The Shared Mobility Boom

Towards reducing traffic congestion in Mexico City

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Cover photo: Lime e-scooters in Mexico City (li.me)

List of Abbreviations

SiTIS	Sistemas de Transporte Individual Sustentable
MaaS Latam	Mobility as a Service Latin America
SEMOVI	Secretaría de Movilidad de la Ciudad de México
SEDEMA	Secretaría del Medio Ambiente de la Ciudad de México
EMB	Estrategia de Movilidad en Bicicleta
ITDP	Institute for Transportation and Development

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Introduction

Traffic jams are a daily occurrence for the *Chilangos*, the original inhabitants of Mexico City. The urban traffic congestion issue in the Mexican capital is not only enormous but also almost permanent in nature. With 22 million inhabitants, Mexico City is one of the largest metropolises in the world. Although the city has an extensive public transport system, the roads are full every day and commuters struggle to make their way through the city. In order to combat the urban traffic congestion issue, the local government of Mexico City introduced various measures such as an advanced rapid bus system and no-drive days for cars. However, the number of cars keeps on increasing in the city and the situation is deteriorating. In 2010, the first shared docked bike system was introduced. A few years later, shared dockless bikes and scooters were introduced in the city centre. The city intends to tackle the traffic congestion problem with a product from a rapid developing industry. In many western cities around the world, the sharing mobility vehicles have proven to be successful. Therefore, the question arises if these innovative modes of transport could operate effectively in a Latin American metropole like Mexico City.

This thesis analyses the introduction and development of shared mobility policy in Mexico City in the last ten years and measures its contribution to a solution for the city's traffic congestion problem. The aim of this study is to find an answer on the following main research question: Does the introduction and development of shared mobility policy in Mexico City in the last ten years contribute to a solution for the city's traffic congestion problem? In order to find a profound answer to the main research question, this thesis consists of three chapters and will be structured as follows: in the first chapter, a theoretical review will be provided based on the main concepts. The concept of shared mobility and urban traffic congestion will be identified. In addition, the main policy considerations in the area of shared micromobility will be outlined and discussed.

Qualitative sources are used in order to find an answer on the main research question. Firstly, secondary sources such as academic articles and research reports have been investigated in order to familiarise with the main concepts of this study. Additionally, scientific publications and technical reports of the University of California, Berkeley Transportation Sustainability Research Center have been examined to create an understanding of the concept of shared mobility. In addition, various research reports of the Institute for Transportation and Development Policy (ITDP) and World Resources Institute (WRI) have been examined. As a matter of fact, these organisations work closely together with the Mexican local government and the city's secretary of mobility (SEMOVI) for research purposes.

In the second chapter, the urban congestion problem, the shared mobility initiatives, and the local governments shared mobility policy will be outlined. First, contextual information will be provided on the traffic congestion issue in Mexico City. The focus will be on the three neighbourhoods Cuauhtémoc, Benito Juárez and Miguel Hidalgo which are the three most

visited areas in the Mexican capital. These are also the three areas where most of the shared mobility services are deployed. Then, the shared mobility policy will be divided in two categories. On one hand there is EcoBici, a docked bike sharing programme initiated and operated by the local government of Mexico City since 2010. On the other hand, there are the private companies who offer dockless bikes and scooters since 2018.

In the third chapter, the above-mentioned topics will be discussed following the results from the conducted interviews. The quotes obtained from the interviews are translated into English. Qualitative fieldwork has been carried out in November and December 2019 in Mexico City. The fieldwork objective was to grasp an inside perspective on how the public policy developed in the last decade. The analysis follows the SWOT model and to aims to classify the strengths, weaknesses, opportunities and threats of the shared mobility policy as possible solution to the city's traffic congestion issue. The central hypothesis of this thesis claims that the public policy stimulates the development of shared mobility in Mexico City resulting in a reduction of the traffic congestion. The interviews were carried out with experts in the fields of shared mobility, local public policy and urban planning.

Consequently, with all the information collected from the first, second and third chapter, a thorough conclusion can be drawn. Here, a careful analysis on the shared mobility policy will be formed by connecting the most important findings from the desk research with the outcomes from the interviews.

Chapter 1

SHARED MOBILITY AND URBAN TRAFFIC CONGESTION IN URBAN AREAS: A THEORETICAL REVIEW

This chapter introduces the concept of shared mobility and its history in order to provide a general understanding of the topic. Then, the concept of traffic congestion with the existing debates in literature will be discussed, seeking to explain the influence of shared mobility with regards to urban traffic congestion. Lastly an overview of shared mobility in the field of public policy will be selected, after which two key policy considerations will be highlighted and explained for large cities that are implementing shared mobility services.

1.1 Shared mobility

1.1.1 Short History Shared Mobility

Nowadays, people are increasingly concerned with the development of the environment and with the social problems caused by the thoughtless use of natural resources, the absence of urban planning, and the deteriorating quality of life for citizens in large metropolitan areas. Therefore, it is considered necessary to rethink the issue of urban mobility. According to various urban planning experts, shared mobility could be one of the solutions (Ajao, 2019).

Shared mobility can be seen as an element and important facet of the sharing economy, with the greatest disruptive potential over urban transportation systems, which are facing significant challenges due to a rapid increase in the number of motorised private owned vehicles (Machado, De Salles Hue, Berssaneti, & Quintanilha, 2018).

This explanation can also be derived from a report from the US Department of Transportation called Shared mobility, Current Practices and Guiding Principles (2016). With the rise and development of the internet, the sharing economy finds its roots in the late 1990's, which is also known as the dot-com bubble. Early websites, such as for instance eBay enabled a marketplace where people had access to a global audience. Technological advancements facilitated changes in consumption and financial transactions. These improvements also more broadly facilitated sociological transformations regarding how people view resources. Technological advancements coupled with the financial crisis of 2007 to 2008 became a driving factor for many individuals and households rethinking resource use. Around the year 2009, various sharing models emerged, such as P2P marketplaces like Airbnb, crowdfunding websites, and shared mobility platforms such as Uber (Shaheen, Cohen & Zohdy, 2016). It can be stated that the sharing economies have the potential to encourage the distribution and use of underutilized assets and to promote a more sustainable consumption, with economic, social, and environmental consequences.

There are many definitions of the concept sharing economy. Some authors disagree on the exact definition of 'sharing' but agree on a common conceptual core: the sharing economy refers to a specific context of exchange which does not have to align with classical industry definitions. The context of exchange is characterised by the nature of participating actors and the relationships they engage in. Actors can be people or organisations who are independent of one another and take the roles of buyer and seller. Transactions in the sharing economy are facilitated relationships between sellers and buyers who connect to exchange access to resources in return for a monetary or non-monetary reward (Reinhold & Dolnicar, 2017).

The figures 1.1 and 1.2 *infra*, show the immense growth of shared mobility services in the past decade, but also, the enormous potential of shared mobility has to improve sustainable urban transportation systems. The number of cities in the world offering bikeshare has increased significantly, from just a handful in the late 1990s to over 1600 in 2018. Various technological improvements and the rapid expansion and adoption of shared mobility services have enabled small electric modes to scale. Therefore, shared bikes and scooters could serve as a point of entry to the broader sustainable transportation network, enabling more people to rely on walking, cycling, and public transit for more trips—and perhaps consider not owning a car at all (Yanocha & Allan, 2019).

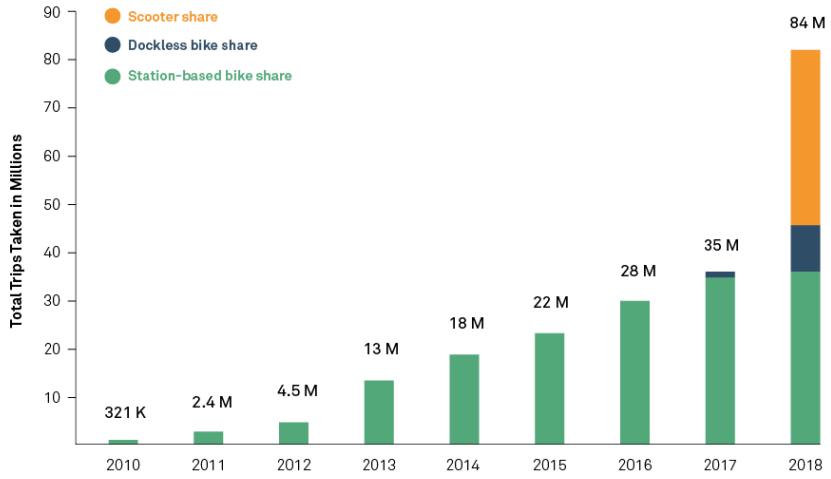

Figure 1.1 - Shared micromobility in the USA (NACTO, 2019).

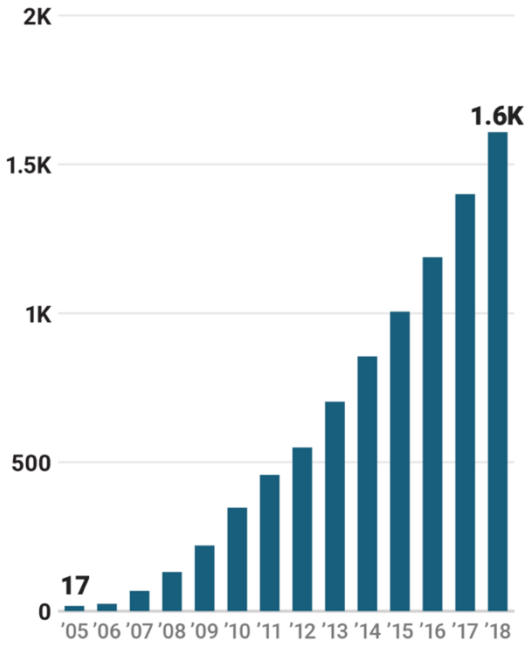

Figure 1.2 - Estimated number of bike-sharing programs in operation worldwide (MetroBike, LLC, 2018).

1.1.2 Defining Shared Mobility

There are relatively few historical studies in the area of shared mobility since the concept emerged and rapidly developed in the beginning of the 21st century. Much research on shared mobility is conducted by the University of California, Berkeley by its Transportation Sustainability Research Center (TSRC). Especially Susan Shaheen is considered as a pioneer and international recognised expert in the field of mobility and sharing economy. According to Shaheen her most recent definition states that: "Shared mobility is defined as the shared use of a vehicle, motorcycle, scooter, bicycle, or other travel mode, which provides users with short-term access to a travel mode on an as-needed basis" (Shaheen, Cohen, & Zohdy, 2016: 11). This definition is of interest because it forms an important standard for the academic, public and private world. It aims to be consistent with existing literature to the extent practicable and current industry practice.

Another definition is provided by Georgina Santos, University Lecturer at School of Planning and Geography, Cardiff University. She builds on the definition of Shaheen and emphasises the technological part:

> "Shared mobility or mobility in the sharing economy is a loose concept, which includes a number of emerging new business models. The two features common to all of these new mobility services is that there is an element of sharing and a vehicle instead of owning it and that they rely on technology, such as mobile apps and the internet" (Santos, 2017: 5).

Santos points out that it is a loose concept and that the concept contains a number of emerging new business models. This is also described in the figure 1.3 *infra*. Furthermore, she mentions the role of technology. This is not explicitly described by definition of Shaheen.

In an article 'An Overview of Shared Mobility', published by researchers of the Polytechnic School of the University of São Paulo, the authors also build on the definition of Shaheen. They accentuate the factor of disconnecting the people's usage from ownership:

> "In a wider understanding, shared mobility can be defined as trip alternatives that aim to maximise the utilisation of the mobility resources that a society can pragmatically afford, disconnecting their usage from ownership. Then, shared mobility is the short-term access to shared vehicles according to the user's needs and convenience" (Machado, De Salles Hue, Berssaneti, & Quintanilha, 2018: 1).

