NOVA IMS Information Management School

MGI

Master Degree Program in
Information Management

ADOPTION OF SHARED MOBILITY APPS IN LISBON

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Master Thesis presented as partial requirement for obtaining the Master's degree in Statistics and Information Management

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ADOPTION OF SHARED MOBILITY APPS IN LISBON

By

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Master Thesis / Project Work presented as partial requirement for obtaining the Master's degree in Information Management, with a specialization in Marketing Intelligence.

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November, 2022

STATEMENT OF INTEGRITY

I hereby declare having conducted this academic work with integrity. I confirm that I have not used plagiarism or any form of undue use of information or falsification of results along the process leading to its elaboration. I further declare that I have fully acknowledge the Rules of Conduct and Code of Honor from the NOVA Information Management School.

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ABSTRACT

The rising of globalization and the internet environment, as well as the rapid development of mobile technology and social media, a new consumer behavior and with consumers realizing the benefits of access to products and services over ownership, contributed to the growth of sharing economy, a business model that matches demand and supply via a digital platform developed by a third entity. This business model has proliferated in many forms, such as cars, bicycles, scooters, homes, clothes, shoes, which has famous marketplaces such as Uber, a mobility platform, and Airbnb, a platform to rent for spaces to stay, however this study will focus on the use of shared mobility apps. Shared mobility apps offer a flexible way to travel, such as carsharing, micromobility sharing as bike sharing and e-scooters, a trend that has many benefits and is crucial to create a multimodal city in which people can complete their journeys and move around the city in a conveniently, sustainably and faster way without needing their own car. However, in almost all countries, the car is still the dominant mode of transport, which is a major issue in terms of greenhouse gas (GHG). In this paper, a theoretical model was proposed with some of the determinant aspects that lead citizens to use smartphone apps in the shared mobility sector, such as compatibility, convenience, social influence and smart city policy and, for instance, explore some of the benefits of this trend. This study was tested using quantitative methods, an online survey with a sample of 127 answers, only including people who use or already tried to use shared mobility apps when travelling around Lisbon. This study will contribute to understand what drives citizens to use shared mobility apps, providing theoretical insights about what are the benefits of following this trend, how it could improve the city of Lisbon, but also people's lifestyle, in a social, sustainable and economical way. This study supports that people use shared mobility apps in Lisbon specially to avoid traffic and due to the lack of parking spots, but also for its economic benefit, people who can't buy their own vehicle or wants to avoid the costs of owning their own vehicle. Finally, building on prior work, this paper aims to contribute to a far-reaching understanding of the perceptions and motivations when using shared mobility apps in Lisbon by answering the above-mentioned research objectives with qualitative methods, literature review and quantitative methods, a questionary.

KEYWORDS

Sharing economy, Apps, Mobility, Smart City, Lisbon.

Sustainable Development Goals (SGD): 11 – Sustainable cities and community

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1. INTRODUCTION

Sharing Economy, also known as “collaborative consumption”, “collaborative economy”, “peer-to-peer economy”, among others, is rising in the past two decades and has already made a mark in areas such as transportation, appliances, furniture, toys, clothing and general peer-to-peer platforms (Angus and Westbrook, 2020). In this business model, demand and supply are matched through a digital platform developed by a third entity, such as Uber and Airbnb, two major players in this market (McLean, 2015). Botsman and Rogers, two active writers and commentators on sharing economy, author and co-author of the book “What's Mine Is Yours: The Rise of Collaborative Consumption” redefined collaborative consumption as an activity which “*is enabling people to realize the enormous benefits of access to products and services over ownership, and at the same time save money, space, and time; make new friends; and become active citizens again*” (Cit. in page 3, Henten and Windekilde, 2016).

The progressive digitalization of everyday life is a strong driving force behind the rapid growth of sharing platforms (McLean, 2015). Although some of these might resulted from a need for frugal spending after the global economic recession of 2008 and by a growing environmental consciousness (Cohen and Kietzmann, 2014). Our economic systems highly depend on the environment which leads to higher resource prices that can affect the economic growth and damage environmental systems. Sharing economy can be consider an innovative method that can gain greater economic value by reusing material and reducing energy resource inputs (Dabbous and Tarhini, 2021).

