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The Role of Institutions for the Development of Car Sharing Services: Evidence from London, Berlin, Rome and Milan

Tommaso Liberati

Declaration
Being a dissertation submitted to the faculty of The Built Environment as part of the requirements for the award of the MSc International Real Estate and Planning at University College London: I declare that this dissertation is entirely my own work and that ideas, data and images, as well as direct quotations, drawn from elsewhere are identified and referenced.

Tommaso Liberati

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Abstract

The purpose of this dissertation is to clarify the role of institutions for the development of car sharing services. Sustainable mobility has gained reasonable relevance in the past decade as it represents a fundamental aspect necessary for the preservation of the environment and for the improvement of the quality of life within urban centres. The use of private vehicles within cities has created numerous issues in terms of pollution and space consumption. The rise of the sharing economy and technological innovations have allowed the spread of new forms of shared mobility that aim at reducing private vehicle ownership. Despite the growing body of work produced by academics regarding the positive externalities that car sharing has on reducing emissions, traffic congestion and car ownership, the role of institutions as enablers and facilitators for the development of these services has remained widely unexplored. Following the development of a theoretical framework that draws on the work of academics that focused on the role of institutors, urban governance, and policy, the paper progresses by presenting four European case studies: London, Berlin, Rome and Milan. By identifying the key institutions and organizations that affect the development of car sharing, we then progress in listing and analysing the key policies and strategic plans that affect these services in each city. The analysis is supported by interviews carried out with eight experts that work in the sector. We then proceed in discussing and concluding that institutions play a central role in facilitating and directing the development of car sharing.

Chapter 1 – Introduction

In today's world, cities are experiencing an urbanization process which is resulting in the number of inhabitants living in urban areas to increase at an inexorable pace. According to the United Nations, the statistics regarding the number of current urban dwellers show that by 2018 55% of the global population was residing in cities, a number that is expected to rise up to 68% by 2050 (UN, 2018). This substantial increase in the amount of people living in urban areas will transfer further pressures on transport systems. Urban areas are currently believed to be responsible for over 70% of the world's carbon emissions, many of which derive from transport (C40 Cities, 2018). In the recent decades there has been an increased emphasis on the need to reduce the environmental impacts of urban dwellers, and much of the focus has been given to ways in which we can reduce the use of the private automobile.

Car sharing (CS, also known as Car Clubs in the UK) has experienced a prodigious rise in popularity over the past decades. The first forms of CS appeared in Switzerland at the end of the 1940's but this service only gained momentum by the end of the 1990's (Becker et al., 2018). This service allows a single vehicle to be accessed by a multitude of different users and represents one of the most environmentally beneficial expressions of the sharing economy (Faivre d'Arcier & Lecler, 2019). CS has incredibly benefitted from innovation in Information and Communication Technologies (ICT), which have enabled an improvement of the accessibility and the number of services offered. Today the main types of CS are station-based, which can be round-trip or one-way with vehicles are bound to dedicated parking bays, or free-floating, which allows cars to be parked anywhere within a confined area (Baptista et al., 2015). Europe currently represents one of the

largest markets for the development of CS and this service is expected to meet 40% of travel demand of private vehicle owners living in cities (Bert et al., 2016; Kent & Dowling, 2016). The impact on vehicle ownership can profoundly change the way we engage with the space that is currently occupied up by the multitude of parked cars and should be a relevant issue to all academics that study the urban realm.

Despite the growing attention given to CS services there has been a lack of focus on the institutional and policy contexts in which these services are developing (Akyelken et al., 2018). Furthermore, the growth of free-floating services has allowed CS to meet the needs of an increasing number of city dwellers, but regulation and policy is fundamental to steer the development of CS in order to meet sustainability goals whilst avoiding that these services replace the role of public transport (PT) (Giesel & Nobis, 2016; LeVine & Polak, 2017). The role of public institutions in regulating CS is thus fundamental, especially in light of Mobility as a Service (MaaS) platforms that aim at promoting intermodal mobility through the combination of PT services and other modes of shared mobility. This is important because institutions have the power of steering private sector investment and developments of CS services in order to maximize the benefits for the wider community whilst limiting the negative impacts that can be caused by a lack of regulation.

Research Question

This dissertation will explore how institutional settings and policy impact the development of CS services in four key European cities: Berlin, London, Milan and Rome. The aim of this paper is to understand the role that institutions have played in the growth of CS services. The overarching question to which we will answer is:

To what extent do institutions matter for the development of CS services?

Research Objectives

1) Identify the institutions and organisations involved in developing and regulating CS
2) Identify the recent policies that have affected or are related to CS
3) Through the use of theoretical framework understand how institutions, underlaying governance structures and policy, have affected (positively/negatively) the development of CS

Chapter 2 – Literature Review

In the past two decades CS started spreading throughout the globe and there has been a growing interest by academics and organizations in producing a growing body of literature that focuses on the benefits and impacts of this service. The relevance of the positive externalities of CS represent a fundamental characteristic that needs to be understood before progressing into the investigation of the importance of institutions for the development of this form of urban mobility.

Environmental Sustainability

The studies exploring the impacts of CS are primarily concerned with the environmental benefits that this service has the reduction of air pollution and CO2 emissions (Cairns & Harmer, 2012; Frikorn & Mueller, 2010; Le Vine et al., 2014 etc). Users of CS services tend to decrease the numbers of miles travelled by car and tend to cover more distances through active travel modes when compared to non-users (Cairns & Harmer, 2012; Le Vine et a., 2014; Martin & Shaheen, 2010; Shaheen & Cohen, 2012). Frequently CS fleets are less polluting than privately owned vehicles thanks to the 'younger' fleets and greater number of electric vehicles (EV) (Giesel & Nobis, 2016; Steer Davies Gleave, 2017). The use of EVs also has the ability of allowing its users to become more accustomed to new technologies and some commentators have supported the theory that this allows users to make increasingly aware and informed choices in the eventuality of a private vehicle purchase (Steer Davies Gleave, 2017).

Car Ownership & Congestion

Studies have also observed that CS has substantial impacts on the reduction of car ownership, as several users of these services are more prone to the disposal of their private vehicles (Frikorn & Mueller, 2010; Kent and Dowling, 2016; Martin & Shaheen, 2010). This was further proven by a survey conducted in 2012 where 30% of respondents differed from the purchase of a car following their subscription to a CS service (Cairns & Harmer, 2012). These results were supported by further studies such as the one carried out by Giesel & Nobis (2016), where they demonstrated that round-trip CS tends to have greater impact than the more flexible and widely appealing free-floating services. Similar results were observed by LeVine and Polak (2017), who analysed the initial impacts of free-floating services in London despite raising questions regarding the appeal that these services can have to individuals that would use them as a replacement of public transport.

For decades our cities have been planned to grant the central role of private automobiles as the preferred transport mode. This planning culture has had a dramatic impact on the way the spaces in our streets are perceived and experienced. Despite some exceptions and pedestrianized areas, on street parking is a feature that characterizes the streets majority of European city centres, where parked cars occupy a large portion of streets due to the constraint created by old buildings erected in eras where cars did not yet exist (Glotz-Richter, 2012). A more intense and efficient use of cars, which spend on average 97-95% of their lifetime parked, could enabled by a further growth of CS (Car Club Coalition, 2015; ONSM, 2018). According to several studies for each station based shared car introduced in an urban area is able to obtain a reduction of 8 to 20 private vehicles (BCS, 2018). Free-floating CS still needs to be

further explored but initial findings suggest that there is a significant impact on the reduction of ownership (LeVine & Polak, 2017). Incrementing the number of shared cars would thus enable a radical change on how we use and perceive public street space (Glotz-Richter, 2012; Kent and Dowling, 2016).

Economic Aspects

The economic sustainability of CS services represents a complex aspect that has different implications for users, providers and public institutions. From a user perspective CS has the advantage of erasing the numerous fixed costs that are linked to private car ownership (Shaheen & Cohen 2012; LeVine & Polak, 2017). These costs are transferred to the CS operator and include the initial purchase of the vehicle, maintenance, insurance and taxation (Baptista et al., 2014; Le Vine et al., 2014). For individuals that travel a limited number of miles per year using their private vehicles this can represent a very convenient cost-saving option, which appears to be the most popular reason for the use of CS services (Bardhi & Ekart, 2012; Böcker & Meelen, 2016).

For CS providers reaching their 'black numbers' is revealing to be increasingly complex, and in order to structure a business model that reveals itself to become economically viable is very complex, especially considering the rise of free-floating services, which have higher operating costs that station-based or point-to-point CS (Münzel et al., 2017). A precondition for the economic sustainability of CS services is to have a high number of users for every car that is introduced. For this reason, they have spread primarily in the core of densely populated urban areas where the potential of CS can be maximised to cover the high operating costs (Deloitte, 2017; Prieto et al., 2017). The increased attention that CS has gained in the past decade has brought several automotive companies and international rental

companies to acknowledge the importance and disruptive potential of this form of sustainable mobility (ibid; McKinsey, 2017).

