner-city land. After the fall of the wall and the reunification, the area again became a very central district of the German capital and a transportation hub for all modes, as it has already been before World War 2.

Potsdamer Platz profited a lot from the rebuilding action that took place after the fall of the wall. The physical removal of the wall itself allowed the connection of the Eastern and Western Road System of the City let the square's importance for the city grow. Nowadays, Potsdamer Platz is one of Berlin's most important transport junctions, where several important street arteries meet. It is also a hub to the mass transit system of the city and accommodates regional train connections to the Areas around the city. Potsdamer Platz has become an important district with recent high rise development but also represents the cultural heart of the City. Many theatres and cinemas are situated around the square, where also the annual Berlinale

film festival takes place. The philharmonic opera house, home to the well-known Berlin philharmonics, is located in the proximity. The major shopping districts of Berlin Mitte and several Tourist sights, such as the Brandenburg Gate are located in short walking distance.[10]

Transportation strategy of Berlin

The overall goal of the transportation strategy decided on by the Berlin Senate is the creation of a 'Balance between the expectations towards the transport system, its actual capabilities and its compatibility with a liveable city environment'. This should be achieved by creating a fairer distribution of traffic space amongst the occurring modes of transport. The for this research most important aspect of the implementation strategy of this plan is the parking management concept.

Parking management is applicable to all central zones of Berlin, as well as outskirts with special attractiveness, like shopping centres and it describes the creation of a demand and supply balance for on street parking by reducing demand with pricing methods. The pricing fares are applicable from Monday to Saturday from nine in the morning till ten o'clock in the evening. On Sundays, stores are generally closed which diminishes the attractiveness of the central zones and decreases demand for parking, which makes pricing methods unnecessary. The parking fares need to be paid per fifteen minutes and amount to 0,5 Euros or 0,75 Euro (£ 0,36 – 0,54), depended on the exact location. Per hour therefore between two Euros and 2,5 Euros need to be paid for on street parking space(£ 1,44 - 2,16). [11]

With the introduction of the pricing measures, a new concept has been implemented as well, which considers on street parking for short stays and off-street parking facilities like garages for long staying vehicles. This is achieved by the creation of enforced maximum parking durations on on-street spaces and the fact that fare of parking garages and other off-street providers usually bring benefits to long stay parkers, compared with on street parking procedures. The dedication of on-street spaces to short stay parking procedures brings the great advantage, that the same amount of vehicles can be parked on a smaller amount of spaces, since the turnover per spot is higher. The strategy of Berlin does not consider a reduction of the amount of parking spaces in general, however the dedication of on street parking to short stay and the therefore higher turnover rates per spot, creates a situation where parking spaces need to be reduced in order to keep the parking supply balanced and on the level it showed before the implementation of the strategy. The gained space from the removal of those parking lots is used to enlarge pedestrian walkways and create bicycle lanes.

Parking garage Potsdamer Platz

The effect this overall strategy creates on parking garages of private parking suppliers like Q-Park shall be considered on the example of the parking garage "Potsdamer Platz-Sony Centre", which is managed by one of Q-Parks European competitors.

As mentioned, the parking garage is a private garage and as the name indicates, it is situated below the square and the Sony Centre Complex next to it. The opening hours are not restricted, meaning it is a 24/7 operation, offering 823 car park places.[12] The garage is permanently staffed

[10] Berlin - Potsdamer Platz, no date.
[11] Parkraumbewirtschaftung / Senatsverwaltung für Stadtentwicklung und Umwelt, no date.
[12] Parken in Berlin Sony Center - APCOA PARKING, no date.

and is equipped with facilities like toilets and can therefore in size and service be compared rather well to the Park Lane/Marble Arch garage in London's West End.

The parking fares are to be paid per hour and amount to 2,50 Euro with a daily maximum of twenty Euros, representing an eight hour stay (£ 2,16; £ 14,37). When using the parking garage at night and entering after seven o'clock in the evening, a maximum night stay tariff of six euros is applicable. The parking garage offers monthly subscriptions for € 172,00 and other special activity offers, such as a Cinema or Theatre Tariff, where the first three hours amount to five Euros.[13]

Although the parking garage is with over 800 spaces a rather large facility, also considering that it is not the only large facility in the area, the parking garage does not accommodate third party businesses like car storage or rental car providers and operates on monthly subscription base and casual usership only.

3.2. Amsterdam - Museums Quarter

Amsterdam is the capital and the most famous tourist destination of the Netherlands. The city is very well connected to other big cities, nationally and internationally. The Museums quarter is situated in the southeast of Amsterdam, located between the main station and Schiphol airport. The city part has the highest average income in Amsterdam and accommodates big amount of working space. The most interesting destinations are the Amsterdam RAI exhibition and convention centre, the world trade centre, The Vondelpark, one of Amsterdam's biggest parks, and the Museums Quarter.