This shift towards a sustainable and a communal way of living allows the development of a convenient and inclusive model that can be the solution for cities that struggle with population growth and increasing density. In addition, sharing economy aims to deliver variety, better quality services, making everyday tasks easier (Angus and Westbrook, 2018). For instance, sharing vehicles promises to reduce inner-city traffic, congestion, and pollution problems (Cohen and Kietzmann, 2014). As driving in cities is less common along with actions made in effort to reduce congestion and pollution (parking meters, fees, tolls), consumers want their transportation across cities to be personalised to their individual needs, providing the rise of shared mobility services (Angus and Westbrook, 2020). Research (Baptista et al., 2014), confirms that car sharing “*contributes to a more efficient*

and rational mobility (with lower number of vehicles per capita among members, lower demand for parking space, lower fixed costs and a complement to public transport)." (Baptista et al., 2014, p.1).

CIVITAS, one of the flagship programs helping the European Commission achieve its mobility and transport goals, has made urban mobility greener over 80 cities. The work of CIVITAS has ten core thematic areas, one of them supports the use of public transport and shared mobility to put private cars in the shade. Additionally, integrating shared transport services is crucial to create a multimodal city in which people can complete their journeys conveniently and sustainably, without needing their own car. However, in almost all countries, the car is the dominant mode of transport, which is a major issue in terms of greenhouse gas (GHG) emissions (see figure 1), (2021, *Eurostat Statistics Explained*).

Travel distance per person per day by main travel mode for urban mobility on all days
(%)

	Belgium	Denmark	Germany	Greece	Croatia	Italy	Latvia	Netherlands	Austria	Poland	Portugal	Romania	Slovenia
By car as driver	54.4	53.8	58.0	44.6	59.6	63.7	54.8	49.6	50.6	48.2	57.3	30.4	65.2
By car as passenger	16.3	11.3	11.8	15.4	13.3	10.6	13.0	12.6	13.5	10.6	12.9	26.4	15.4
By taxi (as passenger)	0.1	0.3	0.2	1.3	0.4	0.2	0.5	0.0	1.1	0.0	0.4	2.5	0.2
By van/lorry/tractor/camper	0.0	8.1	2.2	0.8	2.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.1
By motorcycle and moped	0.8	0.9	0.6	7.0	0.1	2.8	0.3	2.0	1.0	0.6	1.3	0.1	0.2
By bus and coach	4.3	4.1	2.3	11.5	9.9	7.2	13.1	3.7	4.0	25.9	10.8	27.6	6.8
Urban rail	2.8	4.4	5.4	12.8	5.0	2.5	4.9	0.0	13.0	2.9	4.0	1.9	0.0
By train (regular and high speed)	8.6	5.5	8.6	0.1	2.8	3.8	5.2	7.5	9.0	2.9	5.1	3.9	1.3
Aviation and waterways	0.0	0.0	0.1	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.5	0.0	0.0
Cycling	6.6	7.5	5.5	0.5	2.1	1.9	2.2	16.0	3.4	4.7	0.5	0.3	3.3
Walking	3.8	4.1	4.0	5.8	4.5	6.8	6.1	5.1	3.9	1.8	5.8	6.9	6.5

Note: the shares of the main travel modes may not add up to 100% due to the small residual category "Other/unknown", not shown in the table.
Source: Data from thirteen Member States (nine pilot surveys and four national surveys on passenger mobility)

eurostat

Figure 1 - Travel distance per person per day by main travel mode for urban mobility on all days (%).

The topic hereby to be studied is more specifically the usage of shared mobility apps in Lisbon, what are the drivers that lead consumers to follow this trend and what main benefits has in people's lives.

Shared Mobility can be defined as the shared use of a vehicle, such as a car, bicycle, scooter, or other mode that enables users to have a short-term access to mobility. For example, carsharing members can access a fleet of shared vehicles when needed and pay for usage and/or for a membership-based fee, without having the costs of ownership, for example, the fuel, maintenance and insurance (Shaheen et al., 2017). With that said, this paper aims to

answer the following research question: “What drives citizens to use share mobility apps in Lisbon?”.