For public sector institutions CS can represent both a threat or a way to improve the sustainable mobility modes of citizens. On one side decreasing the number of private cars on the road represents a risk in the reduction of a taxation and revenue base for local authorities (Le Vine & Polak, 2017). In other cases, this represents an opportunity to improve the quality of life and the productivity levels of citizens as congestion and traffic has an impact on the economic performance (Bahrdi & Eckhardt, 2012). Furthermore, in a period of austerity and cuts to public expenditure, CS can represent an alternative sustainable transport mode that can be integrated with PT without requiring large investments from the public sector when this is implemented by private providers.

Accessibility and social sustainability

As shown earlier, CS can have numerous benefits for the 'pockets' of a wide promotion of consumers. In numerous cities CS is offered in limited areas, and there is a portion of individuals who are excluded from accessing these services (Kim, 2015; Tyndall, 2017). Furthermore, research into CS user profiles have shown that CS members are primarily represented by white, male, educated and employed people usually within a 20-40 age group (Burghard & Dütschke, 2018; Dias et al., 2017; Kim, 2015).

Transport Integration

As proven by the literature that has been produced on CS the benefits are fundamental in order to understand the profoundly transformative potential that this

service can have for the achievement of both sustainable development and transport objectives. CS thus represents a tool that should be exploited by governments at different levels in order to create an institutional and policy context that regulates and incentivizes the growth of this service whilst incorporating it within PT and a wholistic sustainable transport strategy (Dias et al.,2017). Intermodal transport is becoming key to the way citizens move within urban centres and CS represents a transitionary transport mode that can play a key role in shifting preferences away from the private car whilst maintaining similar levels of comfort and flexibility (Deloitte, 2017; Faivre d'Arcier & Lecler, 2019).

Chapter 3 – Theoretical Framework

In order to interpret and analyse the role of institutions for the development of CS services the following framework has been produced. Raging from different academic fields which include human and economic geography, planning theory, urban governance, and other social sciences we have gathered a comprehensive set of theories and interpretative tools that contribute to deepen our understanding of the institutional context, the governance structures and the policy settings that influence the development of CS within the EU.

Institutions

In order to understand the role of institutions for the development of CS it is firstly important to determine what is meant by institutions. The focus on institutions has become increasingly popular in academic fields linking to human geography, urban planning, and other social sciences. Despite the concept of 'institutional turn' being widely discussed, defining what institutions are still appears to be contested by academics (Hodgson, 2006; Scott, 1995). A widely accepted definition of institutions is provided by North, who states that "Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction" (North, 1990:3).

Other abstract definitions have been given to institutions, which have been identified as behavioural patterns that form social rules and subsequently shape

human interactions (Hodgson, 2006; Morgan, 2007). Institutions can be then divided into two subgroups: “informal constraints (sanctions, taboos, customs, traditions, and codes of conduct), and formal rules (constitutions, laws, property rights)” (North, 1991: 97). This distinction presents difficulties in identifying to which subgroup institutions belong, but generally state and government bodies fall within the subset of formal institutions, whilst informal institutions are more concerned with communities and behavioural patterns (Hodgson, 2006; Rodriguez-Pose, 2013). This paper intends to focus on the role of formal institutions conceived as different levels of government and agencies directly related to the public sector. It is also important to clarify the difference between organizations and institutions, which are closely related but present some differences (Rietveld & Strough, 2007). For the purpose of this paper organizations, which in some instances are considered institutions themselves, need to be identified as aggregations of actors that share the same goals, thus in the realm of CS they are represented by the private companies that provide the services (Bardhi & Eckhardt, 2012; North, 1994). Rietveld and Stough (2007) distinguish the two by writing that: “On the one hand, institutions lead to the emergence and maintenance of organizations […] On the other hand, the behaviour of organizations may result in institutional change” (Rietveld and Stough, 2007: 100). Organizations thus represent the means and mechanisms that contribute to the establishment and reinforcement of institutions (Zukauskaite et al., 2017).

Increased awareness on the environmental impacts forcibly causes institutional innovation, which is fundamental for coordinating governance and polices that truly aim at tackling climate change (Patterson & Huitema, 2019). Modifying the institutional context in which actors and organizations operate can occur at different paces and in the case of CS, considered an integral contributor to sustainable mobility, its development can frequently be negatively impacted by what

can be identified as ‘institutional bottlenecks’. Furthermore, some commentators have observed that there is an increasing ‘institutional isomorphism’ in relation to the different institutions that have impacts on the field of transport (Monois, 2017). This reinforces the importance of observing how institutions function and enhances the possibility of analysing similar ‘institutional bottlenecks’ in different counties and contexts, especially considering the role of some rising international providers in the field of CS.

Another concept relevant to this study is the one of ‘institutional thickness’, already used by some academics observing institutions and transport and developed by Amin and Thrift (1995) in order to analyse the success and effectiveness of institutions (Rye et al., 2018). Instructional thickness is determined by four main features: “a strong local institutional presence, high levels of interaction between local organizations, a structure of domination and/or patterns of coalition, and a mutual awareness of being involved in a common enterprise” (Zukauskaite et al., 2017; 327). The concept, despite having been contested by several academics who argued that the quality of institutions is in some instances is the major determinant of their success, provides a useful overview of the characteristics of institutional contexts and networks (Giorndano, 2001; Tomaney; 2013, Zukauskaite et al., 2017).

The agency theory has been widely used by scholars of urban governance and other social sciences. It presents a useful theoretical approach to understanding the relationship between private CS providers and the development of the institutional setting in which they act. Agency represents the freedom of organizations and individuals to make independent decisions from the institutional context in which they act (Adams and Tiesel, 2015). The ‘agency’ construct was formulated by academics seeking to explain the extent to which individuals had freedom of choice within what can be considered as the structure formed by institutions (Healey, 1991).

Giddens' Structuration Theory (1984) results particularly effective in explaining how the actions and the 'agency' of actors of the economy can impact and shape the way institutions, which he refers to as structure, are arranged. The concept of agency is harmonized by the structure, which represents the synergic institutional setting that frames the behavioural patterns of agents (Healey and Barrett, 1990; Jessop, 2001).

Governance

Governance plays a key role in allowing us to understand the underlaying dynamics between the institutions and organisations that affect the implementation of CS services (Akyelken, Banister & Givoni, 2018). Through historical, societal and economic processes, the concept of urban governance, intended as the ability of the state to steer society towards collective goals, has experienced profound changes (Kjar, 2004; Pierre, 2005). In a world where private sector organizations have gained increasing importance, contemporary governance is characterized by the complex relationships and networks that underlay the power relations between institutions and actors of the economy (Katsamunska, 2016; Morgan et al., 2012).

As Healy (2006) points out "episodes of innovation may create pressures to change governance processes more generally, but there may also be mobilization efforts to initiate such changes elsewhere in governance systems. Shifts in cultural assumptions may put pressure for change on governance processes but provide resources for episodes of innovation" (Healey, 2006; p.306). New technologies, which had a fundamental role in enabling the spread of private sector led CS such as free-floating services, have brought substantial levels of tension to governance structures (Melia, 2018). This represents a change from a top-down approach to a more participative form of governance where the actions of private and frequently profit oriented organizations have an impact on the institutional context in which society develops (Harvey, 1989). Governance represents a fundamental aspect that

needs to be considered when analysing the role of institutions as it represents how power relations are exerted. Faivre d'Arcier and Lecler (2019) argue that the governance structures that impact CS can be explored by analysing the actions of the actors that have a role in implementing this service. In addition, consumer choices frequently have a great importance in influencing governance, and the spread of CS clearly gives input to governments for a greater consideration of this type of service (Standing et al., 2019; Pierre & Peters, 2000). Additionally, it is important to note that the development and increasing complexities of multi-level governance has an impact on institutional structure and decision-making processes that shape economic and social contexts (Daniell & Kay, 2017). The creation of supranational, national, regional, and local levels of government carries further overlapping responsibilities when analysing the institutions associated to the development CS.

Policy

The majority of the academics that have examined the impacts of CS have reached similar conclusions that highlight the importance of policymaking in order to exploit the benefits that this form of mobility can have on our cities (Attard & Shiftan, 2015; Baptista et al., 2015; LeVine et al., 2014; Shaheen, 2016). In the case of innovative services that have been popularized by technological innovations such as CS, the role of institutions needs to be better understood. As Helpman (2004) highlights, the role of institutions is more important than research and development or capital in order to exploit and incentivize innovative opportunities.