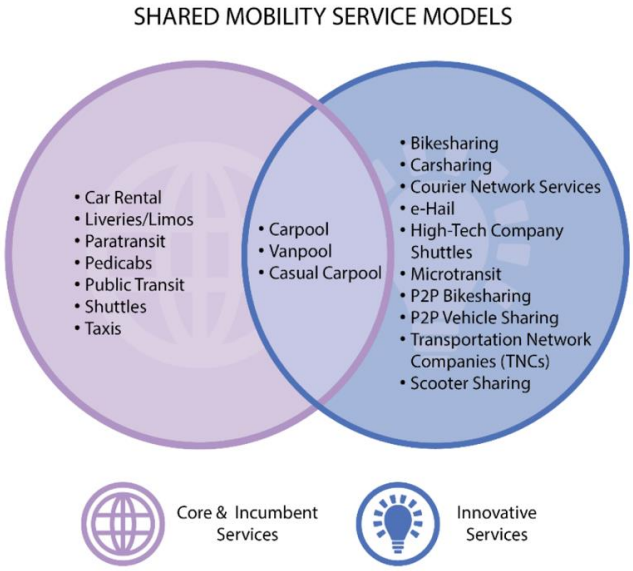

Figure 1.3 - Shared Mobility Service Models (Shaheen, Cohen, & Zohdy, 2016)

As can be seen in figure 1.1, the concept of shared mobility includes many mobility models such as car-sharing, bike-sharing and scooter-sharing which are often the subject of matter. Alternative methods such as paratransit, shuttles, private transit services which also form part of the concept, will not be discussed in this thesis. The focus in this thesis will be on the following two travel modes which form part of the concept of shared mobility: bikesharing and scooter sharing, also known as shared micromobility. Figure 1.2 provides an example of most common types of shared micromobility.

Figure 1.4 - Common Types of Shared Micro Mobility Services (Shaheen & Cohen, 2019)

Shaheen acknowledges the existence of various travel modes within the concept of shared mobility, two of them being: bikesharing and scooter sharing. She first introduces the concept of bike sharing:

> "Bikesharing provides users with on-demand access to bicycles at a variety of pick-up and drop-off locations for one-way (point-to-point) or roundtrip travel. Bikesharing fleets are commonly deployed in a network within a metropolitan region, city, neighbourhood, employment centre, and/or university campus" (SAE International, 2018: 8).

She continues by outlining the concept of scooter sharing:

> "Scooter sharing allows individuals access to scooters by joining an organization that maintains a fleet of scooters at various locations. Scooter sharing models can include a variety of motorized and non-motorized scooter types. The scooter service provider typically provides gasoline or electric charge (in the case of motorized scooters), maintenance, and may include parking as part of the service. Users typically pay a fee each time they use a scooter. Trips can be roundtrip or one way" (SAE International, 2018: 9).

Shaheen highlights that the bikesharing fleets are commonly deployed within a metropolitan region or city, which is also the case for this thesis which has the focus on Mexico City. Regarding scooter sharing, she mentions the electric scooters, these so called standing electric scooter and moped-style scooter will be discussed later on in this thesis.

In contrast to the statement of Shaheen, Santos does not specify a difference within shared mobility regarding bike sharing and scooter sharing. Santos divides the term shared mobility into four main models. One of the models is stating the following:

> "Short term rental of vehicles managed and owned by a provider. The provider owns a number of vehicles which are strategically parked in a city or in certain areas of a city, either in dedicated parking lots and/or on authorised public roads. Potential users can look for a vehicle near to where they are, drive themselves to their destination, then park the vehicle at the end of their trip in another dedicated parking lot or in an authorised public parking space. Locking and unlocking is typically done with a smartphone or smartcard. This is all done via an app, finding the vehicle via a live map, registering details, paying, etcetera" (Santos, 2017: 5).

The Santos explanation is considered too broad and general for the scope of this thesis, she does not elaborate on the difference between scooter sharing and bike sharing. Meanwhile, the definition of Shaheen is more dedicated on the specific type of vehicle. Therefore, the definition of Shaheen is most suitable in order to provide a profound answer on the main research question.

1.2 Urban traffic congestion

1.2.1 Urban Traffic Congestion

In this section, the concept of traffic congestion will be outlined within the urban context, in order to get a general understanding. In contrast to the shared mobility concept, urban traffic congestion is a concept that has been academically researched for some decades already. According to the Encyclopedia of Transportation, the concept is defined as follows:

> "Traffic congestion can be understood as the process by which the number of vehicles on roads exceeds their capacity. Congestion can slow down or stop the flow of traffic altogether, leading to longer and more unpredictable travel times, as well as a host of economic, social, environmental, and infrastructural costs. (…) In this light, traffic congestion has been attributed to low-density, auto-mobile-reliant forms of development" (Saunders, 2014: 1343).

The definition of Saunders is of interest because it highlights the negative economic consequences of urban traffic congestion together with the automobile-reliant forms of development. This assumption also confirmed by De Palma in *A handbook of transport economics*. Moreover, De Palma states that road congestion represents the largest external cost from transportation (De Palma, 2011). An example of these external costs is displayed in figure 1.5 *infra*.

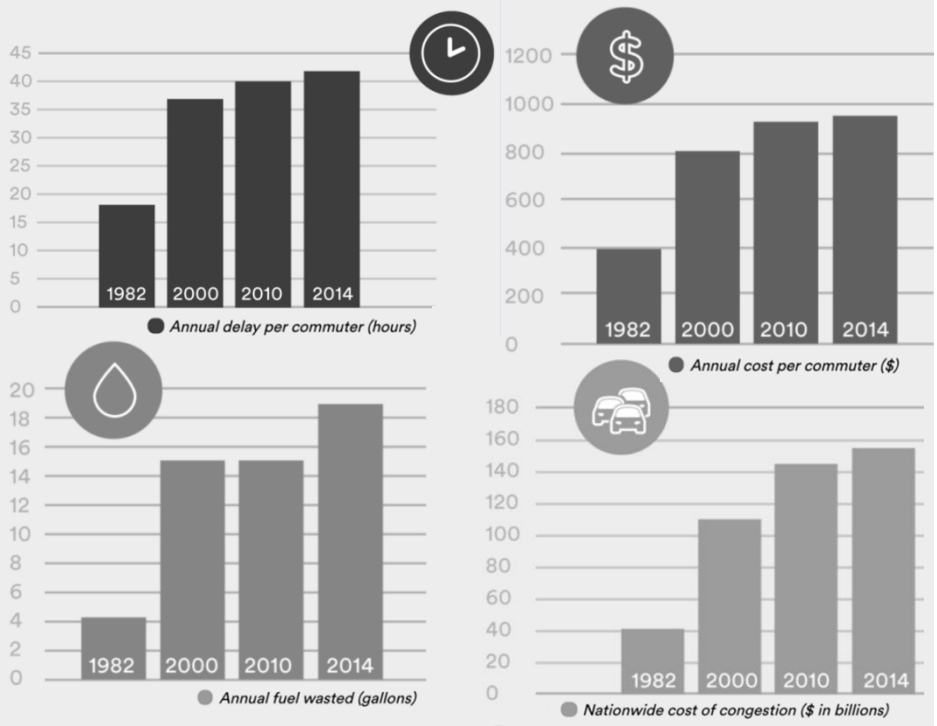

Figure 1.1 – Estimated costs for US citizens to sit in traffic (INRIX, 2019).

The Organisation for Economic Co-operation and Development (OECD) defines the urban traffic congestion as follows in their report on managing the urban traffic congestion:

> "Urban traffic congestion must be understood in the wider context of city dynamics and agglomeration benefits. Traffic congestion in urban areas is often the outcome of successful urban economic development, employment, housing and cultural, policies that make people want to live and work relatively close to each other and attract firms to benefit from the gains in productivity thus derived. There are many indications that, even though they may not be thrilled by the prospect, urban road users are prepared to live with crowded roads so long as they derive other benefits from living and working in their cities" (OECD, 2007: 12).

The OECD points out the effect of the dynamics and prosperous developments within a city. Additionally, the definition focuses more on the effect of urban traffic congestion has on people. For this reason, the definition of Saunders (2014) is more of interest.

1.2.2 Shared Mobility as a Potential Solution for Traffic Congestion

After providing a definition for both shared mobility and urban traffic congestion. The objective of this section is to explain how shared mobility became a potential solution to the traffic congestion problem. In the past decades, a number of debates have developed among researchers and policy makers with regard to measuring, defining, and responding to traffic congestion. Some debates are related to the effects of urban sprawl, while others address the emphasis on the automobile in research and responses. Existing research recognises the critical role played by the concept of urban sprawl with regards to traffic congestion. Urban sprawl could lead to drastic traffic congestion as roads into developments

serve ever greater numbers of commuters, and may contribute to financial issues for local governments. The Encyclopedia of Transportation affirms that:

> "Governmental policies abetted by new transportation and communication technologies contributed to and continue to influence urban sprawl. Most important, the widespread use of automobiles, along with zoning regulations and federal highway construction, influenced urban sprawl. Although many factors feed into urban sprawl, transportation technologies, and specifically, the automobile, are arguably primary catalysts" (Walsh, 2014: 982).

In 2015, when the shared mobility trend became increasingly visible, Elliot Fischman (2015) claimed that greater research was required to quantify the impacts of bikeshare on congestion. Research from the years after 2015 recognises the critical role of a bikesharing system had in order to reduce traffic congestion within a metropolitan area. A study from a think tank named Resources for the Future in 2016 showed the impact of the deployment of a large-scale bikesharing scheme upon levels of traffic congestion in Washington DC. According to their report, the presence of a bike sharing system dock within a neighbourhood reduces traffic congestion up to 4% (Hamilton & Wichman, 2018).

A similar conclusion was drawn by Machado, De Salles Hue, Berssaneti, & Quintanilha, (2018). The authors refer to research conducted in France and Portugal, where in both cases shared mobility contributed to a reduction of traffic congestion in cities. Moreover, they emphasise the fact that shared mobility increases traffic efficiency and simultaneously reduce unnecessary external costs for the local governments.

The potential that shared micromobility has to reduce urban traffic congestion is also confirmed by data analysis company INRIX (2019), who did a research among top 25 US cities and 10 cities in the UK and Germany. They argue that 42% of car traffic in the US is caused by cars on trips less than five kilometres, and the average US commuter spends 42 hours in traffic congestion. This is also displayed in figure 1.5 *supra*. Furthermore, they claim that micro-mobility services, such as e-scooters that are made for short distances, could alleviate almost half of car traffic in the US in the future (Reed, 2019).

When analysing the examples from Fischman (2015), Machado et al. (2018) and INRIX (2019), it becomes evident that shared mobility can strongly influence traffic congestion in metropolitan areas. The impact of deploying bike- and/or scooter sharing in cities is likely to reduce car traffic, therefore freeing up space on the roads. It is an undeniable fact that metropoles need to reduce urban traffic congestion. Implementing bike and scooters sharing are a good way to start according to the previously mentioned sources. Within the context of this thesis, it is expected that such initiatives will pose similar effects in Mexico City.

1.3 Shared mobility and public policy

1.3.1 Key policy considerations

This thesis will review the shared mobility policy of Mexico City as a possible solution to its traffic congestion problem. In this section the various views and approaches with regards to the relation between shared mobility policy and urban traffic congestion will be reviewed.

Software company Remix reviewed 17 cities' scooter and bikeshare policies in the United States. Based on data obtained from their Micromobility Policy Survey, they state that:

> "Cities that will achieve the most success are those who are proactive in management and have clarity on how new mobility options can achieve wider goals for a vibrant, multimodal city. Attributes such as safety, equity, access, and sustainability are all opportunities presented by micromobility. Yet, to positively influence these traits, cities must be positioned through thoughtful policies backed with strong digital infrastructure" (Zack, Shapiro, & Bailey, 2018: 10).