This research pretends to understand the perception of people who moves around Lisbon in relation to the sharing economy, how this trend is affecting the Portuguese market, even with the Covid-19 pandemic. Since this pandemic has radically affected sharing economy activities, even though sharing economy is considered a disruptive phenomenon, especially in the transport sectors and accommodation, expected to grow from US$15 billion in 2015 to US$335 billion in 2025 (Narasimhan et al., 2018), the pandemic forced this sector to recalibrate (Hossain, 2021).

The study aims to contribute to a far-reaching understanding of the perceptions and motivations when using shared mobility apps and to explore if Lisbon can be considered a city who have successfully implemented a sharing economy. Building on prior work and basing this research on proposed future research from (Philip et al., 2015). Therefore, primary and secondary data were used to answer the research objectives, a qualitive method, literature review, was used to answer how this trend is driving people to follow and a quantitative method, online survey, to identify the drivers that make people using this type of experience when moving around Lisbon.

By answering the above-mentioned research objectives, this research aims to provide insights related to the use of sharing economy apps in the mobility sector, more specifically in Lisbon.

2. LITERATURE REVIEW

2.1. SHARING ECONOMY

The process of sharing is not new, we can share for functional reasons, or as a convenience, courtesy or kindness to others, we can share intangibles like ideas and values, however (Belk, 2010) excludes simple coincidences such as "sharing" a common language or place of birth. Sharing involves "*the act and process of distributing what is ours to others for their use and/or the act and process of receiving or taking something from others for our use*" (Belk, 2007, p. 126). And this process shares two commonalities, the use of temporary access of non-ownership models with goods or services and their reliance on the Internet, especially Web 2.0. (Belk, R. 2014).

The evolution of the Internet was fundamental to spread and facilitate the connection between people through online platforms (Novikova, 2017). With the Internet of Things firms can now evaluate and take more fine-grained decisions about their business models thanks to all the global information they have access to and the higher quality of the information (Lo et al., 2020). This evolution has influenced the approach of firms toward innovation and how they create and capture value in everyday business activities (Bresciani et al., 2018), which includes the growth in sharing systems.

Sharing economy systems resembles e-commerce, where people prefer to have access to goods and services instead of ownership via online. This type of economy and this type of industries are increasing as they are seeing all the benefits of this economy. Some names in this industry are already recognizable such as Uber and Gira in transportation, UberEats in delivery service, AirBnB in lodging, and others among (Lo et al., 2020).

Besides the evolution of the internet, the spread of sharing economy can also be due to the shift towards sustainable consumption, resulting from economic, environmental and societal pressure (Chuah et al, 2021). Dealing with people's excess capacity or resources, in the case of AirBnB, it can be a room at one's home or place of residence that people are not currently using (Lo et al., 2020). The goal is to maximize the utilization of assets through efficient models of shared access and the use of online platforms is what connects a consumer that aims to temporarily use a service or product and prefers to have access to it instead of ownership (Chuah et al., 2021). However, COVID-19 outbreak resulting in a

world-wide lock-down with high restrictions affecting the global economy, forcing the shared economy sector to recalibrate (. These platforms struggled to keep customers and service providers, it was an uncertainty situation for both sides, passengers and drivers could pass the virus. To overcome this situation different measures and solutions were implemented, for example, Uber increased hygiene and safety concerns and developed insurance policies for their drivers, treating service providers more like employees.

2.2. SHARING MOBILITY

Sharing economy services are changing entire industries, such as tourism and hospitality, where several services are delivered by individuals (such as Airbnb hosts) rather than companies (Shuqair et al., 2021). One of the most recognized and widespread applications of the sharing economy has emerged in the mobility area through car sharing (Botsman & Rogers, 2010; Cohen & Kietzman, 2014). With car sharing, individuals gain the benefits of using private cars without the costs and responsibilities of car ownership, expenses that the vehicle owner must pay independently of its usage, including costs such as vehicle depreciation, insurance and taxation (Shaheen et al., 1998). Another way is ride sharing, when vehicle owners allow other passengers to ride in the same vehicle to and from the same or similar destinations.