Kotrum (2016) identifies the importance of creating flexible and reactive policies that are able to sustain the pace of rapid innovation and expansion of CS services and underlines how the sector will continue to grow independently from government involvement. The role of the public sector is thus fundamental for

creating policies that steer the development of CS towards the maximization of its positive externalities and limit possible negative effect that this can have on PT (LeVine & Polak, 2017). Nonetheless other critics suggest that a restrictive policy context can be detrimental to the development of CS (Kent and Dowling, 2016; Standing et al., 2019). As Baptista et al. (2015) argue, "the successful deployment of CS systems can be influenced by policies targeting features such as allocation of parking, the fees and complementarity with public transport, signage and rankings, and marketing of social and environmental benefits" (p.207). Parking policies are also the basis of an academic case study of CS in the city of Zurich led by Balac et a. (2017), which highlight the importance of these for the correct function of CS. It should be noted that in several western economies the levels of expertise and development reached by the private sector have an impact on how institutions develop policies, demonstrating how government could work collaboratively with CS providers and other organizations to create a prosperous institutional context for the promotion of sustainable mobility (Katsamunska, 2016; Rode, 2017). Careful considerations should also be made regarding the important role of interest groups and non-governmental organizations, which have a role in lobbying different levels of government and can have a profound but indirect impact on institutions and policy making (Stoker, 1998). Viewing the urban realm from a holistic perspective convincingly requires the formation and integration of policies that combine sectors that impact the public realm, such as transport and urban planning, and represents a fundamental aspect for the improvement and development of contemporary policy-making (Rode, 2017).

Path Dependency and Shifts Towards Public Transport

The rapid spread of CS raises questions over how the service should be controlled and implemented, as there is a blurred line on whether it should be considered as a private or public service (Faivre d'Arcier and Lecler, 2019). Moreover, it is important to emphasize how path dependency patterns can be used to explain the development and popularity of CS services. Increased environmental awareness, the rise of the sharing economy and innovation in ICT, have enabled and increasing number of individuals to shift towards the use of CS as it represents a form sustainable mobility that replicates some of the characteristics of privately-owned cars (ibid). Standing et al. (2019) argue that long term held norms linked to independence, private space, and social status represent a barrier to giving up private car ownership, but it is important to acknowledge that CS is the modal option that majorly replicates the advantages of private cars (Paradowska, 2016). MaaS platforms will integrate CS together with other transport services to promote intermodal travel and will possibly increase the number of individuals using PT. Long term monitoring of free-floating schemes, which according to some are being used as an alternative to PT, will be fundamental in order to understand the impacts of these on the use of PT (LeVine & Polak, 2017).

Chapter 3 - Methodology

"The primary way a researcher can investigate an educational organization, institution, or process is through the experience of the individual people, the "others" who make up the organization or carry out the process". (Siedman, 2006: 10)

Investigating the role and impact of intuitions on sustainable transport development is particularly complex and requires the adoption of qualitative research methods (ibid; Ritvelt & Stough, 2007). Understating the role of institutions for the development of CS entails the investigation of governance structures, policies and institutional contexts that have acted as both enablers and barriers to the spread of these services. Starting from secondary data, the key institutions and organizations involved in CS were identified. Following this step an in-depth policy review was carried out to better understand how the public sector has perceived the growth of these services. The research progressed by interviewing experts through semi-

structured interviews with questions adjusted to address the local institutional context. These provided insight on how institutional contexts and policies are affecting the development of CS.

For the purpose of this research, which has focused on European CS, the case studies have been selected from the UK, Germany and Italy. The cities that have been selected for the analysis are London, Berlin, Rome and Milan. It is important to note that the Rome and Milan case studies share a section that links to the national context. CS is a service that is associated to the local spatial dimension, so the studies focus on specific urban contexts rather than providing a solely national overview. For contextualization purposes an overview of different tiers of government was enacted in order to understand the governance structures confronted in the case studies. A brief overview of the role of supranational organizations was introduced in order to allow a holistic view of all the institutions involved in the process. The case studies were selected by ensuring that all the locations had similar types of business-to-consumer CS services (station-based and free-floating). This allowed a broader and more effective understating of how institutions perceive and react to the different service options. Despite taking into account the differences between the countries and cities selected, a reflexive iterative analysis of the collected data was carried out in order to explore relationships and patterns regarding the role of institutions and policies for the development of CS services (Hopwood & Srivastava, 2009).

Interviews

The selection of the interviewees was carried out following the principles of generic purposive sampling in order to obtain information from professionals that have a profound knowledge of the topic and that have worked both with and within institutions relevant to CS (Bryman, 2012). In order to gain a holistic view, the set of

people interviewed was composed of public sector workers, consultants, and private sector workers. This ensures a wider and more complete perspective on institutions and their role for CS development and attempts at limiting possible bias in the information collected (Siedman, 2006). The identification of different institutions and organizations that participate and affect CS and sustainable mobility has supported the choice of the interviewees that participated to the research. The initial sampling method was further strengthened by snowball sampling as some of the initial interviews led to contacts with other interviewees (Bryman, 2012). In total eight experts were interviewed, all with a minimum of 3 years of experience in the sector, with peaks of individuals that have worked with CS for over twenty years. All interviews lasted for approximately 45 minutes.

Interviewee Table

Interviewee	**Country & City**	**Date**
A	UK, London	7th August 2019
B	UK, London	21st August 2019
C	Germany, Berlin	26th July 2019
D	Germany, Berlin	7th August 2019
E	Italy, Milan	24th July 2019
F	Italy, Milan	1st August 2019
G	Italy, Rome	20th July 2019

H	Italy, Rome	9th August 2019

Ethics Statement

The methodology adopted for this research presents little ethical risk. All the secondary data collected for the policy review is available to the public from government websites and sources. Information regarding the interviewees, including name, job title and company have been kept anonymous to encourage frank replies and to avoid any conflicts. All the interviewees were also informed of the academic purpose of the study and were aware of the topics discussed.

Limitations

The methodology used for this paper presents several limitations. The qualitative research method allows to gain profound insight and is appropriate to understand the role of institutions, but it fails to quantify the level of contribution or detriment that these have had for the development of CS services. The interviewee sample is composed of 8 experts, a number that represents a marginal share of the individuals, organizations, and institutions working in the field.

Chapter 4 – Case Studies

European Context

The four cities that have been selected to carry out the analysis are all located in countries that are currently members of the EU. Following the general recognition of the dangers linked to pollution and emissions that have been identified in the most recent decades, both the UK, Germany, and Italy have committed to the reduction of their emissions. The European union has been considered one of the institutions at the forefront of climate change, and CS represents one of the tools that national, regional and local governments can exploit in order to decrease the environmental impact of the vehicles circulating in cities (Loose, 2009). In 2017 the EU started financing the ambitious *Shared Mobility Opportunities and Strategies for European Cities* (STARS) project through the Horizon 2020 funds, which aims at analysing the

development of CS in Europe (STARS, 2019). The EU has indeed set ambitious targets for the reduction of greenhouse gasses, renewable energy, and energy efficiency for 2020, 2030 and 2050 (European Commission, 2019). In 2014 the EU parliament has issued a directive for which cities need to produce a Sustainable Urban Mobility Plan (SUMP).

The EU, apart from its linkages and influence over public sector institutions for the promotion of innovative polices concerning the environmental impact of transport, has also been directly and indirectly supporting private sector CS and shared mobility providers though the allocation of EU funding for several projects and start-ups working towards improving sustainable mobility (Loose, 2009; Best & Hasenheit, 2018). Despite this aspect interviewee H (2019) has pointed out that in some instances regional and local institutions that distribute EU funds have been inefficient.

London

In 2019 the UK's CS offer provided a total of 5,385 vehicles and 353,726 users (CoMoUK, 2019). The growth of CS at national level received support from the Department for Transport, which corresponded to part of the Local Sustainable Transport Fund, other £500,000 in 2014, and the subsequent addition of £1.8 million in 2015 (DfT, 2014; CoMoUK, 2019). London, with over 8.8 million inhabitants, is one of Europe's largest cities, and urbanization processes are causing its population to constantly growth. Despite a dense PT network, the rapid level of expansion has caused increased car dependency (Abenoza et al., 2017; GLA, 2017). CS first arrived in London in 2003, and since then it kept growing at a constant pace (CoMoUK, 2019).

Following the reforms that changed the institutional context of the UK, in 2000 London experienced the establishment of the Greater London Authority (GLA), a city-wide government led by a newly elected mayor and composed of other 25 elected members of the London Assembly (Rode, 2017). Additionally, Transport for London (TfL) was created, representing an institution under mayoral control that has full control and supervision of transport within the GLA area. It is important to note that the territory under the GLA's control is divided into 33 boroughs managed by elected members (Akyelken, Banister & Givoni, 2018). These boroughs are responsible for numerous functions and their powers extend all the way to managing parking within their areas (ibid). There are two important non-governmental organisations that have a fundamental role for the development of CS. The first one is the British Vehicle Rental and Lease Association (BVRLA), which has a limited responsibility for CS but represents all the rental companies that are also active in offering CS services. The second organization that has a very important role for the development of CS services in the UK and in London is CoMoUK (ex Carplus). This non-profit environmental transport organization has been very active for the promotion of CS services at national level and has produced numerous documents in support of shared mobility and also acts as an accrediting body for CS providers (Akyelken et al., 2018). In London there are several CS operators, the ones working at larger scale are Zipcar, offering both station-based and free-floating in 10 boroughs, and BMW's Drivenow, a free-floating service and working in 9 boroughs.