An additional advice is provided by Laurent Franckx, he argues that shared mobility has the potential to substantially reduce congestion, if embedded in appropriate policies. He states that local government agencies should encourage shared solutions such as Mobility as a Service (MaaS). MaaS can be explained as a system in which people can buy mobility services that are provided by the same or different operators by using just one platform and a single payment. Furthermore, local government agencies should provide the necessary infrastructure for shared mobility in a city. Next to that, Franckx suggests the creation of public-private partnerships for data sharing. Lastly, he affirms that a higher supply of shared solutions will decrease the waiting times for customers, and thus make the service more attractive, and generate additional demand (Franckx, 2017).

Authors Shaheen and Cohen (2019), from the University of California, Berkeley Transportation Sustainability Research Center, designed a so called Shared Micromobility Policy Toolkit. According to this toolkit, the best approach for establishing pilot programs and policies for shared micromobility may depend on a number of factors. Therefore, the authors state that local governments should consider seven key policy areas:

- General approach to regulation (e.g., establishing a pilot program);
- Key service characteristics, such as mode and operational model;
- Procedures for allocating curb space and right of way;
- Policies for managing competing modes, operators, and stakeholder interests
- Equity policies;
- Enforcement procedures;
- Data sharing guidelines

Moreover, they claim that reasonable shared micromobility policy can support local government agencies in leveraging positive impacts and suppress negative impacts to achieve key public policy goals such as: reducing driving and parking congestion; lowering vehicle kilometres travelled and single occupant vehicle auto dependency (Shaheen & Cohen, 2019).

A recent report from the Institute for Transportation and Development (ITDP), claims that local governments can take the four main steps to expand access to and oversight of electric micromobility in the near term: legalise use, standardise speed limits for electric modes when using cycling infrastructure, design safe cycling infrastructure that accommodates both electric and non-electric devices, manage and regulate shared electric micromobility systems and monitor use and ridership trends (Yanocha & Allan, 2019).

Based upon the advises and sources from experts mentioned above, two key policy fields will be analysed. Moreover, taking into account the scope of this thesis and the main research question, the following two policy areas are considered most valuable: curb space management and data sharing.

The reason for choosing the two policy fields of curb space management and data sharing is that both policy fields could have significant influence on traffic congestion if applied by local government agencies in the right way. This will be further explained and clarified in the following two sections.

1.3.2 Curb Space Management

The expansion of shared mobility in the past decade has led to an increased demand for curb space management policies. Curb space management is a term used to describe a transportation design and policy approach that requires curb access to be planned, designed, operated, and maintained to enable safe, convenient, and multimodal access for all transportation users. A common issue according Shaheen & Cohen (2019) for curb space management includes preventing shared micromobility devices from parking in inconvenient or dangerous locations that impede physically disabled people, pedestrian, and bicycle access.

As stated in a report from the International Transportation Forum (ITF) in 2018, providing more space at the curb to shared mobility services, together with widespread adoption of shared mobility, can lower overall vehicle kilometres travelled, raise average traffic speeds, and most important: reduce traffic congestion (International Transport Forum, 2018).

As local governments work to develop their urban cores to a more efficient and sustainable future, it is essential that they should reconsider how curb space is designed, allocated, and managed. Nowadays, a greater part is used for parked cars that, on average, 95% of the time stand still. Rather than view curbs as “static, inflexible installations,” the ITF encourages local agencies to rethink their curbs as “dynamic, highly flexible, self-solving puzzles” and outlines the potential benefits of adopting this transition (International Transport Forum, 2018: 8).

According to Shared Mobility Policy Playbook, key elements of shared micromobility curb space policies include:

- Fees: charge operators a variety of fees for allowing the placement of shared micromobility.

- Device caps: limit the number of bicycles, scooters, or other devices that can be deployed per provider.
- Designated parking areas: special areas where to park a device on the curb, a requirement to lock or attach a device to bicycle rack or other piece of street furniture.
- Service areas and geofencing: access limitations of operational areas, which may be enforced through virtual geographic boundaries (commonly referred to as geofencing) by using for example GPS (Shaheen, Cohen, & Randolph, 2019).

1.3.3 Data Sharing

Over the past years, shared bikes and scooters have expanded to over 300 cities around the world. With this increase, local governments want operators of shared mobility fleets to provide cities with data and information to support policy makers more effectively manage their streets and public spaces (Clewlow, 2019). Regina Clewlow, CEO of data platform Populus.ai argues in an article on Forbes' website the following about data and shared mobility:

> "At the end of the day, there are both positive impacts and negative impacts of private shared mobility services. And it is only with data that transportation planners and policymakers can drive progress towards the positive outcomes: safer, more reliable, more equitable, and more efficient transportation in cities" (Clewlow, 2019).

Shaheen and Cohen (2019) published a policy toolkit for cities to integrate shared micromobility services into existing city environments. The policy toolkit explains that data sharing can help local governments actively enforce policies and help prevent potential issues. Furthermore, data sharing is a requirement that local government agencies may require as a condition for operating in the public rights-of-way. Standardised and open data allows public agencies to understand micromobility impacts; identify gaps in the transportation network; monitor equitable service standards; and offer multimodal, real-time transportation information through smartphone apps, websites, and other platforms. These efforts are helping to support research, public policy development, and contribute to public agency enforcement, operational management, and transportation planning. Obviously, it is important when collecting data to take into account the local privacy policy (Shaheen & Cohen, 2019).

In another report from the UC Berkeley on shared mobility policy, the authors explain that data can be shared in a number of ways:

- Public agencies requesting and enforcing data sharing as a requirement for shared modes operating within the public rights-of-way;
- Mobility operators can share open-source data for public use; and
- Public agencies and operators can work with third-party organisations to share and anonymise data (Shaheen, Cohen, & Randolph, 2019).

In addition, ITDP acknowledges the importance of data sharing by stating that cities and national governments should work to collect data on e-bike and e-scooter use, disaggregating e-bikes from pedal bikes in order to better understand and evaluate travel

patterns for both modes. Evaluating trip types and use cases other than commute trips as well as disaggregating usage data by gender, age, and socioeconomic status would provide a more accurate picture of use. Understanding who is using these modes and how it is important to ensure that transportation interventions are meeting multiple goals, from safety to environment to equity (Yanocha & Allan, 2019).

Finally, the ITF outlines one of the key messages in their report on managing curb space and data. They state that there is a widening gap between the algorithm's decisions based on shared mobility data that allows people to behave in new ways. On the other hand, there are the public authorities managing those decisions and behaviour. In other words, code automated decision-making systems on one side, paper law and human readable regulations on the other side. This is causing a lot of tension among policy workers. So one of the key recommendations of the ITF report is that governments should start thinking about creating algorithmic law and regulatory interventions that allows the government to close that gap (International Transport Forum, 2018).

1.4 Conclusion

In this chapter the core concepts were analysed. First the concept of shared micromobility is understood as the bike and scooter sharing system which operates in large cities. It is an emerging business model that showed its value in the past decade in the western world. Furthermore, urban traffic congestion can be understood as the process by which the number of vehicles on roads exceeds their capacity leading to economic and infrastructural problems. Often, the traffic congestion is caused by the automobile-reliant developments in the area. It can be concluded from this theoretical review that shared micromobility has the potential to contribute to a solution for a city's traffic congestion problem. However, local governments should take into account the key policy considerations created by experts from the Transportation Sustainability Research Center in California. Two of these key policy considerations, curb space management and data sharing, are outlined in this chapter. It is proven that both policy considerations could have significant influence on a city's traffic congestion if applied in the correct way. The next chapters will place this policy in the context of Mexico City and offer an analysis of the public policy programs and projects adopted by the local government.

Chapter 2
INTRODUCTION AND DEVELOPMENT OF SHARED MOBILITY IN MEXICO CITY

This second chapter provides a contextualisation to the main research topic. First of all, the city's traffic congestion issue will be outlined and discussed. Then, the introduction, development and current status the various shared mobility services in the context of Mexico City will be explained. Mexico City has adopted various modes of shared micromobility in the last decade. The local government's bike sharing system called EcoBici will be presented. Later the relatively new and privately-owned bike sharing and scooter sharing services will be highlighted. As discussed in chapter one, two key policy consideration that will be highlighted are the ones on curb space management and data sharing.

2.1 Traffic Congestion in Mexico City

2.1.1 Demography Mexico City

The Mexican capital is the largest city in the Western Hemisphere and saw its population grow from 13 million in 1980 to nearly 22 million in 2019. Population growth, urban sprawl and hyper urbanisation are generating many social and economic issues. According to Priscilla Connolly (2018), urban sociology professor at *Universidad Autónoma Metropolitana*:

> "No one expected Mexico City to grow so much, but for years it was thought that the more people who lived there the better. There was a pro-population policy. Now the city has stopped growing and medium-sized cities are growing fastest" (Vidal, 2018).

Mexico City is still overcrowded, heavily polluted, congested and predominantly poor. There is only little space to construct 50,000 new houses a year that the city needs. But rapid change can be coordinated, and urbanisation has its benefits claims Connolly (2018):

> "There has been progress in so many ways. Most people can read and are housed. All in all, it's been a successful transition, though fraught with future environmental risk. Planning and thinking was geared to the idea that cars could circulate. Only 30% of Mexico City has a car, but the city was designed for the car" (Vidal, 2018).

Mexico City consist of 16 *alcaldías* or municipalities. These 16 municipalities are divided into 319 of *colonias* or neighbourhoods. In this thesis, the focus will be on the following municipalities located in the city centre: Cuauhtémoc, Benito Juárez and Miguel Hidalgo. A detailed map of these municipalities and the service areas of the shared mobility services is presented in figure 2.1, 2.3 and 2.7 *infra*. Cuauhtémoc, Benito Juárez and Miguel Hidalgo are the three most visited areas in the city. These three municipalities will be briefly introduced below.

1. Benito Juárez has the highest socioeconomic index in the country as it is primarily populated by the middle and upper middle classes. In the past decades, there was a strong economic pressure to transform residential buildings and areas into commercial places mostly due to the central location of Benito Juárez and its accessibility by road. This saturation has led to lots of traffic congestion (Mautner, 2008).

2. Cuauhtémoc can be seen as the historic heart of the city and therefore attracts lots of tourists during their visit to the Mexican capital. Due to the large number of people who enter and leave Cuauhtémoc each day, up to 800,000 cars circulate the streets per day, leading to traffic jams, especially in the historic part. Besides, the municipality has the largest number of metro lines running through it (Mautner, 2008).

3. Miguel Hidalgo is home to most diplomatic missions and a number of multinational headquarters. Therefore, a lot of workers come and go in this neighbourhood during weekdays. The area is one of the wealthiest parts of Mexico City and contains the affluent neighbourhoods of Polanco, Popotla and Lomas de Chapultepec (Mautner, 2008). But most important, it is the neighbourhood with the most registered vehicles per household according to Fernández Silva et al. (2018), as can be seen in figure 2.1 *infra*.

2.1.1 Commuting in Mexico City

According to interviewee Diego Antero (2019), sustainable transportation planning advisor at the secretary of mobility, most commuters coming from the peripheries of the city work in these areas. Some of them travel almost three hours to their work and another three hours to return back home. In these six hours, commuters use a combination of travel modes to reach their destination such as *colectivos* (collective buses), metro, *Metrobús* (a bus rapid transit system), train and in some cases a bicycle. However, most citizens use their car for commuting. Commuters in the city spent an average of 227 hours per year driving in congestion (Parish, 2019). Around 1980, there were 124 cars per 1,000 citizens; by 2010, that number had more than doubled to 267, as can be seen in figure 2.2 *infra*. In 2015, there are almost five million vehicles registered and another 5.1 million registered in the surrounding state of Estado de Mexico. (Guerra, 2015). The IBM Commuter Pain Index estimates the emotional and economic expense of commuting, in which Mexico City is the leader to 20 other world cities (IBM, 2011). According to the latest data from INRIX (2019), Mexico City is the third most congested city in the world. Average travel speed has decreased to 12 km/hour meaning citizens are spending an average of three hours a day commuting (INRIX, 2019). Urban traffic congestion also translates to financial and inefficiencies for the city in multiple forms. Office buildings in Mexico City dedicate an average 42% of their surface to parking lots in order for their employees to meet the current transport habits. It is stated that, traffic congestion reduces the productivity of workers because a significant amount of time is spilled in traffic (Avendaño & Jimenez, 2015).