The Museums Quarter is one of the cultural hotspots from the Netherlands, with museums like the Netherlands national museum, the concert-hall, Stedelijk museum and Van Gogh museum. Yearly, these museums attract 4,5 million visitors.[14] Apart from these museum the P.C. Hooftstraat, Amsterdam's most fancy shopping street, is right next the Museums quarter.

In between the museums a large area is open space grass, which on normal days can be used to recreate and have a break. This space has also been used for several festivals and other events like a world championship football. In 1999 the complete square has been rebuilt, during this reconstruction of the sight a underground grocery store and a Q-park have been build.

Amsterdam's Strategy on Parking

Most of the Dutch cities are historically grown with small city centres around a church. These cities normally have narrow streets, which are completely flat, since the Netherlands does not have a lot of elevation. Partly because of these reason cycling has become so popular in the Netherlands, but car traffic is still an important factor. In Amsterdam 800 thousand people live of which around one third has a car. Considering there are more than three times as much trips done by bike, driving a car in the inner city is not promoted, but the accessibility of this area should be as high as possible.

Part of Amsterdam's parking strategy is the introduction of park and ride facilities, which are made on such a way, that travellers to the inner-city benefit the most from it. For example the park and ride at the Amsterdam Arena football stadium offers parking tickets for a little more

[13] Parken in Berlin Sony Center - APCOA PARKING no date.
[14] Concertgebouw 2014.

than 2 euro per hour (£1,45). But when a valid travel card from the day parked is shown, the price will be 5 euros including the public transport (£3,62). Compared to the fares in the centres, going up to 5 euros per hour[15], these park and rides are very attractive and often used. For travellers, which are not interested in the park and ride and would like to travel straight to there end destination different zones are created. The zone with the highest parking pressure is within the S100, a ring road around the centre, plus the area of the Museums quarter. In this centre area the prices for parking are 4 to 5 euros per hour (£2,90 – £3,62). For the rest of the city counts, the further out of the centre the cheaper parking become. For the inner city there is a restriction of 4 hours per parked car.

Four main problems are being focused on the municipality of Amsterdam; First of all the long searching time for cars, before they have found a parking lot is seen as problematic. The average search time for a free parking lot is 12 minutes[16]. By reducing this time less traffic will drive around the busy and narrow streets and there is less pollution created. Secondly the long waiting times for a inhabitants permit have to be death with. At the current state new inhabitants have to wait on average 5 years before they have a permit. Furthermore the poor accessibility for costumers to stores and from entrepreneurs to the costumer have to be improved. Last of all the municipality want to create more space for other used than parking, such as creating open space or make room for terrace.

To meet these goals several measures are being taken; one of these measures is to hire in total 2750 parking places in parking garages in the centre, providing space for inhabitants. These cars will than not be parked on the kerb side anymore and therefore safe space here. To regulate this an extra sign is places before entrances of these garages, showing available spaces for license holders and for casual users. Regulating the parking lots on the road and the (commercialized) parking garages as one has the advantage that peak hours of the two systems are normally not the same. Combining these systems leads to a more equal parking pressure while reducing the total amount of parking spots needed.

Other measures are the reward system for license holders to park at the edge of the inner city, and therefore create more space for casual users. License holders can earn back up to 50 per cent of the purchase price of their license by parking outside the inner city ring.

These measures create more spaces for license holders and will therefore decrease the waiting time for new inhabitants. Moving away license holders to parking garages and the edge of the inner city will also create more space for casual users and entrepreneurs. Because these casual parkers have a parking time limitation the average time parked will decrease and therefore

[15] PR Transferium Amsterdam Arena, no date.
[16] B&W, 2012.

create a faster turnover of cars. One parking lot can now be used more often per day, which might lead to a decrease in needed parking lots and provide space for others uses.

Q-park Museum Plain

The Q-park Museums has place for 600 cars, including reserved space for disabled visitors and special parking spots for charging of electrical vehicles. The fees for the parking lot are 2 euro per 20 minutes (€6,-/h, £4, 35/h) with a maximum of €50, - a day (£36, 24). Driving in is possible from 07:00 till 1:00 and ongoing out night till 2:30. Driving out is always possible when your parking ticket is shown to open the door and gain access to the garage. Outside of the garage €4, - per hour (£2, 90) is charged from 09:00 until 24:00. As mentioned before the Q-park is situated underneath Museums Quarter where are a lot of attractions to visit for potential parkers.