The most important policy documents for the development of transport in London are key to the growth of CS. Significant efforts for the promotion of CS can be identified in the creation of the Mayor's Car Club strategy in 2008 and the Car Club Strategy for London in 2015. This last strategic document was created by multi-stakeholder organization named Car Club Coalition, which set the target of reaching

one million car club users by 2025 (Car Club Coalition, 2015). The participants included TfL, BVRLA, Carplus, several London boroughs, and other private CS providers (ibid).

Despite the efforts represented by the dense network of institutions that have worked on the development of the Car Club Strategy for London, The Mayor's Transport Strategy (2018) represents one of London's most important policy documents for promoting sustainable transport in the city. This last version has paid very limited attention to CS as a sustainable mobility tool, which appears to have had a marginal role and is rarely motioned throughout the document (ibid). Furthermore, CS appears to be implemented according to the discretion of local authorities. According to Proposal 19 "The Mayor, through TfL and the boroughs, will support the provision of car clubs for residents when paired with a reduction in the availability of private parking, to enable more Londoners to give up their cars while allowing for infrequent car travel in inner and outer London" (GLA, 2018 p.89). Despite this aspect the document also suggests forms of scepticism regarding the negative externalities of CS on public transport: "Increasing access to car sharing could bring benefits, but these would be outweighed by the impacts on congestion, emissions and health if cheap, convenient car travel is extended to Londoners who do not own a car or do not have a driving licence" (GLA, 2018: p28). These two stances, combined in the same document, show that there is some degree of misperception of CS within the institution that produces the strategy. Furthermore, it is important to note that the draft of the London Plan, the most important strategic document that should steer sustainable development, has an entire section that is dedicated to transport which fails to address the relevance of CS as a tool to reduce the impact of private vehicle use and only briefly mentions that operators should be awarded parking without further parking bays being created (GLA, 2017).

It is important to note that the London Assembly's transport committee has produced a document entitled *Future transport How is London responding to technological innovation?* a month before the publishing of the Mayor's Transport Strategy in 2018 (London Assembly, 2018). In this document they express how "The Mayor's draft Transport Strategy indicates his support for car clubs but is short of detail on specific measures he will take to increase membership or encourage boroughs to facilitate their provision. Given the looming development of CAVs, we believe there should be a renewed focus on this area, to help embed car clubs as a viable transport option" (London Assembly, 2018 p.23). This suggests that London's main authority, despite some efforts condensed into the 2015 strategy, is failing to promote the development of CS services. The inability for the Mayor to exercise power over matters fundamental for the development of CS is due to each of the 33 boroughs having direct control over parking (Akyelken et al., 2018). This presents a fragmentation of governance over an aspect that is fundamental for managing transport and the use of the public realm by private vehicles. CS operators are thus expected to arrange agreements with each borough in order to establish their services.

The key issue that is presented here is that each borough is governed by politicians that have political interests, and as interviewee A clearly stated "Local boroughs, which are led by elected members, have control over parking and don't have much interest in reducing the parking spots available to local residents and replacing them with dedicated areas for Car Clubs … An increase in the number of free-floating vehicles also causes increased competition for parking". Interviewee B instead outlines how there are diverging views also within the body of experts working in both planning offices and TfL, as some people are supportive and others aren't, and this issue is caused primarily by ignorance and prejudice regarding the

proven benefits of CS. Moreover, Interviewee B stresses on how parking fees represent a fundamental source of income for LA that have already experienced dramatic government cuts. The general picture that emerges from reviewing policies and interviews clearly demonstrates that there are profound issues caused by the fragmentation of governance in relation to parking, both highlighting the high levels of variability present between boroughs in implementing parking fees for CS. By observing the parking fees for boroughs, we can indeed discover that there is inconsistency in the fees that LA require for CS providers. Some boroughs can charge up to £1300 for yearly parking fees whilst others don't charge or don't provide the possibility to establish these services a priori (Interviewee A, 2019).

This issue becomes increasingly relevant for free-floating providers, which in some cases are subject to further fines if the number of CS parked vehicles exceeds the limit set by the local authority (ibid). Furthermore, as interviewee B points out, users of free-floating services move around the city as their lives aren't bound by the geographical divisions. This fragmentation has caused incredible issues for free-floating providers, because in order to expand the area in which their services are provided, they are required to strike agreements with each different local authority (Akyelken et al., 2018; CCC, 2015; LeVine & Polak, 2017). This process carries costs and complexities that have caused some free-floating providers to abandon London's market (Taylor, 2014). Particularly interesting is Daimler Group's case, that tried to enter the London market with their car2go service and following the complexities of the city's institutional context and fragmented governance structure, decided to come back in the market offering their ride hailing taxi and car-pooling service Via-van (Daimler Mobility Services, 2018; Taylor, 2014).

Regarding the complexities of the governance structure interviewee B clearly states that "there are no people that have a clear responsibility and engagement in

order to achieve the goals [of the CCC], and TfL is not taking up its role" and that "there is a reluctance by Government to influence local boroughs". Currently it appears that this coordination role is being covered primarily by CoMoUK through their efforts in researching and delivering guidelines for both local authorities and CS providers. Interviewee A stresses on how this situation represents a missed opportunity, especially when considering the market penetration of free-floating services (Kent & Dowling, 2016). This is further supported by Interviewee B that says: "the UK used to be one of the leading countries for CS, now, despite some growth, the levels of variability we have encountered in London are representing a real obstacle that is causing us to be lagging behind other European countries in exploiting this opportunity". It is interesting to note that interviewee B stressed on the possibility of further incentivising the integration of CS in new real estate development through S106/S75, an aspect that has been addressed in a comprehensive report and that represents a way of partially circumventing some of the problems that derive from local parking governance (CoMoUK, 2016).

Berlin

Germany has been one of the pioneering countries for the development of CS services, which first appeared in Berlin at the end of the 1980's (Loose, 2020). Today Germany is the European country with the largest number of CS providers and users, with 20,200 CS vehicles and 2.46 million users (Best & Hasenheit, 2018; BVMI,

2019). In Berlin CS is offered in multiple forms and the city has represented prosperous grounds for the development of these services (Burghard & Dütschke, 2018). The city's population, which in the last decades has attracted numerous young professionals, fits the typical user base to which CS appeals (Best & Hasenheit, 2018; Schmöller et al., 2015). In its recent history Berlin has experienced profound changes to the governance structures and to public sector administration (Rode, 2017). As Rode (ibid) explains: "A further exception in Berlin's governance is the city's two-tier structure. Unlike boroughs in German cities without city-state status, such as Munich, Cologne, and Frankfurt, Berlin's boroughs are responsible for a whole range of municipal tasks, mostly linked to service delivery and implementation of city-wide policy" (p.46). Today the city is divided into 12 'boroughs' belonging to the 'city-state' of Berlin (ibid).

Berlin's Senate Department for the Urban Environment and Transport and Climate Protection (SenUKV) is the main institution that manages mobility at city-wide level. This institution has produced a Sustainable Urban mobility plan to 2025, where CS is portrayed as bringing positive contributions to sustainable mobility despite a need to further integrate the service with public transport and other active transport modes (SenUKV, 2014). Recent statistics published in their 2017 traffic figures show that CS has spread successfully throughout the city (SenUKV). Particular care needs to be taken to the numbers relative to free-floating services, which were introduced in 2011 and by the end of 2016 made up nearly 80% of the CS fleets (ibid). Currently the city is proceeding in the production of a Berlin Mobility Act which is expected to be approved by the city's government in 2020 (SenUKV, 2019). There is currently no information disclosed regarding CS, but this is expected to be released shortly (ibid). According to interviewee D, despite the greater advantages of station-based CS, Berlin's authorities recognized that free-

floating is more appealing to a greater number of individuals and the fact that it still contributed to the environmental gains was sufficient to let it grow with moderate regulation. Interviewee C is expecting the new Berlin Mobility Act to further support and facilitate the spread of CS.

It is important to mention also the state's direct involvement with the CS provider Flinkster, that operates at national level and is fully owned by Deutsche Bahn, Germany's national railway company (Goecke & Ringeisen, 2016). Recently their platform has been opened to include other sharing providers at national scale, further demonstrating how key public transport institutions are favourable and directly supportive of CS integration and growth (ibid).