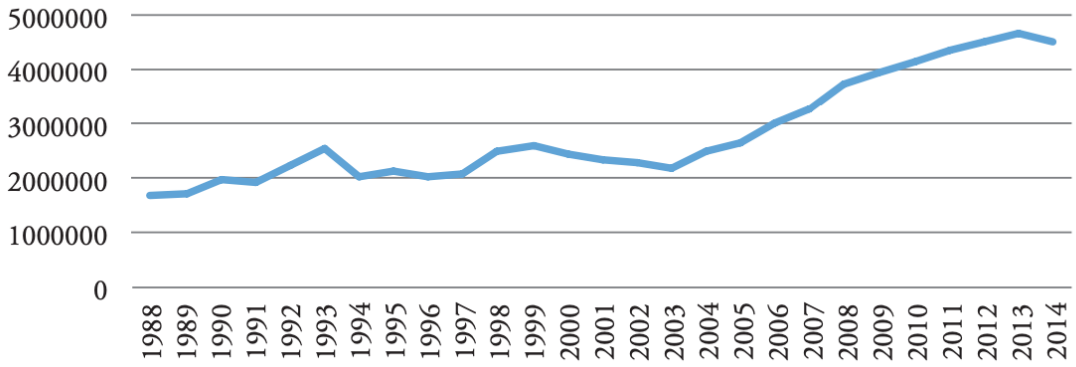

Figure 2.2 - Motorization in the Metropolitan Area of Mexico City (Fernández Silva, Suárez Lastra & Quiroz Rothe, 2018)

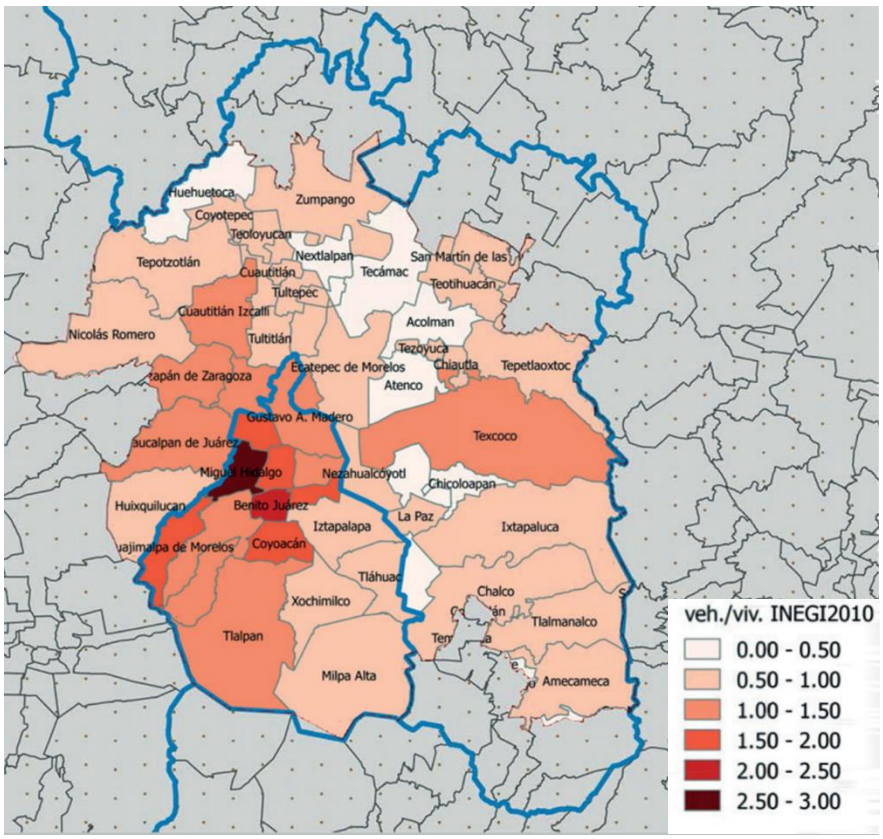

Figure 2.1 - Registered vehicles per household (Fernández Silva, Suárez Lastra & Quiroz Rothe, 2018).

The TomTom Traffic Index of 2017 identified the top 10 roads with most traffic problems in Mexico City (Animal Político , 2017). Four out of TomTom's top 10 most congested roads are located in Cuauhtémoc and Benito Juárez:

- Viaducto Miguel Alemán, between Eje Central and Doctor Vertiz (Cuauhtémoc)
- Avenida Guerrero, between Mosqueta and Puente de Alvarado (Benito Juárez)
- Calzada Chabacano (Cuauhtémoc)

- Doctor Vertiz, between Baja California and Viaducto Miguel Alemán (Benito Juárez)

The secretary of mobility (SEMOVI) have introduced several measures in order to combat the congestion problem and reduce the number of cars in the city centre. For example, a bus rapid transit (BRT) system called *Metrobús* was implemented in 2006. The BRT moves around 1.5 million people every day and it has contributed to the reduction of commute time from one and a half hour to one hour per day (Metrobús Ciudad de Mexico, 2020). Furthermore, the city implemented numerous taxes and tolling systems. Also, a car restriction system was set up called *Hoy No Circula* or in English 'no-drive days'. The program restricts driving on a schedule determined by a coloured sticker based on a vehicle's license plate number. However, it is never proven that *Hoy No Circula* led to a reduction of the total vehicles in the city (Davis, 2008). In addition, the public bike-sharing system EcoBici and the recently introduced dockless bike and scooter sharing companies are part of a new strategic mobility plan. They are one of the many initiatives from the local government that aim to promote sustainable ways of transport and improve quality of living in Mexico City. How these shared mobility services function and operate will be further explained in the next section.

2.2 Docked Bike Sharing System: EcoBici

The first micromobility service that was introduced in Mexico City was EcoBici. The docked bike sharing system was launched in February 2010 under the city's *Estrategia de Movilidad en Bicicleta* (Bicycle Mobility Strategy), a program of SEDEMA, the Ministry of Environment of Mexico City. It was launched with the aim to increase cycling while simultaneously reducing traffic congestion and transport related emissions within the city. While funded by the local government with an upfront investment of 75 million Mexican pesos (almost 3 million Euro), the operator of EcoBici is a private company called Clear Channel. The company also operates successful bike sharing models in Barcelona and Stockholm, among others. Clear Channel manages the software and data of the service while the government of Mexico City owns the bicycles and the docking stations. This means there is a public-private partnership model between the two actors (POCACITO, 2015).

Initially, EcoBici started with 85 docking stations and 1000 bicycles. Then the network expanded every year and currently has around 480 docking stations and over 6500 bikes, both regular and a small number of e-bikes. This growth is also reflected in the figures 2.3 and 2.4 *infra*. A current overview of EcoBici docking stations is presented in figure 2.5 *infra*. The docking stations are usually situated close to public transportation stops, which allows for an effective combination of different types of transportation. Since the launch in 2010, EcoBici accumulates more than 65 million overall trips and has an average of 30,000 trips per day. Therefore, EcoBici is the largest bike sharing system in Latin America (SEMOVI, 2019).

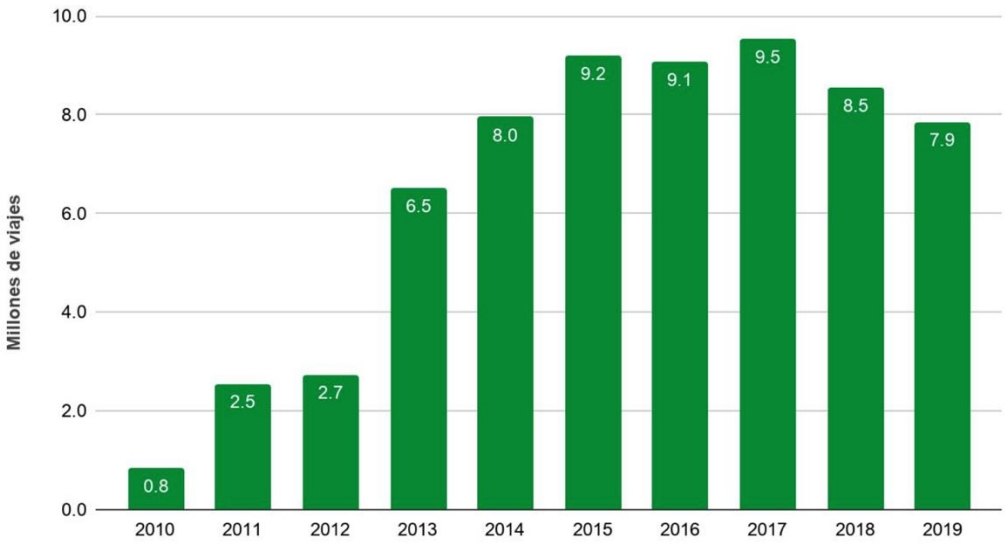

Figure 2.3 - Trips made per year *(SEMOVI, 2019)*

In total, the area covered by EcoBici is 38 km^2 divided over three municipalities: Benito Juárez, Miguel Hidalgo and Cuauhtémoc, as displayed in figure 2.5 *infra*. Since the beginning of EcoBici, the local government's bike sharing system has 322.000 registered users, this number increased every year as showed in figure 2.4 *infra*. In the first two years, EcoBici saw a significant increase in users and daily trips. The local government together with the operator Clear Channel decided to increase the number of bikes and docking stations in the city centre of Mexico City. First, the neighbourhoods Polanco, Roma and Condesa were added. Three years later in 2015, the second expansion took place when they added Benito Juárez. Lastly in 2017, around 340 electric bikes were added to the EcoBici fleet (SEMOVI, 2019).

According to data from SEMOVI, one in two users do not live in the EcoBici area of operation. In addition, 15% of the users live in the Metropolitan Area of the State of Mexico. One in five users stopped using motorised means of private transportation and switched to EcoBici as principal transport use (SEMOVI, 2019). Moreover, according to research conducted by the local Ministry of Environment, the cities bike sharing system reduced roughly 8% of taxi use and 5% of private car use (SEDEMA, 2014).

The decision to make EcoBici part of the larger urban mobility and environmental plan was crucial to its success. Consequently, the sharing system was not implemented by the city's *Secretaría de Movilidad* (SEMOVI) but, instead, by the *Secretaría del Medio Ambiente* (SEDEMA) because of a series of ambitious transportation projects that were developed around that period. The city's *Estrategia de Movilidad en Bicicleta* is more than just bike sharing program. Its objective is to increase bicycle trips by linking the city's bicycle strategy and the EcoBici with the wider urban transport network (such as bus rapid transport and metro) to improve last-kilometre connectivity (SEDEMA, 2014).

It can be said that EcoBici has had a significant growth in ridership in the last decade and therefore expanded its fleet several times. Additionally, the system grew to become the largest in Latin America. Most important, the bike sharing system contributed to a reduction of taxi use and private car use. Therefore, it can be considered as a very successful bike sharing system.