The prices for on- and of street parking represent the parking strategy of Amsterdam regarding the long term and short-term parking. For the first hours the kerb side is cheaper than the parking garage, but after a number of hours the parking garage becomes cheaper, making the kerb side more attractive for shorter visits.

This Q-park has, since June 2015, 50 parking places hired by the municipality, which are to be used for license holders in the area[17]. This is part of the municipality's strategy to reduce the amount of long-term parkers on the street. Because of the high parking pressure and these collaborating strategies no third parties are used to fill up the parking lot.

3.3. Comparison: Three Cities – Three Strategies

The description of the situation in Amsterdam and Berlin above, as well as the description of London's West-End parking situation show, that the three Cities follow a rather different path when tackling the problem of congestion and parking within their urban Area.

Berlin and Amsterdam, however, somehow have the same policy base line when considering curb side on-street parking as short term related and dedicating the existing parking spots on-street to short term only. The implementation of this concept of course differs in the two cities but the overall effect is the same: Drivers who want to park their cars for longer periods will and have to make use of off-street parking facilities, which are mainly operations of private corporations, such as Q-Park.

The transportation strategies of Amsterdam and Berlin appear to consider and manage on- and off-street parking as one entity. The authorities in Amsterdam for example even solve the problem of residential parking in cooperation with these private businesses. The strategies of Amsterdam and Berlin seem to make use of the respective advantageous of the on-street and off-street parking subsystems. The curb side with its proximity to stores and restaurant is dedicated for short term parking, which allows direct access to shops and gives business owners the possibility to reach customers situated in the cities by car. The off-street parking system with its mainly privately operated garages on the other hand provides protected parking lots for longer stays and parkers with distinct purpose of travel, such as visiting a specific theatre or business, so long staying parkers and their cars do not block the valuable curb side spots. The resulting rather high usership rates of private parking facilities creates for those investors a

[17] Museumsplein Garage letter, no date.

situation, where no commercialization of the parking lots in their facilities is necessary, since the operation based on casual users creates the expected revenues.

The interesting effect of this time oriented dedication of parking spots is the increase in turnover per parking lot on the curb side, which allows a reduction of parking lots without lowering the actual parking supply, since several cars make use of the same parking spot during the flow of a day. This space that has been occupied by parking vehicles before can be used to provide appropriate facilities to other modes, mainly the slow means like cycling and walking, which can positively impact the liveability of the City.

In the City of Westminster in London on the other hand, it appears like parking on-street, which is managed by the City Council, and parking-off street managed by private businesses like Q-Park, are less considered to contribute to the same entity of City-Parking. The curb side parking spots of the City of Westminster are not necessarily dedicated for short term usage, which can be seen in the fact, that parking fares can be topped-up and that no maximum occupation time is given. The City of Westminster Council is using a lot of Innovative technology to manage it's highly demanded curb side space, like the previously described sensor technology which is connected with an application showing drivers where parking spaces are available. This parking app is provide information to the road user prior to their trip with the goal to reduce search traffic. The application, however, does not include off-street parking facilities, which may have a lot of capacities even in those areas, where the curb side is completely occupied.

This situation in which the on-street and off-street parking systems exists more or less parallel to each other with very few cooperation creates certain pressure for private facility providers like Q-Park, which are more or less forced to search for additional revenue creation apart from their core business of providing parking space. This can be seen in the Q-Park parking garage at Park Lane/Marble Arch, where more than sixty percent of the spaces are used commercially.

4. Conclusion and recommendation

4.1. Conclusion

The phenomenon parking as part of the transport system is connected with and also creates several conflicts, especially in its application in more urbanized areas. General public interest, which can be seen in many Cities transport policies, was mainly to provide enough parking space to allow people to reach the economic centres of the cities by Motor vehicles. This view is more and more changing, since parking is considered to contribute to inner-city congestion in terms of search traffic for empty parking spots.

Parking demand and therefore also the supply of parking spots in an area, strongly depend on the attractiveness of the area. Facilities and Activities attract people and therefore create demand for parking spaces. Off-street parking spaces, such as underground garages, are more and more managed and operated by private corporations, such as Q-Park.

The parking garage of Q-Park at Park Lane/Marble Arch which has been the main point of interest within this project is situated in London's West End, the bussing centre of the biggest City in Europe and one of most trendy cities in the world. The overall park parking demand for this area situated in the City of Westminster Is very substantial, due to the high amount of activities located there, such as the well-known theatres and shopping possibilities. The City council of Westminster, which manages the on-street parking facilities, is trying to cope with the high demand for parking spaces in this area by making use of very innovative pre-trip information systems, while on the other hand private parking facility providers like Q-park need to search for more commercial business partners to fill their parking garage capacities like it is done in their Park Lane/Marble Arch garage in London.