Despite the importance of the Regional and local authorities, Germany's Federal Ministry of Transport and Digital Infrastructure (BVMI) has a fundamental role for the development of CS. The creation of this ministry has been particularly effective in creating integrative policies that coordinate innovative practices and smart mobility (Rode, 2017). This ministry, together with the Ministry of the Environment, Nature Conservation and Nuclear Safety has been key in delivering what is known as 'The Carsharing Act', a nation-wide policy for the promotion and development of CS services (BVMI, 2019). This Act was approved in September 2017 and created a law to which all Federal States must comply with, profoundly impacting the CS industry and demonstrating how central government is able to create a homogenous institutional environment across the country. The key aspects of this Act are the recognition of what is meant by CS in law and it creates the basis for assigning public parking to CS providers together with the possibility of waiving parking fees for CS (Bannon, 2017; BVMI, 2019). As interviewee C highlights, CS has been developing in Germany for numerous years and a standardization of how all municipalities work with CS will greatly contribute to creating Maas platforms and

integrating this service within wider multimodal mobility strategies. Both interviewees C and D have highlighted the importance of greater integration of CS and PT in order to avoid these services to be discredited, despite interviewee C highlighted how CS might remain a niche market.

In order to understand the reaction of the German government to the needs of CS providers it's important to analyse the role of two fundamental organisations. The first is the Bundesverband CarSharing e.V. (BCS), which is an umbrella organization that represents 151 CS providers out of the 181 operating in the entire country (BCS, 2019). The organisation was established in 1998 and their tasks range from lobbying for the adoption of CS at all levels of government to the production of scientific research papers that analyse the growth and impact of CS. The enactment of the CS act indeed appears to be a result of 13 years lobbying by the BCS group in order to mobilise central government in order to pass a law that truly facilitates the development of CS (Jacobs, 2017). Despite BCS' influence at institutional level, it is important to take into account that Germany has a very powerful automotive industry. The relatively recent entrance of automakers such as BMW (Drivenow), Mercedes (Daimler Group – Car2Go), and VW group (Weshare) in the CS industry at both national and international level has consolidated the role of CS as a fundamental transport mode for the future. According to both interviewees working in Germany this has had a relevant impact on how national government is privileging and facilitating the development of these services.

Italy

According to recent statistics the number of passenger cars in Italy has reached 625 vehicles per 1000 inhabitants, placing the country at the second place in

the EU after Luxembourg (ECEuropa, 2016). CS was first introduced in Milan in 2001 through a public sector initiative led by the Ministry for Environment, Land and Sea Protection (MATTM) and Legambiente, a non-profit organization (Burlando & Mastretta, 2007). By the end of 2018 there were over 1.86 million CS users and nearly 8000 shared cars (ONSM, 2019). In Italy there are multiple institutions that are working at national level for the promotion of CS. The most important efforts have been carried out by Iniziativa Car Sharing (ICS), an institution that was established in 2000 and sponsored by MATTM (Burlando & Mastretta). This initiative contributed to developing projects at municipal scale across the entire country by providing guidance and a total funding of €9,300,000 for the initial phases of the projects, to which other €10,000,000 were later added (ibid). Currently ICS is also providing €600,000 for the promotion of small-scale local projects labelled as 'microcarhsring' (ICS, 2019). In 2015 the National Observatory for Sharing Mobility was established, and they have had a fundamental role in monitoring and promoting shared mobility and CS (ONSM, 2019).

In the recent National Strategic Plan for Sustainable Mobility (PSNSM), developed though the joint forces of four ministries, CS is recognized as being an important tool that needs to be incentivised and exploited to reduce the environmental impact of private vehicles (MIT, 2018). Despite CS being identified as such, interviewees F and H have highlighted how at national level there is no normative or legal document that either regulates or defines what is meant by CS. The lack of a normative framework appears to be an issue that still needs to be resolved (Burlando & Mastretta, 2007). Despite the general recognition of CS as a service that brings numerous benefits to urban dwellers, the lack of national government regulation has brought municipalities to act independently by issuing documents that aim at regulating CS within their territory. In practice, CS in Italy is

being controlled by municipalities, which have been undergoing independent initiatives by issuing public notice documents that aim at managing the development of CS services within their urban centres. It is important to add that since 2017, municipalities with over 100,000 inhabitants are obliged by law to produce sustainable urban mobility plans that set out a vision for the future ten years or more (SUMP, in Italy PUMS) to strategically address sustainable urban mobility (MIT, 2018; ONSM, 2019). Despite these efforts interviewee G stated that "there is a lack of overarching policies and regulation at national level for CS, this has resulted in numerous municipalities having copied and pasted polices developed by other authorities … this is what truly undermines a successful development of CS".

Rome

CS in Rome has experienced a great growth in the past decade. The adoption of free-floating services in 2014 has greatly increased the number of users of this service, which have greatly benefitted from the flexibility of the service. They city currently has over 600,000 CS users and the main service providers are Car2Go, Enjoy, and ShareN'go. Interestingly Rome is one of the only cities out of the four case studies selected for this paper to have a public station-based CS service named CarSharing Roma, which benefits from having exclusive access to the only CS dedicated parking spots together with advantage for users to drive these vehicles on bus and tram lanes (RomaMobilità, 2019). The rapid spread of CS in Rome and its increased popularity can be attributed to both the reduction of the fixed costs linked to private vehicle ownership and the ability of these services to meet the needs of many inhabitants that were dissatisfied with shortcomings of PT services, which have frequently presented issues regarding punctuality, quality, safety and reliability (Cordera et al., 2018; Musso et al., 2012; Mugion et al., 2018). The shortcomings of

PT services, managed by ATAC, have been frequently portrayed by the media. The city's dependency on private vehicles is thus having a profound impact on air quality and traffic congestion (Mugion et al., 2018). The issues with public transport have further enabled the growth and popularity of CS services, which by interviewee G are considered to be a viable alternative for PT users that need to make relatively short trips. Interviewee H expressed concerns regarding issues in terms of the integration of CS with PT due to the lack of reliability of the services offered in Rome, and as he suggests, a further growth of CS and an eventual decrease in prices could eventually lead to a disproportionate and unsustainable use of CS in place of PT.

The main governing body in Rome is represented by the municipality, which is led by an elected mayor. Within the municipality the department for mobility and transport is directly responsible for coordinating the strategic planning of transportation services. These efforts have been expressed in the city's recent Sustainable Urban Mobility Plan (SUMP, PUMS in Italy), which is an important strategic policy document produced by the municipality in order to promote sustainable mobility (ONSM, 2019). The plan was adopted on the 2nd of august 2019 and introduces numerous changes to the perception and relevance of CS. The most important changes that the plan introduced are the ambitions for increasing the number of CS trips, expanding the number of dedicated station-based parking bays in proximity of PT nodes, extending the areas where CS is accessible and the inclusion of privately provided services within a public transport app in order to improve the integration of mobility services (Roma Capitale, 2019). This new document clearly demonstrates the municipality's commitment in facilitating the development of CS and confirms the intensions that had been outlined in the city's Plan for Managing Urban Traffic (PGTU) of 2015, even though this needs to be confirmed by the future

enactment of policies and regulations that will transfer the ambitious objectives into legally binding policies.

In Rome CS is controlled at municipal level through the production of specific policies that aim to regulate the private provision of the service. The most recent document is represented by a 'public notice for the manifestation of interest' and was published in early 2014. Operators indeed need to pay € 1,200.00 upfront to access parking and limited traffic areas and electric cars are exempted from paying this fee (Giunta Capitolina, 2014). According to interviewees F and H this document has been extensively based on the one published in Milan a few months before, and they both highlight the issue of replicating a document produced to meet the needs of a specific territory which presents profoundly different characteristics. Despite these issues the recently adopted PUMS anticipated that some modifications will be carried out to this document in order to facilitate the development of CS services (Roma Capitale, 2019).

Milan

Milan has been the first Italian city to experience the implementation of both initial station-based and free-floating CS services. Currently Milan has over 800,000 CS users and offers the greatest variety of Providers within the country (ONSM, 2019). The city has indeed represented the testbed for different types of CS in Italy, and the participation and support received by the public sector suggests a favourable institutional setting for CS (Burlando & Mastretta, 2007; Interviewee F, 2019). When compared to its Italian counterpart, it is important highlight that the city presents a dense and PT network, which is managed by the Azienda Trapsorti Milanesi (ATM), a company that is owned by the municipality and that provides a service that is characterized by strong linkages and a generally high-quality service. ATM also used

to provide a public station-based CS service, GuidaMi, which was privatized in 2015 and sold to Europcar's sharing services company Ubeequo in 2017 (Carra, 2017). Innovation in the CS sector is also promoted by the E-Vai, the first regional electric CS service active in Lombardy and is promoted by private railway service providers and sponsored by the regional government (E-Vai, 2019). According to interviewee E, the role of PT in the city has further enabled the growth of CS, allowing more and more people to embrace intermodal transport and abandon the use of their private cars. The city has also been recognized at national level as one of the most successful in the reduction of privately-owned vehicles, which have decreased by 100000 since the year 2000 (MIT, 2018).