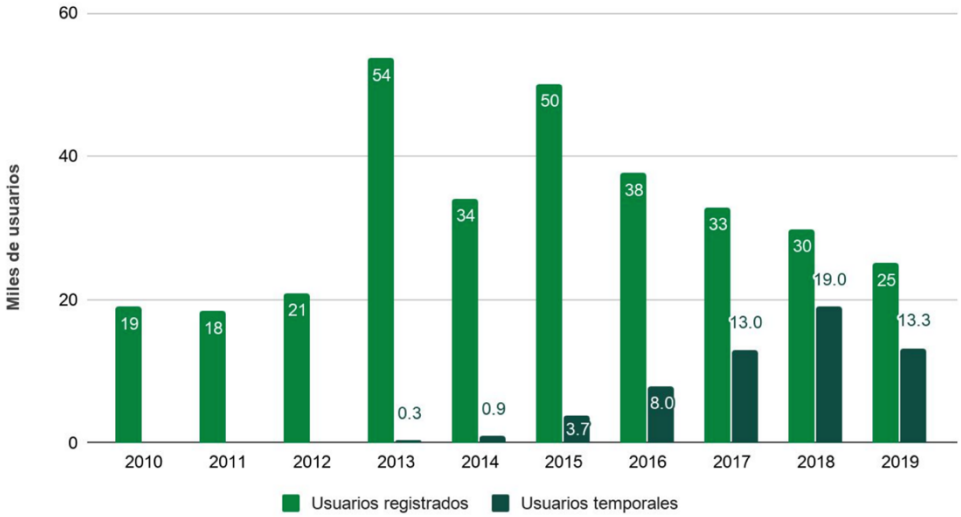

Figure 2.4 - Memberships by type of user *(SEMOVI, 2019)*

2.2.1 Public Policy Review: EcoBici / Curb Space Management

EcoBici started in 2010 under the city's *Estrategia de Movilidad en Bicicleta* (bicycle mobility strategy). This strategy was launched with the aim to make the bicycle system accessible to the entire population of Mexico City. Another objective was to create a 300 km cycling infrastructure network within the city and design proper bicycle parking stations near public transport hubs by 2012. Also, a plan was set up to educate the local people on how to ride a bicycle. The *Estrategia de Movilidad en Bicicleta* is a comprehensive strategy that is linked to various national and local policies concerning:

National Policies:

- *Ley General de Cambio Climático 2012*
- *Programa Nacional de Desarrollo 2013-2018*
- *Programa de Impulso a la Movilidad Urbana*
- *Programa Integral de Movilidad (PIM) 2013-2018*

These national policies focus on investment in public and non-motorised transport and overall reduce of emissions in Mexico. They strive towards 30% reduction in greenhouse gas emissions greenhouse in 2020 and 50% in 2050. In the context of EcoBici, the aim is to consolidate and expand ECOBICI, to create cooperation agreements, in the public-private field to promote the use of the bicycle. Finally, the plans seek for an expansion of EcoBici, promoting the daily, massive and safe use of the bicycle in the city (De la Lanza, 2018).

Regional Policies:

- *Plan Verde 2007-2022*
- *Programa General de Desarrollo del Distrito Federal 2013–2018*
- *Programa de Acción Climática de la Ciudad de México 2014-2020*

With the regional policies, the *Derecho a la Movilidad* or Right to Mobility was established in 2014. The regional policies are more focused on the recognition of the bicycle as a vehicle with rights and obligations. In addition, it aims to improve the construction of cycling infrastructure (De la Lanza, 2018).

As described in the first chapter, Shaheen et al. (2019) states that key elements of shared micromobility curb space policies include: fees, device caps, designated parking areas and geofencing. The Government of Mexico City pays an annual fee for operating, maintenance and subsidy costs to the operator Clear Channel. Clear Channel owns the software tool regarding the management of the bike sharing service. The operator must meet and maintain the service levels established by the Government of Mexico City. Because of this unique public-private partnership model, the government of Mexico City is in control of the distribution and management of the bicycles. EcoBici has currently 480 docking stations where users have to park their bicycle in order to finish the trip. The docking stations are displayed in figure 2.5 *infra*. For EcoBici users, it is not allowed to park bikes outside this area.

2.2.2 Public Policy Review: EcoBici / Data Sharing

The Institute for Transport and Development Policies (ITDP), together with the *Instituto Politécnico Nacional* (IPN) and EcoBici, designed a public policy program called *Sistema de Análisis de la Movilidad* (SAM) to make public transport systems in Mexico City more efficient through smart data usage. The SAM EcoBici project is an example of the opportunities for improvement in a public transport system thanks to efficient information management and open data policies. This project uses the data generated by the Mexico City public bicycle system EcoBici to create a demand analysis and projection platform that can be used to rebalance the system predictively; which tangibly demonstrates benefits for Mexico City local government, operators and users (ITDP, 2017).

The policy programme uses the data that is provided on the EcoBici website, which also is publicly available. The following data is used for the project:

- Trips made by docking station
- Average distance of trips
- Bike stations with the highest use and least use (for relocation)
- Total trips made by year and month
- Trips made by gender and age.
- Connectivity between stations

The SAM project includes advanced analytical capabilities so that, in addition to being an informative system, it is an intelligence system for the visualization and analysis of EcoBici. The objective of SAM project is to be able to optimise the operation of the transport system by automating processes. SAM currently provides an hourly estimate of this reordering point using the historical information available. The demand predictive model is also adjusted to be able to receive more variables in the future, such as weather conditions or traffic events, and in this way deliver even more accurate results (ITDP, 2017).

The direct benefit of this solution is to reduce the use of resources to balance the EcoBici system. In other words, operating costs are reduced to know where to move the bikes according to travel needs and allows the local government to have better supervision on the operation. It also means that users will benefit in their overall experience of the bike sharing system. Users will benefit from a reduction of total travel times and a better flow during rush hour. These improvements in the operation of the system are also reflected in the quality of the service, which encourages more people to start using EcoBici as their main way of transport or, as a complement in their daily commuting life. This means creating intermodal trips and offering shared mobility alternatives that may be more convenient and attractive than a private car (ITDP, 2017).

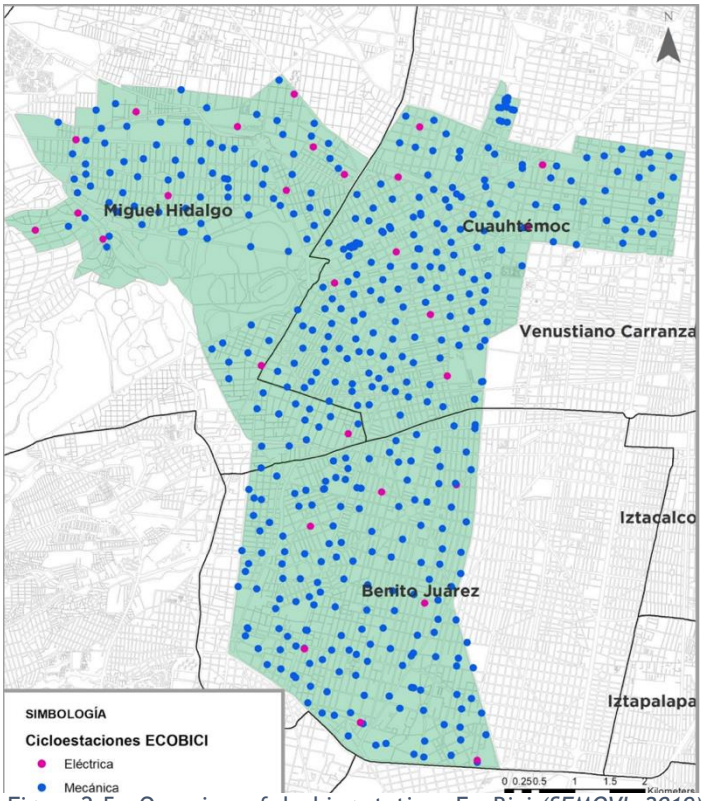

Figure 2.5 - Overview of docking stations EcoBici *(SEMOVI, 2019)*.

2.3 Dockless Bikes and Scooters

Besides, the government owned bike sharing system EcoBici, there are a number of private companies who offer dockless bikes and electric scooters in Mexico. SEMOVI uses the term *Sistemas de Transporte Individual Sustentable* or simply SiTIS when referring to the dockless bikes and scooters. An overview of the private operators of dockless bikes (*bicicletas*) and scooters (*monopatines*) are presented below in table 2.6 *infra*.

Dockless Bikes			Scooters		
Company	**Units Permitted**	**Status**	**Company**	**Units Permitted**	**Status**
Mobike	1,100	Active	Lime	500	Active
Vbike	1,100	Active	Bird	500	Active
Dezba	1,100	Active	Grin	500	Inactive
Motum	1,100	Inactive	Movo	500	Active
			Motum	500	Inactive
			Econduce	500	Inactive

Table 2.6 - Dockless bike and scooter sharing companies in Mexico City *(SEMOVI, 2019)*.

The shared bikes and scooters were introduced quite recently; in February 2018 the dockless bikes were allowed to start operating. Five months later, in July 2018, the electric scooters

companies started their activities (SEMOVI, 2019). Since the bike and scooter sharing companies were introduced very recently in 2018, there is only few data and research publicly available. The dockless bike and scooter sharing companies have the following characteristics in common: Users will have to download the mobile application of the operator and register online with their credit card details in order to use the bike or e-scooter.

SEMOVI carried out the operation *Piloto* for the SiTIS between 6 February and 25 March 2019. During this period of 45 days, various tests were carried out that were aimed at ordering and standardising the operating conditions of the companies mentioned in table 2.6 (SEMOVI, 2019). The city officially decreed that according to the legal framework relating to bike sharing in Mexico, companies interested in providing this service must apply for a permit from SEMOVI. To receive the permit, the operator must comply with the following requirements:

- Certification as a Mexican company
- Proposal on technical implementation and operation process
- Feasibility study, including demand analysis
- Share real time data with SEMOVI
- Provide insurance for users
- Free registration for users (WRI, 2019).

Based on the findings of the second operation *Piloto* report, SEMOVI published SiTIS' operational guidelines, which included, among others, the area of the city where the service could be offered, basic components required for bikes and scooters, branding regulations, parking restrictions and most importantly, they were required to share details of operational data with SEMOVI. These operational guidelines will be further discussed in the next section.

However, it is important to note that in the period before the pilot programme was introduced, (February 2018 till February 2019) there was no official policy on regulating shared mobility in Mexico City. According to the interviewees Aguirre (2019) and Antero (2019), the reason for not implementing an official public policy, was because the government of Mexico City was in the middle of a transition when the dockless bikes systems and scooter companies were introduced. A proposal was created, but never officially published according to Aguirre (2019). This meant, the private companies had to launch their activities in the city without clear regulations from the local government.

2.3.1 Public Policy Review: Dockless Bikes and Scooters / Curb Space Management

On 26 March 2019, the Ministry of Mobility of Mexico City (SEMOVI) published the guidelines for the operation of dockless bikes and scooters. The objective of the guidelines is to regulate the operation of the services provided by legal entities that make up the sustainable individual transportation systems of Mexico City. The policy on curb space management is described in the *Capítulo V* (Chapter 5) in the *Gaceta Oficial,* the official gazette of the government of Mexico City. In this gazette, the local government announces the guidelines for the operation which are presented by the secretary of mobility (SEMOVI, 2019).

According to the *Gaceta Oficial* (2019), the local government will create dedicated parking areas for dockless bikes and scooters. In January 2020, around 75 new parking spots were designed for the bikes and scooters across different areas in the city centre. The new parking spots for bikes and scooters will replace the car parking spots and will be beneficial for regular bikers and pedestrians as well.