This largest of the Q-Park garages in London has been fully refurbished when Q-Park took over fourteen parking facilities from the Westminster council in 2011, which makes it a very pleasant and modern appearing parking lot. Q-Park shows a service strategy of having the parking lot staffed 24/7 and offering special parking fares that are provided in partnership with several destinations in West-End, such as theatres and shops. These factors, in combination with the parking lot's location just outside the congestion charging zone of central London, are rather unique selling points for the garage. The occupation by casual users, which is considered as core business of Q-Park, does, however, not exceed a degree of about 30%. The majority of the garage, about 60 percent, is used commercially for car storage of the close-by BMW store and for hire car companies, such as Sixt and Enterprise and other facilities. The rather small amount of casual users is making use of the parking facility mainly because of its proximity to their final destination, which is for the majority the working place, making the casual users mainly work commuters. In the weekends and at night, the casual usership is low due to the fact that parking is permitted on several curb sides, where parking is not permitted during the week, which is indicated by a single yellow line. The survey conducted at the Q-Park Marble Arch/Park Lane was not a representative research. Nonetheless, the conclusion can be drawn that the majority of the people entering and leaving the parking garage choose this parking facility because of close proximity to work-related destinations. Congestion charge is only seen by a minority of the respondents as reason to make use of this particular parking garage. About half of the respondents comes from outside the London region.

The short comparison of the Park Lane/Marble Arch parking garage with a parking garage at Berlin's Potsdamer Platz and at Amsterdam's Museum Plain showed that the impact of different City transport strategies on the business of parking providers can be tremendous. It became clear, that Amsterdam and Berlin consider both, on- and off-street parking as cooperating sub systems contributing to the general city parking entity. With the dedication of the curb side to short term parking only, long term vehicle parking was put into the hands of off-street facilities, which are more and more managed by private corporations like Q-Park. The casual user degree of these garages generates the expected revenue, which makes commercialization of parking lots, as seen in Park Lane/Marble Arch unnecessary. But not only have the private facility providers profited from this situation. Short stay parking dedication increases the turnover of the parking lots on street, so more vehicles use the same parking spot during the flow of a day, which means that parking space reduction actually becomes necessary in order to stay with the previous amount of parking spots. This traffic space which is then not occupied by parked vehicles anymore can be used for other modes, for example for the creation of cycle paths or better pedestrian facilities and contribute to the liveability of the City.

The current situation in London, where parking garages and curb side exist parallel to each other, even showing some sort of competition, seems to indeed make it necessary for parking providers to fill their parking lots with commercial customers in order to create the expected revenue, while the curb side's capacity is completely utilized and demands for innovative and costly management measures to reduces search traffic, which contributes to the cities road congestion.

4.2. Recommendation to Stakeholders

As mentioned previously, the current parking situation in London, where on-street parking spots and off-street parking facilities exist parallel in a competition surrounding, forces parking providers like Q-Park to commercialize their parking spots, in order to create revenue.

Based on this situation, various further commercialization concepts can be considered. A parking facility like Park Lane/Marble Arch may for example find new user groups for storage. Currently BMW is storing cars in the facility, which are then sold in their store above the garage. A car in an inventory aspect is nothing different than a sales product. The parking garage may therefore be interesting as storage room for other retail stores in its proximity. Parking garages are a safe climate independent environment, where which need a lot of space, such as household electronics, fridges, wash machines etc. may be stored in proximity to the client.

Another usage concept may occur from the logistical challenge of City distribution. New modes in distribution, like cargo bicycles cannot cover the same distance ranges as motor vehicles and therefore require some sort of distribution centre in the proximity of the customers. Parking garages with overcapacity might play a role in this new supply chain strategy as inner-city hubs for cargo distribution, which is expected to increase a lot due to the still rising importance of E-commerce.

The core business of Q-Park, however, is the provision of parking spaces. The demand for parking in London's West End is immense but the described situation of the supply being divided in two systems, which somehow compete against each other brings disadvantages to all stakeholders of the parking system. For Q-Park this is mainly the low usership for certain, actually good located garages.

A more cooperative relationship between the local authorities and private stakeholders of the City's parking system, creating a combination of the respective strategies may be a great opportunity for both, Q-Park and the City of Westminster. A more dedicated usage of the available parking spaces of the parking system as an entity may allow higher casual usership for garages like the one at Park Lane/Marble Arch, but also bring relief to the high demanded curb-side parking. A certain shift from curb side parking towards parking garages may also allow a redesign of traffic space, which might allow further implementation of infrastructure for slow means of transport.

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