One of the key institutions for the implementation of sustainable mobility in Milan is the Agenzia Mobilita, Ambiente e Territorio (AMAT), which has been supportive of CS and has played a central role in the production of the city's PUMS that was approved in December 2018. Even in this case, despite with less practical details when compared to the roman version, Milan's PUMS appears to be supportive of CS and highlights the necessity of allowing the growth of these services (Comune di Milano, 2018). These intentions become apparent as the plan expresses explicit interest in the creation of dedicated parking in key transport nodes (ibid). In support of the issues addressed in the document, both interviewees E and F expressed concerns regarding the lack of dedicated parking areas as it represents the greatest barrier for the growth of station-based CS.

In terms of free-floating services, the most important regulatory and legally binding documents are the 'public notices' as the city follows similar mechanisms to the ones present in Rome. The first document was issued in 2013, and it set the foundations upon which other municipalities (including Rome) modelled their CS regulatory and policy documents (Comune di Milano, 2016; Interviewee E and F,

2019). The last update of 2016 introduced some changes to the previous document, introducing a series of further incentives and for operators that introduced electric vehicles, expanded the areas of their services, and several other discounts for offering increasingly efficient services (Comune di Milano, 2016). According to the public notice each operator is required to pay 100 euros monthly, which replaced the initial upfront payment of 1100 euros and includes parking on areas where private vehicles are required to pay and allows access to the limited traffic zone (ibid). EV are exempted from these charges. As interviewee F points out "this choice, which shows a preference for electric cars, should take into account that some require up to 12 hours to charge, causing accessibility issues for users". This observation, coupled with the limited amounts of permits allowed by the municipality, makes us question the way institutions have enacted regulations, especially in light of a lack of infrastructure for charging EV. These changes that have occurred suggest that the municipality has shown some flexibility and adaptation to the needs of CS providers, despite not having been able to meet the demands of making available an increasing amount of parking areas dedicated to CS. As interviewee E explicitly expressed "Milan's municipality has been aware of the benefits of CS since the service was first implemented, they have shown some flexibility but there is still a lot of work to be done".

Chapter 5 – Discussion and Conclusions

As observed in the four case studies, the governance structures that emerge from different institutional contexts are having a profound impact on the development of policies that enable the growth of CS services. The regulatory frameworks that derive from the work of different tiers of government are a result of the ability of the institutions involved to seize the opportunities that innovation has enabled within the realm of sustainable transport.

As we have seen form Berlin's case study, the city has represented a fertile ground for the growth of CS sharing services. It is fundamental to note that the changes that have occurred at national level with the introduction of the Car Sharing Act in 2017 a clear representation of how institutions change and react to the growth and development of sharing providers. Identifying and clarifying the objectives and importance of CS within a national normative framework consolidates the role of sharing vehicles and sets a basis for how all institutions and organisations working with CS should view and perceive the integration of this service. In addition to BCS's role, further research it is required to understand how the entrance of Germany's three main automotive groups in the CS market (Daimler, BMW and VW) could have exerted pressures on national government for institutional and policy changes.

The Italian case studies show that there has been some effort in promoting CS, despite Rome and Milan presenting several differences in terms of context, especially when considering the future integration of CS with PT through MaaS platforms. Extreme care will need to be taken by Roman institutions, who will need

to improve PT in order to avoid CS to replace public services. Most importantly the lack of a normative framework at national level represents the greatest problem for facilitating the development of CS. As pointed out in the research, the discrepancies between policies and regulation are creating an obstacle for further growth and consolidation of these services, especially for national and international providers. Clearer guidelines and recognition of the benefits of these services by central government at legislative level would positively impact the growth of CS in both cities examined. This could become particularly helpful considering the numerous issues that have risen in terms of dedicated parking for CS vehicles. Further research will be required to observe how the objectives set out by the SUMPs are going to translate into local policies regarding CS.

London's case presents findings that are consistent with what was observed by Akyelken et al. (2018) who point out that "despite the existence of a central transport authority that is in charge of the transport system in London (TfL), the lack of a centralized governance system for suing London road networks is one of the most crucial challenges for parking and visibility of car sharing systems" (p.350). The fragmented governance and institutional context created by the lack of synergy and policy uniformity between the London boroughs represents what can be determined as an 'institutional bottleneck'. Interestingly the density of networks and the 'thicknesses' of institutions represented by the boroughs results in being detrimental to the development of CS. London's case shows that the institutional and governance structure doesn't seem to have adapted to change, and to an extent the responsibility can also be attributed to the importance of parking as one of the primary sources of income for the boroughs. We can assume that this is one of the reasons that have caused such a lack of consideration of CS within the last strategic policy documents concerned with London's transport system as a whole. Overall the

fragmented governance over parking represents the greatest barrier for the development of CS services. This greatly affects the business models and the mobilization of resources for CS providers, causing repercussions on end users and citizens.

Approaching the development of CS from an institutional perspective allows to observe how there has been a continuous adaptation of both institutions and organisations. This can be linked to the theories and approaches explored in the theoretical framework, which outline how the institutional structures and policies adapt to changes perpetuated by the choices of consumers and business within the CS industry. Furthermore, the role of institutions and organisations in promoting and lobbying for CS, represented in the case studies by CoMoUK, BCS, and ICS, appears to have contributed to shaping policy. The Berlin case is the only clear example that demonstrates how institutional change can occur by initiating proactive policies and regulation through a legal and normative recognition of how innovation is impacting and shaping our society.

The creation of an institutional setting that creates favourable conditions for the development of these services appears necessary as their growth carries numerous positive benefits both users and local communities. In order to maximize these advantages, it is important to sustain investment on PT and promote its integration with CS and other shared mobility services through MaaS platforms. Furthermore, creating a policy setting that presents flexibility and homogeneity will facilitate the growth of CS services, especially for larger providers working at both national and international levels. The complexities arising from the operating costs of CS, especially in its free-floating option, should therefore bring institutions to collaborate more closely with operators to guarantee the expansion of the service where it still remains inaccessible. Further research could be carried out in order to

determine the quantitative contribution of individual policies, despite variables being very difficult to isolate when analysing such a contemporary and rapidly changing service. Analysing current institutional contexts of CS in other counties could also allow further insight regarding the role of institutions and good practice.

The development and spread of CS has a profoundly transformative potential that can be exploited to change the way we conceive streets and public spaces. Reducing the number of parked cars would allow urban dwellers to experience urban space in a radically different way and would enable the availability of space allowing greater safety for active travel. CS also has the potential to pave the way for a true modal shift, and institutions will need to take an increasingly proactive stance towards steering these services towards a future that truly enables collective benefits. It is important for national governments to recognize the potential of CS and to act upon the institutional barriers and fragmented governance structures that are currently undermining a more effective and sustainable expansion of these services.

References

Abenoza, R., Cats, O. and Susilo, Y. (2017). Travel satisfaction with public transport: Determinants, user classes, regional disparities and their evolution. *Transportation Research Part A: Policy and Practice*, 95, pp.64-84.

Attard, M. and Shiftan, Y. (2015). *Sustainable urban transport*. Bingley: Emerald.

Akyelken, N., Banister, D. and Givoni, M. (2018). The Sustainability of Shared Mobility in London: The Dilemma for Governance. *Sustainability*, 10(2), p.420.

Akyelken, N., Givoni, M., Salo, M., Plepys, A., Judl, J., Anderton, K. and Koskela, S. (2018). The Importance of Institutions and Policy Settings for Car Sharing - Evidence from the UK, Israel, Sweden and Finland. *EJTIR*, 18(4), pp.340-359.

Amin, A. and Thrift, N. (1995). Globalization, institutions, and regional development in Europe. 1st ed. Oxford: Oxford University Press.

Bannon, E. (2017). *Public privileges for car sharing enshrined in German law | Transport & Environment*. Transportenvironment.org. Available at: https://www.transportenvironment.org/news/public-privileges-car-sharing-enshrined-german-law [Accessed 30 Aug. 2019].

Baptista, P., Melo, S. and Rolim, C. (2015). "Car Sharing Systems as a Sustainable Transport Policy: A Case Study from Lisbon, Portugal" In Sustainable Urban Transport, pp. 205-227.

Bardhi, F. and Eckhardt, G. (2012). Access-Based Consumption: The Case of Car Sharing: Table 1. *Journal of Consumer Research*, 39(4), pp.881-898.

BCS (2019). *bcs-Studie*. bcs Bundesverband CarSharing e.V. Available at: https://www.carsharing.de/bcs-studie [Accessed 30 Aug. 2019].

Becker, H., Ciari, F. and Axhausen, K. (2018). Measuring the car ownership impact of free-floating car-sharing – A case study in Basel, Switzerland. *Transportation Research Part D: Transport and Environment*, 65, pp.51-62.

Bert, J., Collie, B., Gerrits, M. and Xu, G. (2016). *What's Ahead for Car Sharing? The New Mobility and Its Impact on Vehicle Sales*. 1st ed. [ebook] Boston: The Boston Consulting Group. Available at:

https://www.bcgperspectives.com/Images/BCG-Whats-Ahead-for-Car-Sharing-Feb-2016_tcm80-205619.pdf [Accessed 9 Apr. 2017].