Furthermore, the guidelines state that the units may be parked in spaces outside the vehicular stream that do not affect pedestrian mobility. The beginning and end of the trip must be made within the indicted area. Service trips may not be completed in spaces outside the area of operation or in any other area than defined for this purpose as indicated on the map in figure 2.7 *infra*. Furthermore, it is forbidden to park the units in the following zones:

- Pedestrian strip, front strip and pedestrian access to buildings
- Crossings and pedestrian ramps
- Entrance to public transport stations and within public transport station
- Vehicle circulation lanes
- Parking spots dedicated to people with disabilities
- Loading and unloading spaces
- Urban furniture, such as EcoBici cycle stations
- Areas of environmental value, areas of cultural heritage, green areas and federal areas (Gobierno de la Ciudad de México, 2019)

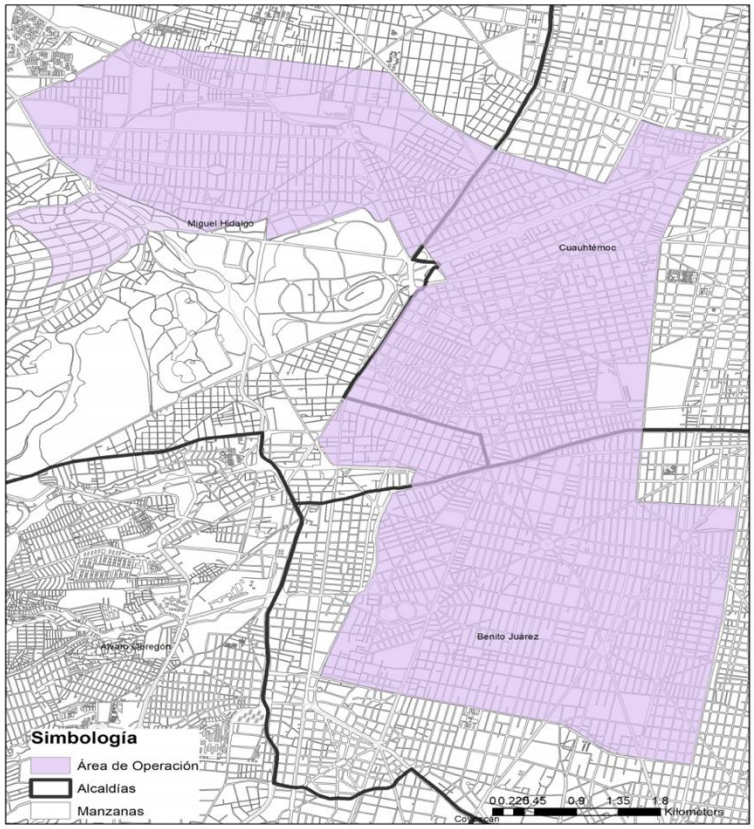

Figure 2.7 - Area of Operation SiTIS (SEMOVI, 2019)

2.3.2 Public Policy Review: Dockless Bikes and Scooters / Data Sharing

The policy on data sharing is described in *Capítulo X* in the *Gaceta Oficial* published by SEMOVI (2019). According to the *Gaceta Oficial* the data collected from trips of the users are considered of public utility. The operator must provide the data to SEMOVI when requested. This means access to the operator's digital platform, which allows real-time consultation of the location and number of service units. In the same way, it should allow SEMOVI to consult the anonymised data about the historical trips. In addition, the operator must provide a monthly operation report to SEMOVI, with quantitative and qualitative analysis. The information should include, among others: registered users by gender, number of trips per day, origin and destination of trips, average duration and distance of trips during weekdays and weekends. These monthly operation reports are of interest for SEMOVI in order to design an efficient and comprehensive urban mobility policy based on data analysis. In this way, the Government of Mexico City intends to design and implement evidence-based public policies to guarantee the effective displacement of people with regards to safety, quality, equality and sustainability (Gobierno de la Ciudad de México, 2019).

Thanks to the operation *Piloto* that was carried out in February and March 2019, the SEMOVI was able to get a general overview of the scooter and bike sharing activities. For instance, SEMOVI collected data from travel origins and destinations, as displayed in figure 2.8 *supra*. Furthermore, after reviewing the operation *Piloto*, it can be said that dockless bikes use is mostly used for to educational and work-related trips, whereas scooters are used for leisure trips or in between work trips. Among these findings, it should be noticed that 701 thousand total trips were made during the pilot period. This accumulates to an average of 16 thousand trips pe day. In the period of 45 days, different trends were identified in terms of hours of use, as well as the distance and duration of trips between those made by bicycle, electric bicycle and e-scooter. Finally, the analysis was identified specific areas that require further development. For example, on the infrastructural aspect: Mexico City needs to implement more parking zones for the shared mobility systems in order to ensure both user and pedestrians safety (SEMOVI, 2019).

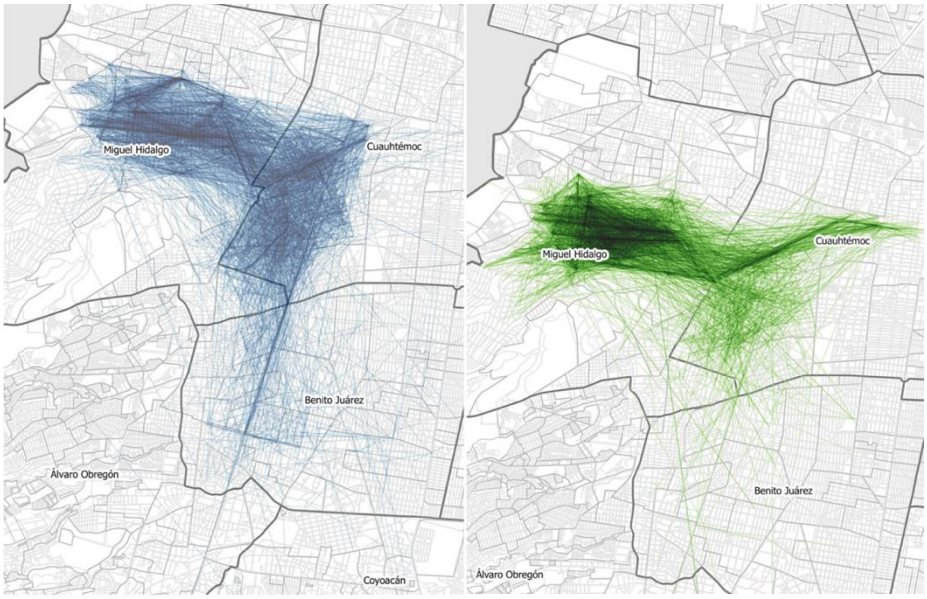

Figure 2.8 - Travel origins and destinations. Left: dockless bicycles. Right: e-scooters *(SEMOVI, 2019)*

2.4 Conclusion

All in all, this chapter has provided a general overview with regards to the context of fairly new shared mobility services in Mexico City as well as the city's extensive traffic congestion problem. There have been many attempts to reduce the impact of traffic congestion. However, the question arises if the government did implement the shared mobility policy appropriately. The third and final chapter will provide a more in-depth analysis with critical note on the introduction and development of the EcoBici policy and the dockless bike and scooters policy.

Chapter 3
SHARED MOBILITY POLICY IN MEXICO CITY

This chapter provides an analysis on the policy programs and projects set up by the Mexican local government (*Gobierno de la Ciudad de México*) and Secretary of Mobility (*SEMOVI*) of Mexico City in the past decade. It identifies the main political challenges to the implementation of the shared mobility policy. Moreover, it highlights the strategy of local government and reflects the impact on the traffic congestion problem. This study includes an analysis of the information obtained by six interviewees. The interviews were conducted in semi structured form. Some of the interviewees include the directors of the non-governmental organisation BikeNcity and interest group Mobility as a Service Latin America (MaaS Latam). Others are representative of the Institute for Transportation and Development Policy (ITDP) and deputy director of the city's secretary of mobility (SEMOVI). An overview of all interviewees is included in the appendix. The first section of this chapter will critically analyse the policy regarding shared mobility in Mexico City. On one hand, the implementation and success of EcoBici and its policy will be explained. On the other hand, the unsuccessful outcome of the dockless bikes and scooters (SiTIS) policy will be presented. From these policies, both strengths and weaknesses will be discussed in order to create an in-depth understanding of its successful and unsuccessful outcomes. The chapter highlights the accomplishments and failings of these shared mobility policy programs as to what extent they have contributed to a solution for the city's traffic congestion problem. Finally, this chapter is concluded with a SWOT model. The SWOT model is a tool to analyse internal and external factors regarding the public policy. SWOT stands for Strengths, Weaknesses, Opportunities and Threads. In this thesis, the model will be used as a tool for evaluation of the public policy on shared mobility in Mexico City. The last section of this chapter analyses the shared mobility policy in the light of urban traffic congestion more specifically.

3.1 The Success of the EcoBici Policy

EcoBici was the first micromobility sharing system that was adopted by the local government of Mexico City. The docked bike sharing system was launched in February 2010 under the city's *Estrategia de Movilidad en Bicicleta* (EMB), a program of SEDEMA, the Ministry of Environment of Mexico City. From the very beginning, EcoBici had a flying start, thanks to EMB policy which included various special educational programs. It is considered as a successful policy program throughout the past ten years. Kennia Aguirre (2019), former employee of EcoBici, argues that:

> "EcoBici is the most successful bike sharing system in Latin America. It has definitely changed the way of getting around the city. In *Paseo de la Reforma*, one of the busiest avenues of the city, ten years ago, when there was no cycle track, around 70 cyclists passed per day. After implementing the cycle lanes and EcoBici, the number increased in the first year, to more than a thousand people per day. Nowadays, there are an average of three thousand cyclists per day. So, the policy has had a significant impact on the infrastructure in the centre" (Aguirre, interview with the author, 2019).

This argument is supported by Ari Santillán (2019), who also refers to a rapid increased number of EcoBici trips in the *Paseo de la Reforma*, the biggest avenue in Mexico City, which runs diagonally across the heart the city. Santillán claims it is an example of the success of the EcoBici policy. Aguirre continues by pointing out three main factors of success:

> "One, there is a subsidy for the operation of the system. Two, it was implemented under a comprehensive strategy which included cycling infrastructure, parking zones, educational programs, and cycle lanes. Three, EcoBici became part of the identity of the city" (Aguirre, interview with the author, 2019).

It is stated that EcoBici became part of the identity of the *Chilangos* over the past decade. This statement is also affirmed by Ari Santillán (2019), urban mobility expert and journalist. He claims that in the city centre, it was only very recently that people start using bikes for commuting, with the start of EcoBici in 2010. The system gained a lot of confidence from the citizens since then (Santillán, 2019). Sonia Medina, representative of ITDP Mexico, agrees with Santillán by arguing:

> "The government focused on the Cuauhtémoc area because the bicycle used to be seen as a vehicle for poor people, for people with a low income. It had a bad image. That is why they focused on the city centre so they could attract a new type of users like the businesspeople" (Medina, interview with the author, 2019).

In the first years of the operation, the changing image of EcoBici was proven to be successful. Because of its implementation and adoption in higher income areas of Mexico City, EcoBici has supported a new target group to use the bicycle, causing a new profile of a cyclist: one who is middle class, educated, and for whom cycling is a choice rather than an economic necessity. This has supported EcoBici to build up visibility, social acceptance, and legitimacy (López, 2013: 104-124).

3.1.1 Effectiveness of the EcoBici Policy

It can be said that the EMB policy program implemented by SEMOVI contributed to a solution for the traffic congestion problem in Mexico City. The policy made people choose for a bike instead of choosing a car to commute. Next to that, the system connects very well with public transport according to BikeNcity CEO Aguirre:

> "More than 65 million trips have been made by EcoBici users, which could have been made in other modes of transport. But I consider that not only EcoBici, but also the connection with the public transport, makes it a perfect combination for commuters in the city centre. Around 86% of all the EcoBici trips are combined with another mode of public transportation" (Aguirre, interview with the author, 2019).

In addition, Diego Antero, working for the city's secretary of mobility (SEMOVI), states that EcoBici is part of a greater mobility platform for Mexico City. A platform that is an urban traffic management solution that integrates different modes of transportation:

> "The solution is not only the bike or EcoBici, we have to enhance the entire public transport system. To stimulate the use of a bicycle instead of using cars is part of this. But we have to

> do it in an integrated way to create an integrated mobility platform" (Antero, interview with the author, 2019).

This statement is also affirmed by Aguirre (2019): "Instead, EcoBici helps with the first and last mile. You generate intramodality. EcoBici is part of a working mobility system you already have" (Aguirre, 2019). The fact that EcoBici is connected to various public transport hubs can be seen as a strength of the EMB policy program. However, Santillán is more critical on the policy and believes that SEMOVI could improve:

> "Personally, I believe that the EcoBici system did not grow enough and progress was minimal compared to the need; in areas where the system is fully established, such as Buenavista station, which is an important bottleneck in the Cuauhtémoc area. For example, the more than 200 bicycles are not enough to meet the demand in rush hour in that specific area. The growth was barely enough to avoid the collapse of the system" (Santillán, interview with the author, 2019).

3.2 The Complications of the Dockless Bikes & Scooters Policy

3.2.1 No Clear Regulations from the Start

In March 2018, the first private companies with dockless bikes and scooters were introduced in Mexico City. However, there was no public policy set up by the local government, there was no clear political strategy. Irasema Mendoza (2019), infrastructure and logistics advisor at the Dutch embassy in Mexico explains how one of the first companies called Mobike from China, started operating. In March 2018, the SEMOVI provided Mobike with a permit to operate. However, the city's secretary did not provide Mobike with clear guidelines nor regulations on what was expected from the Chinese shared micromobility company. Therefore, Mobike had free rein to operate. Mendoza, Santillán and Medina all state that the previous administration had no knowledge or strategy on how to manage these companies (Mendoza, 2019). According to ITDP representative Sonia Medina (2019), the reason for not setting up an official public policy from the beginning is that the dock less bike and scooter companies were introduced just before the transitions of administration in 2018. In March 2018, Miguel Ángel Mancera ended his six-year term as mayor of Mexico City. He was succeeded for the short term of eight months by José Ramón Amieva. On December 5th 2018, current mayor Claudia Sheinbaum, started her six-year term. Diego Antero (2019), representative for SEMOVI also states that the previous administrations did not know how to deal with the situation:

> "When we started in January 2019, there were no regulations, there were no rules, or parking zones. Because the previous administration did not know how to deal with it, there were many reasons, there was not much time for the previous administration to set up a new public policy. They did not have that much knowledge. (...) I think they focused on other things. They left it aside" (Antero, interview with the author, 2019).

Aguirre (2019) agrees with Antero (2019) by stating that the process of planning and creating the new policy did not go well for the previous administration. This led to tensions between the private companies and SEMOVI:

> "The previous administration was also asking private companies for studies. Visibility studies on demand, expected drop zones, everything. But when the companies provided their studies, the government told them: we will not publish the guidelines, you will have to wait for the next administration. This was the start for a discontent between the private companies and the local government" (Aguirre, interview with the author, 2019).

3.2.2 Transition of Administration

However, times were changing in 2018 when Claudia Sheinbaum was the first elected female mayor in Mexico City. She is member of the left-wing National Regeneration Movement (*MORENA*) which supports, among other things, environmental care. Moreover, from 2000 till 2006 she held the position of Secretary of the Environment of the Federal District. Together with Sheinbaum the new secretary of mobility was installed: Andrés Lajous. His passion for cycling is also reflected in his work for the local government according to Mendoza (2019). Both Sheinbaum and Lajous are pushing the developments in the area of innovative, green and sustainable transport systems in Mexico City. The new SEMOVI administration under Lajous wanted to bring order in the mess. Antero (2019) explains how the situation was when the new administration started operating:

> "In January SEMOVI faced a great challenge, in Mexico City and the central area there is a huge parking problem. Users of shared mobility services, used to put the vehicles on the sidewalks, in front of the houses, everywhere they wanted. So, there were a lot of complaints from neighbours, a lot of trouble between the companies and citizens. People said: why don't they regulate it? What are the rules? (…) So now, that the new administration arrived, we want to do things well and orderly. We know that these problems exist, but you also need rules" (Antero, interview with the author, 2019).

The new administration decided to create a pilot program for the dockless bikes and scooters in early 2019. In this pilot programme, the private companies had to share all their data with SEMOVI for 45 days. Through this detailed pilot programme of dockless bike and scooter use in Mexico City, the SEMOVI has been able to publish better guidelines and managing the use of the vehicles. In addition, they were able to define an efficient and comprehensive shared mobility policy based on the data analysis (SEMOVI, 2019).

3.2.3 From Underregulated to Overregulated

Whereas in the beginning there was a lack of regulation regarding the SiTIS policy, the policy implemented in March 2019 is considered too strict and inefficient. This also has affected the collaboration between the private companies and SEMOVI. Aguirre (2019) explains why the guidelines set up by the current administration are too strict:

> "Until now, it seems that the SEMOVI regulations has been very strict and with an inefficient process. Currently, there are only few scooter companies active, and also some bike companies already left. (…) But the micro mobility market is a very volatile market" (Aguirre, interview with the author, 2019).

Sonia Media, representative of the Institute for Transportation and Development (ITDP) believes the government should have a different approach towards these private companies. She thinks that the government should create progressive and open working environment for the private companies:

> "Mexico City has to be an attractive city to these companies. It is a good thing that the foreign investment could solve problems that you cannot solve from inside. For example, there is not a lot of money for the government to promote bicycles. You need to be flexible. From what I have heard from people inside the government, this overregulation was because they did not want to harm the image of the bicycle" (Medina, interview with the author, 2019).

Adriana Zenteno, director of the interest group for the dockless bikes and scooters called Mobility as a Service Latin America (MaaS Latam), does not understand why the government is currently overregulating the use of dock less bikes and scooters. It seems that there are no governmental incentives for the private companies. She states that:

> "The reality is that there are no incentives, on the contrary, we believe that they are disincentives for this type of mobility. The reason that many companies were surprised is because SEMOVI set a maximum of caps. Additionally, the fees charged by SEMOVI were quite high. So, that is one of the reasons it is a largely disorder in the city" (Zenteno, interview with the author, 2019).

Zenteno (2019) has been working with MaaS Latam on behalf of the private companies to improve the situation. She suggests the following policy changes for SEMOVI in order to improve the system as a whole:

> "SEMOVI needs to make the regulations more flexible, in order to balance supply and demand. Currently in Mexico City, the number of units is fixed for a year. MaaS Latam is proposing for the next pilot project that the units can be adjusted, perhaps per month. So, the movement of supply and demand for these vehicles can be followed" (Zenteno, interview with the author, 2019).

Sonia Medina (2019) refers to case studies in the United States of America, where the local governments did act properly in advance to create a shared mobility policy:

> "Some of the best examples come from Washington D.C. and Seattle, they made regulations before the companies entered. So, when the companies started their operations, they knew exactly what to do. The regulations do not necessarily have to be very strict, but they can be flexible. But if you make it a mess, the shared mobility companies will not be likely to continue operating in your city" (Medina, interview with the author, 2019).

Another problem that occurred after the implementation of the dock less bikes and scooters is that a lot of the vehicles were stolen. The theft of electric scooters in Mexico City has generated losses around 50 million pesos, about 2.6 million USD. In total thousands of vehicles have been stolen between September 2018 and May 2019 (Infobae, 2019). According Medina (2019), even 80% of the fleet of Mexican e-scooter company Grin was stolen in the first year of operation. Eventually, Grin suspended its operation in Mexico City because they were not able to handle the situation. However, this problem is not solely a Mexican issue. Micromobility companies around the world struggle with vehicles that have been vandalized,

stolen, or damaged (Ho, 2018). Aguirre (2019) believes that the government can play a role in this to reach the private companies a helping hand:

> "SEMOVI should work more closely with the private companies, especially to help them with the prevention and care of unit theft. Although it is true that the government cannot watch over private assets, it can facilitate channels and protocols" (Aguirre, interview with the author, 2019).

3.2.4 Lack of Communication from SEMOVI to Users

A weakness of the current SiTIS policy is the lack of communication from SEMOVI to users. It is stated that most of the users do not follow the guidelines and regulations because there was no proper communication strategy and no clear information provided since the dockless systems was introduced in 2018. As a consequence, users park the vehicles in places where they do not belong. Aguirre explains:

> "But the problem is communication with society. Because in the end, you as a user will get used to it. For two years, users could leave the vehicle where they wanted. But now, you will have to tell them to put them in the drop zone, if there is one. Most of the government communication is via social media. This has to be improved. But eventually, after two years for most users it is a habit, it will be more difficult for people to respect the new rules. You basically have to change their behaviour which will be very difficult now (…) A lot of communication is missing, towards the users" (Aguirre, 2019).

Representative of SEMOVI, Diego Antero (2019) affirms that communication towards users is a crucial point for the current administration and SEMOVI to improve:

> "We have learned that these types of shared mobility can fulfil a travel purpose for users in Mexico City. However, we need to work on the topic of communication, parking spaces, violation and theft. In order to working operation, so we can prevent the problem that users leave them in any place" (Antero, interview with the author, 2019).

3.3.5 Effectiveness of the Dockless Bikes & Scooter Policy

Until now the policy on dockless bikes and scooters, or as the Mexican government officially calls them *Sistemas de Transporte Individual Sustentable* (SiTIS), did not contribute to a solution for traffic congestion. However, Aguirre states that the system still has the potential to become a solution for the city's traffic congestion in the future:

> "Definitely yes, it means there will be less cars in the streets. I believe that when the government and the private sector are working more closely together, agreements can be reached that cover the interests of both" (Aguirre, interview with the author, 2019).

In addition, Zenteno believes that it is very likely that dockless bikes and scooters will benefit the city centre traffic environment. However, she is still very critical on the current policy of SEMOVI:

> "I think the policy with these types of vehicles is currently a mess. The SEMOVI charges a fee per unit, per vehicle, which are basically taxes. If you take into account the climate change effects, and the cars that are allowed to drive in the city. But at the same time, you want to decrease the pollution levels and decrease the traffic congestion. These dock less scooters and bikes will eventually replace the private cars. So, this will benefit the city, the direct users as well as the indirect users. But at this moment the government is not acting like they are stimulating the use of the dockless shared mobility vehicles. So, the approach of mister Andres Lajous (SEMOVI), has generated a lot of indignation" (Zenteno, interview with the author, 2019).

Furthermore, Zenteno (2019) believes that there has to be a transformation, a change of mind for the secretary of mobility and Mexico City as a whole. The dockless bikes and scooters should become part of a greater mobility plan, which makes it possible for commuters to connect various ways of transportation. We can see that EcoBici, in the past decade became part of this greater mobility plan. However, the dockless bikes and scooters are still struggling to settle themselves in the city. On one hand, the reason for this is the absence of a clear public policy in the very beginning, during the introduction of the vehicles. On the other hand, the current way of managing the curb in the city centre is causing trouble, which means the vehicles are not able to function properly. Next to that, SEMOVI representative Diego Antero expects that the dockless bikes and scooters will contribute to a solution for the city's traffic congestion problem. However, he also realises that a lot of work has to be carried out by the Mexico City local government in order to make the policy as successful as the EcoBici public policy:

> "We need to potentialize shared mobility services, together with the public transport services, to those types of advantages that the bicycle and scooter has. Where people can transfer from one service to another. We need to enhance that part. People her in Mexico City do not go one hour by bicycle, they would not do that here. We need to potentialize short and medium trips. Electric bikes and e-scooters can also be a benefit in peripheral areas where they are needed as well" (Antero, interview with the author, 2019).