Best, A. and Hasenheit, M. (2018). *Car Sharing in Germany*. Circular Impacts. [online] Ecologic Institute. Available at: https://circular-impacts.eu/sites/default/files/D4.2_Case-Study-Carsharing_FINAL.pdf [Accessed 30 Aug. 2019].

Böcker, L. and Meelen, T. (2017). Sharing for people, planet or profit? Analysing motivations for intended sharing economy participation. *Environmental Innovation and Societal Transitions*, 23, pp.28-39.

Bryman, A. (2012). *Social Research Methods 4e*. Oxford, UK: Oxford University Press.

Burghard, U. and Dütschke, E. (2018). Who wants shared mobility? Lessons from early adopters and mainstream drivers on electric carsharing in Germany. *Transportation Research Part D: Transport and Environment*.

BVMI (2019). *BMVI - Carsharing*. Bmvi.de. Available at: https://www.bmvi.de/SharedDocs/DE/Artikel/StV/Strassenverkehr/carsharing-gesetz.html [Accessed 28 Aug. 2019].

Cairns, S. and Harmer, C. (2012). *The Emission Impacts of Car Clubs in London*. 1st ed. [ebook] London: Transport Research Laboratory. Available at: https://www.carplus.org.uk/wp-content/uploads/2012/08/The-emission-impacts-of-car-clubs-in-London_S-Cairns-and-C-Harmer_PPR591.pdf [Accessed 8 Apr. 2017].

Car Club Coalition (2015). *A Car Club Strategy for London - Growing car clubs to support London's future*. 1st ed. London. Available at: http://content.tfl.gov.uk/tfl-car-club-strategy.pdf [Accessed 22 Mar. 2017].

Carra, I. (2017). *Car sharing Milano, GuidaMi diventa Ubeeqo: "Alternativa all'auto privata anche per il lungo raggio"*. Repubblica.it. Available at: https://milano.repubblica.it/cronaca/2017/01/28/news/il_car_sharing_ubeeqo_sbarca_a_milano_un_alternativa_ad_avere_l_auto_-157067199/ [Accessed 1 Sep. 2019].

CoMoUK (2016). *Car Clubs in New Developments - a review of experience and good practice in low car and free carbon developments (2003-2014)*. Available at: https://como.org.uk/wp-content/uploads/2018/06/Car-Clubs-in-New-Developments-Report-1.pdf [Accessed 30 Aug. 2019].

CoMoUK. (2019). *Developing Car Clubs England Programme - CoMoUK*. Available at: https://como.org.uk/project/developing-car-clubs-england-programme/ [Accessed 31 Aug. 2019].

Comune di Milano (2018). *Piano Urbano della Mobilità Sostenibile*. Milan: Comune di Milano. Available at: https://www.comune.milano.it/aree-tematiche/mobilita/pianificazione-mobilita/piano-urbano-della-mobilita [Accessed 30 Aug. 2019].

Cordera, R., Coppola, P., dell'Olio, L. and Ibeas, Á. (2018). The impact of accessibility by public transport on real estate values: A comparison between the cities of Rome and Santander. *Transportation Research Part A: Policy and Practice*.

Daimler Mobility Services (2018). *Mercedes-Benz and Via set up joint venture | Daimler*. [online] Daimler. Available at: https://www.daimler.com/products/services/mobility-services/via.html [Accessed 30 Aug. 2019].

Daniell, K. and Kay, A. (2017). Multi-level Governance: An Introduction. *Multi-level Governance: Conceptual challenges and case studies from Australia*, pp.3-32.

Deloitte (2017). *Car Sharing in Europe Business Models, National Variations and Upcoming Disruptions*. Monitor Deloitte. Munich: Deloitte. Available at: https://www2.deloitte.com/content/dam/Deloitte/de/Documents/consumer-industrial-products/CIP-Automotive-Car-Sharing-in-Europe.pdf [Accessed 30 Aug. 2019]

Dias, F., Lavieri, P., Garikapati, V., Astroza, S., Pendyala, R. and Bhat, C. (2017). A behavioral choice model of the use of car-sharing and ride-sourcing services. *Transportation*, 44(6), pp.1307-1323.

DfT (2014). *Car clubs cash awards*. GOV.UK. Available at: https://www.gov.uk/government/news/car-clubs-cash-awards [Accessed 31 Aug. 2019].

E-Vai (2019). *Chi è E-Vai | Car-sharing Elettrico Regionale | e-vai*. Car-sharing Elettrico Regionale | e-vai. Available at: https://www.e-vai.com/cose-e-vai/ [Accessed 30 Aug. 2019].

ECEuropa (2018). *Passenger cars in the EU - Statistics Explained*. Ec.europa.eu. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php/Passenger_cars_in_the_EU [Accessed 30 Aug. 2019].

Elkington, J. (1994). Towards the Sustainable Corporation: Win-Win-Win Business Strategies for Sustainable Development. *California Management Review*, 36(2), pp.90-100.

European Commission (2019). *EU climate action - Climate Action - European Commission*. Climate Action - European Commission. Available at: https://ec.europa.eu/clima/citizens/eu_en [Accessed 30 Aug. 2019].

Farnsworth, K. and Irving, Z. (2018). Austerity: Neoliberal dreams come true?. *Critical Social Policy*, 38(3), pp.461-481.

Faivre d'Arcier B. and Lecler Y. (2019). Governing Carsharing as a Commercial or a Public Service? A Comparison Between France and Japan, in Finger, M. and Audouin, M. *The Governance of Smart Transportation Systems*. Cham: Springer Nature, pp. 55-77.

Firnkorn, J. and Müller, M. (2011). What will be the environmental effects of new free-floating car-sharing systems? The case of car2go in Ulm. *Ecological Economics*, 70(8), pp.1519-1528.

Giesel, F. and Nobis, C. (2016). The Impact of Carsharing on Car Ownership in German Cities. *Transportation Research Procedia*, 19, pp.215-224.

Giordano, B. (2001). 'Institutional thickness', political sub-culture and the resurgence of (the 'new') regionalism in Italy - a case study of the Northern League in the province of Varese. *Transactions of the Institute of British Geographers*, 26(1), pp.25-41.

Giunta Capitolina (2014). *ESTRATTO DAL VERBALE DELLE DELIBERAZIONI DELLA GIUNTA CAPITOLINA*. Roma: Roma Capitale. Available at: https://www.comune.roma.it/PCR/resources/cms/documents/Delib_9_2014.pdf [Accessed 1 Sep. 2019].

GLA.(2017). *Download the draft London Plan*. London City Hall. Available at: https://www.london.gov.uk/what-we-do/planning/london-plan/new-london-plan/download-draft-london-plan-0 [Accessed 30 Aug. 2019].

GLA. (2018). *Mayor's Transport Strategy 2018*. Greater London Authority: London. Available online at: https://www.london.gov.uk/sites/default/files/mayors-transport-strategy-2018.pdf [Accessed 30 Aug. 2019].

Glotz-Richter, M. (2016). Reclaim Street Space! – Exploit the European Potential of Car Sharing. *Transportation Research Procedia*, 14, pp.1296-1304.

Goecke, R. and Ringeisen, P. (2016). Flinkster: The Carsharing Platform of Deutsche Bahn AG. *Open Tourism*, pp.383-391.

Healey, P. (2006). Transforming governance: Challenges of institutional adaptation and a new politics of space1. *European Planning Studies*, 14(3), pp.299-320.

Harvey, D. (1989). From Managerialism to Entrepreneurialism: The Transformation in Urban Governance in Late Capitalism. *Geografiska Annaler: Series B, Human Geography*, 71(1), pp.3-17.

Hodgson, G. (2006). What Are Institutions?. *Journal of Economic Issues*, 40(1), pp.1-25.

Hopwood, and N. Srivastava, P. (2009). A Practical Iterative Framework for Qualitative Data Analysis. *International Journal of Qualitative Methods*, 8(1), pp.76-84.

Jacobs, F. (2017). *Germany enacts car-sharing law* Fleet Europe. Available at: https://www.fleeteurope.com/en/smart-mobility//article/germany-enacts-car-sharing-law?a=FJA05&t%5B0%5D=Car%20sharing&t%5B1%5D=Parking&t%5B2%5D=Bundesverband&t%5B3%5D=Germany&curl=1 [Accessed 30 Aug. 2019].

Jessop, B. (2001). Institutional Re(turns) and the Strategic – Relational Approach. *Environment and Planning A*, 33(7), pp.1213-1235.

Kamargianni, M., Li, W., Matyas, M. and Schäfer, A. (2016). A Critical Review of New Mobility Services for Urban Transport. *Transportation Research Procedia*, 14, pp.3294-3303.

Katsamunska, P. (2016). The Concept of Governance and Public Governance Theories, Economic Alternatives, *University of National and World Economy*, Sofia, Bulgaria, 2, pp.133-141.

Kent, J. and Dowling, R. (2016). "Over 1000 Cars and No Garage": How Urban Planning Supports Car(Park) Sharing. *Urban Policy and Research*, 34(3), pp.256-268.

Kim, K. (2015). Can carsharing meet the mobility needs for the low-income neighborhoods? Lessons from carsharing usage patterns in New York City. *Transportation Research Part A: Policy and Practice*, 77, pp.249-260.

Le Vine, S., Lee-Gosselin, M., Sivakumar, A. and Polak, J. (2014). A new approach to predict the market and impacts of round-trip and point-to-point carsharing systems: Case study of London. *Transportation Research Part D: Transport and Environment*, 32, pp.218-229.

Le Vine, S. and Polak, J. (2017). The impact of free-floating carsharing on car ownership: Early-stage findings from London. *Transport Policy*.

London Assembly (2018). *Future Transport - How is London Responding to Innovation*. [online] Available at: https://www.london.gov.uk/sites/default/files/future_transport_report_-_final.pdf [Accessed 30 Aug. 2019].

Loose, W. (2009). *The State of European Car-Sharing*. 1st ed. [ebook] Bundesverband CarSharing & MOMO. Available at:http://www.eltis.org/sites/eltis/files/tool/the_state_of_carsharing_europe.pdf [Accessed 28 Aug. 2019].

Martin, E.W., Shaheen, S., (2010). *Greenhouse Gas Emission Impacts of Carsharing in North America*. Mineta Transportation Institute, San Jose State University.

McKinsey. (2017). *How shared mobility will change the automotive industry*. [online] https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/how-shared- mobility-will-change-the-automotive-industry [Accessed 30 Aug. 2019]

MIT (2018). *Piano Nazionale della Mobilità Sostenibile*. Available at: https://www.sipotra.it/wp-content/uploads/2019/03/Piano-Strategico-Nazionale-della-Mobilità-Sostenibile-per-il-rinnovo-del-parco-mezzi-su-gomma-per-i-servizi-di-trasporto-pubblico-locale-e-il-miglioramento-della-q.pdf [Accessed 30 Aug. 2019].

Meliă, A. (2018). SUSTAINABLE URBAN MOBILITY IN THE SHARING ECONOMY: DIGITAL PLATFORMS, COLLABORATIVE GOVERNANCE, AND INNOVATIVE TRANSPORTATION. *Contemporary Readings in Law and Social Justice*, 10(1), p.130.

Morgan, K. (2007). The Learning Region: Institutions, Innovation and Regional Renewal. *Regional Studies*, 41(sup1), pp.147-159.

Morgan, G., Campbell, J., Crouch, C., Pedersen, O. and Whitley, R. (2012). *The Oxford handbook of comparative institutional analysis*. Oxford: Oxford University Press.

Mugion, R., Toni, M., Raharjo, H., Di Pietro, L. and Sebathu, S. (2018). Does the service quality of urban public transport enhance sustainable mobility?. *Journal of Cleaner Production*, 174, pp.1566-1587.

Münzel, K., Boon, W., Frenken, K. and Vaskelainen, T. (2017). Carsharing business models in Germany: characteristics, success and future prospects. *Information Systems and e-Business Management*, 16(2), pp.271-291.

Musso, A., Corazza, M. and Tozzi, M. (2012). Car Sharing in Rome: a Case Study to Support Sustainable Mobility. *Procedia - Social and Behavioral Sciences*, 48, pp.3482-3491.

North, D. (1990). Institutions, institutional change, and economic performance. 1st ed. Cambridge: Cambridge University Press.

North, D. (1991). Institutions. *Journal of Economic Perspectives*, 5(1), pp.97-112.

ONSM (2019). *3° Rapporto Nazionale Sulla Sharing Mobility*. [online] Osservatorio Nazionale Sharing Mobility. Available at: http://osservatoriosharingmobility.it/wp-content/uploads/2019/07/come-sta-la-sharing-mobility_III-Rapporto-SM_13-e-FRONT.pdf [Accessed 30 Aug. 2019].

Paradowska M. (2017) Grounds and Challenges for Implementing a Circular Economy in the European Road Transport Sector. In: Suchanek M. (eds) Sustainable Transport Development, Innovation and Technology. TranSopot 2016. Springer Proceedings in Business and Economics. Springer, Cham

Huitema, D. and Patterson, J. (2019). Institutional innovation in urban governance: The case of climate change adaptation. *Journal of Environmental Planning and Management*, 62(3), pp.374-398.

Pierre, J. (2005) 'Comparative Urban Governance: Uncovering Complex Causalities', *Urban Affairs Review*, 40(4), pp. 446–462. doi: 10.1177/1078087404273442.

Pierre, J. and Peters, G. (2000). *Governance, politics and the state Jon Pierre*. MacMillan Press.

Prieto, M., Baltas, G. and Stan, V. (2017). Car sharing adoption intention in urban areas: What are the key sociodemographic drivers?. *Transportation Research Part A: Policy and Practice*, 101, pp.218-227.
Seidman, I. (2006). *Interviewing as qualitative research*. New York: Teachers College Press.

Scott, W.R. (1995) Institutions and Organizations. SAGE Publications, Thousand Oaks.

SenUKV (2014). *Urban Transportation Development Plan 2025 Sustainable Mobility*. Berlin: Senate Department for Urban Development and the Environment of the State of Berlin.

SenUKV (2017). *Mobility in the City - Berlin Traffic in Figures*. Berlin: More Mobile. [online] Berlin. Available at: https://www.berlin.de/senuvk/verkehr/politik_planung/zahlen_fakten/download/Mobility_en_komplett.pdf [Accessed 1 Sep. 2019].

SenUKV (2019). *Berlin Mobility Act / State of Berlin*. [online] Berlin.de. Available at: https://www.berlin.de/senuvk/verkehr/mobilitaetsgesetz/index_en.shtml [Accessed 1 Sep. 2019].

Shaheen, S. (2016). Mobility and the sharing economy. *Transport Policy*, 51, pp.141-142.

Shaheen, S. and Cohen, A. (2012). Carsharing and Personal Vehicle Services: Worldwide Market Developments and Emerging Trends. *International Journal of Sustainable Transportation*, 7(1), pp.5-34.

Schmöller, S., Weikl, S., Müller, J. and Bogenberger, K. (2015). Empirical analysis of free-floating carsharing usage: The Munich and Berlin case. *Transportation Research Part C: Emerging Technologies*, 56, pp.34-51.

Standing, C., Standing, S. and Biermann, S. (2018). The implications of the sharing economy for transport. *Transport Reviews*, 39(2), pp.226-242.

STARS (2019). *About STARS – STARS H2020*. Stars-h2020.eu. Available at: http://stars-h2020.eu/about-stars/ [Accessed 1 Sep. 2019].

Steer Davies Gleave (2017). Carplus Annual Survey of Car Clubs London 2016-17. https://como.org.uk/wp-content/uploads/2018/06/Carplus-Annual-Survey-of-Car-Clubs-2016-17-London.pdf [Accessed 30 Aug. 2019].

Stoker, G. (1998). Public-Private Partnerships and Urban Governance. In J. Pierre (Ed.), Partnerships in Urban Governance: European and American Experiences (pp. 34–51).https://doi.org/10.1007/978-1-349-14408-2_3

Goecke, R. and Ringeisen, P. (2016). Flinkster: The Carsharing Platform of Deutsche Bahn AG. *Open Tourism*, pp.383-391.

Rietveld, P. and Stough, R. (2007). *Institutions and sustainable transport*. Cheltenham: Edward Elgar.

Rode, P. (2017). Urban planning and transport policy integration: The role of governance hierarchies and networks in London and Berlin. *Journal of Urban Affairs*, 41(1), pp.39-63.

Rodríguez-Pose, A. (2013). Do Institutions Matter for Regional Development?. *Regional Studies*, 47(7), pp.1034-1047.

RomaMobilità (2019). *Car Sharing Roma | Roma Servizi per la Mobilità*. Romamobilita.it. Available at: https://romamobilita.it/it/carsharing [Accessed 30 Aug. 2019].

Roma Capitale (2019). *Il Piano Urbano Della Mobilità Sostenibile A Roma*. PUMS. Comune di Roma. Available at: https://www.pumsroma.it/download/Pres-PUMS-complessiva-luglio-2019.pdf [Accessed 30 Aug. 2019].

Taylor, E. (2014). *Daimler's car sharing business car2go to quit UK, London a challenge*. Reuters. Available at: https://www.reuters.com/article/us-daimler-europcar-carsharing/daimlers-car-sharing-business-car2go-to-quit-uk-london-a-challenge-idUSKBN0E81ZX20140528 [Accessed 28 Aug. 2019].

Tomaney, J. (2013). Region and place I: Institutions. *Progress in Human Geography*, 38(1), pp.131-140.

Tyndall, J. (2017). Where no cars go: Free-floating carshare and inequality of access. *International Journal of Sustainable Transportation*, 11(6), pp.433-442.

Zukauskaite, E., Trippl, M. and Plechero, M. (2017). Institutional Thickness Revisited. *Economic Geography*, 93(4), pp.325-345.