3.3 Mexico City Government: Addressing the Parking and Cycling Infrastructure Issue

3.3.1 Car Oriented Approach

One thing that significantly affects the shared mobility policy is the current infrastructure. Several interviewees stated that Mexico City has an infrastructural problem when it comes to parking zones and lanes for bikes and scooters. The city centre has a car-oriented infrastructure. Also, the approach of the government in the past decades have been very much on improving the situation for the private cars. That is also why cycling still has a bad image among most residents. Medina (2019) states in an example that bicycles and busses have to share one and the same lane. If one does not have the ability to ride a bike such as unexperienced users, it can be really dangerous. Santillán (2019) added:

> "Some people in Mexico say: you become a man once you own a car. Because the public policy is also that way, it is focused on people buying more cars. They believe that all the people will grow economically and buy a car. It is an aspiration of a lot of people in Mexico City to

> own a car. And the government agrees with them by saying: we need more lanes for more cars" (Santillán, interview with the author, 2019).

Zenteno argues that: "The budget is very low for public transportation. For example, the local government is giving 1.3% of the budget for mobility to public transportation. Around 50% goes to infrastructure for private vehicles" (Zenteno, 2019). She adds that there are three main problems in the city that currently counteract the use of the dockless bikes and scooters:

> "There is very little cycling culture, poor infrastructure and there are very few cycle lanes. That does not encourage the use of the service either. Using dockless bikes and scooters comes with great risks. (…) The human right to mobility is recognised in the national constitution. I think the city should be more bicycle oriented, if you want to guarantee better road safety, many studies show that you should invest more in public infrastructure and cycle lanes, public transport etcetera" (Zenteno, 2019).

As Zenteno (2019) indicated, there are very few parking zones for bikes and scooters in the city centre. EcoBici is not affected by this problem since it is a docked system with fixed parking places. But according to Shaheen & Cohen (2019), the dockless private companies need a proper curb space policy in order to work effectively. Antero (2019) affirms that the city has a big parking problem. Users parked the dockless bikes and scooters in every place they wanted because the lack of proper parking zones. They put them for example on the sidewalk, in front of houses, which caused a lot of complaints from local residents (Antero, 2019). It will be easy to solve these problems according claims Aguirre (2019):

> "SEMOVI has a shared mobility system to operate, they have a cycling infrastructure to implement. In the new administration, at SEMOVI many people have experience in mobility, but who do not have expertise in a public role. Besides that, the learning process is slow. Inside the government, there is so lots of bureaucracy" (Aguirre, interview with the author, 2019).

An example of the bureaucracy and the slow policy process is when SEMOVI announced in the *Gaceta Oficial* in March 2019 that they would construct 75 parking zones for the dockless bikes and scooters and regular bike traffic. However, interviewee Aguirre claims that the construction of the parking zones did not go fluently.

> "It seems to me SEMOVI was doing a good job with the parking zones implementation. However, they did not implement all the 75 parking zones that they said they were going to implement, and in reality, the whole process was very slow and confusing for companies" (Aguirre, interview with the author, 2019).

3.4 SWOT Analysis on the Shared Mobility Policy in Mexico City

Strengths	Weaknesses
• EcoBici was implemented under a comprehensive strategy • EcoBici became part of the identity of the citizens • Connection EcoBici with other public transport services • EcoBici is planning to renovate their fleet and expand their operations	• EcoBici vehicle availability during peak hours is very minimal • SiTIS had no clear regulations for users and companies in the first year after kicking off • Overregulation SiTIS since new administration • Bad communication from SEMOVI to users on regulations SiTIS
Opportunities	**Threats**
• SiTIS has the potential to become part of the solution to traffic congestion issue	• Transition of administration during implementation SiTIS • SiTIS companies had to cope with violation and theft of vehicles • Private companies SiTIS had to stop operating because of financial issues • Private companies SiTIS are unsatisfied with current attitude SEMOVI • Car-oriented infrastructure and policy • Lack of parking zones for SiTIS • Lack of cycle lanes for both SiTIS and EcoBici

The SWOT model has identified the main strengths, weaknesses, opportunities and threats regarding the shared mobility policy in Mexico City. Firstly, the main strengths show that the EcoBici policy was implemented under the comprehensive EMB policy programme which formed part of a larger national and local policy set. The EMB also included an extensive educational programme and the construction of cycle lanes. This stimulated the development and expansion of EcoBici over the last decade. Next to that, thanks to this rapid development, it can be argued that EcoBici became part of the citizens identity over the years. SEMOVI's strategic choice to implement the shared bike in the business districts in the city centre, which appealed to a new target group, has supported the rapid development of EcoBici. Another important factor of the success lays in the connection of EcoBici with the public transport. The EcoBici docking stations are strategically situated close to public transport hubs which allows users to quickly transfer from one transport service to another. Moreover, EcoBici officially announced to increase and expand its operations within the city to meet the increasing demand of users.

Secondly, the main weaknesses reveal that the demand of EcoBici bikes during rush hour is very minimal. It means that the commuter stream at some time is too high for EcoBici to handle which leads to uneven distribution within the service area. Furthermore, most

weaknesses can be found in the SiTIS policy. It is stated that there was no clear policy strategy or policy guideline from SEMOVI for both users and private companies. In the first year after implementation, the private companies had to rely on themselves, there was only minimal guidance and a lack of cooperation from SEMOVI. After the transition of local government, in the beginning of 2019 after operation *Piloto*, new regulations and guidelines were implemented. Though, these regulations were considered as too strict and inefficient by experts. In addition, the communication from SEMOVI to its users is very limited. This leads to confusion among the users of SiTIS who park the vehicles at places where they should not be parked.

Thirdly, the only opportunity of the shared mobility policy is that the SiTIS system in the rest of the world has proven to be effective when implemented in an appropriate way. The SiTIS system is operational for around two years which means it still has some teething problems which often occur during the early stages of implementation.

Finally, there are a significant amount of threads to the shared mobility policy. Firstly, the transition of administration of the local government during the implementation period of the SiTIS services. The previous administration decided to not implement the policy for SiTIS and to leave it for the current administration, with all its consequences. Then, the SiTIS vehicles had to cope with a series of violence and theft. This caused serious financial issues to several private companies who had to cease their operations in Mexico City. Additionally, many of the SiTIS companies are not satisfied with the current approach of SEMOVI causing trouble in the public private relationship. Many of the current regulations are considered too strict and the private companies feel excluded. On top of that the policy in the past decades in Mexico City has been very much car oriented. That is why, there is lack of parking zones for the SiTIS vehicles and a lack of cycle lanes in the city centre. Both SiTIS and EcoBici are affected by this problem.

Conclusion

The aim of this thesis was to analyse to what extend the introduction and development of the shared mobility policy in Mexico City contributed to a solution for the city's traffic congestion issue.

As stated in the previous chapter, Mexico City is facing a serious dilemma with its ever-increasing traffic congestion issue. Many Mexicans moved from the countryside to Mexico City in the 20th century for better living and working conditions, which eventually led to urban sprawl and hyper urbanisation. Nowadays, around 22 million people are living in the metropolitan area of Mexico City. The road network and public transport system in the city centre can barely handle the 21 million commuters every day. This study has shown that, the stream of commuters leads to traffic congestion issues in the city centre.

The focus in this thesis was on the three most visited neighbourhoods in Mexico City: Cuauhtémoc, Benito Juárez and Miguel Hidalgo. The three neighbourhoods were selected because of their central location and high employment rates. These are also the neighbourhoods where the shared mobility services are deployed. Every weekday, around 21 million commuters travel through Mexico City, the majority of them work in the aforementioned neighbourhoods. In relative terms it can be said that, these three neighbourhoods are most affected by the traffic congestion issue since most commuters work in this area. This research has also identified that the number of cars in Mexico City is increasing every year because the policy of the local government kept stimulating the use of cars. It can be said that the automobile-reliant forms of development as described by Saunders, and the car-oriented approach of the government of Mexico City in the last decades counteracts the development of the shared mobility policies. Simultaneously, with this approach, the problem of traffic congestion in Mexico City will remain.

What is more, the results of this investigation show that EcoBici was implemented under a comprehensive EMB policy program in 2010, which led to a number of fleet expansions and to its success over the past years. These findings suggest that in general, the governmental bike sharing system became part of the city's identity. The local government's strategic choice to implement EcoBici in the crowded business districts in the city centre, which appealed to a new target group, has supported the rapid development of EcoBici. In addition, the connection with important public transport hubs are considered as crucial components that supported the intermodal passenger transport in the last decade. EcoBici shows that the concept of shared mobility in Mexico City could work as a successful alternative transport mode when implemented under a proper extensive policy plan.

One of the more significant findings to emerge from this study is that the SEMOVI together with the local government of Mexico City failed with implementing the SiTIS policy. From the beginning in 2018, the private companies had to rely on themselves because there was no clear policy program. Although many people started to use the new shared mobility services, the vehicles had to cope with violence and theft which eventually led to financial problems for some private companies. A year after the operations started, the first official

policy program for the SiTIS was implemented in March 2019 after a pilot program set up by SEMOVI. It can be said that this delay caused severe chaos and disturbance for the private operators of dockless bikes and scooters. It seems that this delay was caused by the transition of administration of the local government. Even though the dockless bikes and scooters have proven to be valuable in other western cities, in Mexico City so far, the implementation of this ambitious project has run into numerous problems resulting in serious delays to its implementation.

The relevance of the infrastructure issue in Mexico City is clearly supported by the current findings. It became clear that the infrastructure of the city centre is very much car oriented. One of the key policy considerations on implementing shared micromobility according to Shaheen, was curb space management. It can be argued that Mexico City is a bad example of curb space management because there is a lack of lanes for bicycles and scooters and a lack of parking zones. The lack of cycle lanes means that the user will have to share the same lane with cars and busses which often threads road safety. Additionally, it is proven that the lack of parking zones for dockless bikes and scooters in Mexico City leads to blocked sidewalks and complaints from local residents.

The major limitation of this study is the fact that SiTIS is operational for since the beginning of 2018, which means there is only limited research and data publicly available. Moreover, the system still has to cope with teething problems which are insurmountable during the early stages of the implementation. As a consequence, it is difficult to state to what extent the system has contributed to a solution for the city's traffic congestion problem. Notwithstanding the relatively limited sample, this work offers valuable insights into the implementation process of the SiTIS policy.

In response to the hypothesis formulated in the introduction, it can be argued that to a certain extent the shared mobility policy in Mexico City stimulated the development and contributed to a solution for the city's traffic congestion problem, mainly with the introduction and development of EcoBici. Nonetheless, the delayed introduction of SiTIS seemed to counteract the development of the shared mobility policy as a result of a lax attitude of the previous administration.

To conclude, if the government of Mexico City wants to address the current traffic congestion problem with shared mobility more effectively, they will have to take draconian measures. Or as some experts suggested in this thesis, the city needs a transformation, a radical change for SEMOVI and Mexico City as a whole. The dockless bikes and scooters should become part of a greater mobility plan, which makes it possible for commuters to connect various ways of transportation. Additionally, decreasing the number of cars in the city centre and creating a bicycle friendly environment would be two key elements to consider. EcoBici already became part of an extensive mobility plan to a great extent. A further study could assess the long-term effects of the SiTIS policy and its contribution to traffic congestion in the case of Mexico City.

Appendix

List of Interviewees

Interviewee	Role / Organisation	Date / Place
Irasema Mendoza Martínez	Infrastructure and Logistics Advisor, The Netherlands Embassy in Mexico	27-11-2019, Mexico City
Ari Santillán	Journalist and Sustainable Urban Mobility expert, Nosotrxs	06-12-2019, Mexico City
Sonia Medina	Active Mobility and Urban Design coordinator, Institute for Transportation and Development (ITDP) Mexico	06-12-2019, Mexico City
Diego Antero	Subdirector Bicycle Systems, Secretary of Mobility (SEMOVI)	12-12-2019, Mexico City
Kennia Aguirre	CEO, BikeNcity and former EcoBici employee	13-12-2019, Mexico City
Haidy Lazalde	COO, BikeNcity	13-12-2019, Mexico City
Adriana Zenteno	General Director, Mobility as a Service Latin America (MaaS Latam)	19-12-2019, Skype

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