This sharing trend can be called shared mobility, which consists in the shared use of a motor vehicle, bicycle, or other mode that enables travelers to gain short-term access to transportation modes on an on-demand basis (Novikova, 2017). An approach in order to overcome challenges in modern societies, concerning pollution and traffic is helping the rising of Car companies and independent sites such as Uber, Getaroun, Lyft, Blablacar, and many others. The case of Mercedes is also interesting, called car2gether which connects the car owners and those who are looking for a ride, besides generating favorable press, the car reducing, congestion-reducing, environmentally friendly strategy also offers a way to make car ownership more attractive to users who can then earn part of the cost of car ownership by offering others rides (Belk, 2014). Additionally, ridesharing applications became a success for their lower prices, better accessibility, great flexibility, ease of use and “a user focused mission” including transparency and interactive communication (Zhu

et al., 2017). In this sector, the fast-expanding Uber, a mobile application that provides an online network for people to share rides by connecting independent drivers and customers, has taken a dramatic amount of business from taxi companies in cities where it operates around the world (Hall et al., 2015).

In addition, the use of electric scooters (e-scooters), rental e-bicycles, hoverboards or monowheels are part of the global boom of urban "micro-mobility", which includes a variety of light, individual vehicles, often enabled by technological innovation. They have recently grown in popularity and use worldwide as on-demand rental e-scooters have been deployed (by companies such as Lime and Bird), but are also being purchased by private users, creating a new form of single user transit. This trend causes a considerable debate regarding safety but offers new opportunities for less invasive and polluting transit than cars (Tuncer et al., 2020).

More specifically in Portugal, the road transportation sector was responsible for 35% of the final energy consumption in 2010 and approximately 30% of CO2 emissions (Aparicio et al, 2021; EUROSTAT, 2012). To reverse this trend, many approaches have been applied and promising results have been reported in Europe with car-sharing and other solutions (Baptista et al., 2014). In Lisbon was implemented a fourth-generation bike-sharing system (BSS), called GIRA, which is currently expanding, since it's an important strategy in the context of urban mobility policies approved by the City Hall in order to achieve intelligent and sustainable urban mobility in Lisbon (Albuquerque et al., 2018; Aparicio et al., 2022; Mergulhão et al., 2022).

In 2018 there were already 140 bike stations across the city, among which 92 in the central area of the city, 27 downtown and there were 1,410 bikes available in the total, with 940 electrics. This system has future expansion plans towards achieving intelligent and sustainable mobility in Lisbon but numbers and changes due to the pandemic COVID-19 were not found yet. In fact, more cities in the world are implementing bike-sharing systems to tackle urban mobility and pollution problems. One of the most sophisticated bikes sharing systems in the world is in Copenhagen, reaching a ratio of 557,920 habitants for 650,000 bikes, with 48,000 bike stations, it is estimated that overall, there's 5 times more bicycles entering the city than cars (Akande et al., 2020).

3. RESEARCH MODEL PROPOSAL

This study conceptualizes that sharing economy can facilitate the mobility sector, turning "traditional" cities in smart cities, an opportunity to adopt in order to overcome challenges particularly in the context of big cities that struggle with population growth and increasing density (Gao et al., 2017). A conceptual model is proposed to determine the drivers and benefits that influence the intention of Portuguese to use mobility sharing platforms (Fig. 2).

This model was constructed based on dimensions from prior studies (Haindlmaier, Giffinger, & Gudrun, 2010; Min et al., 2019; Tussyadiah, 2016; Shee et al., 2021; Belk, 2007; Cohen and Kietzmann, 2014) and for example, Chuah et al. (2021) study has identified the direct effects of motivations (Financial benefits, sustainable benefits, social connection benefits, reciprocal benefits) and constraints (perceived risks, lack of trust of the platform, lack of trust in the service provider, lack of regulatory support) on a firm's intention to adopt Sharing economy and establish whether top management support serves as a mediator in these relationships. In this case will be study the drivers that lead a potential consumer to adopt a sharing economy system in the mobility sector, the intention of use to the step of using the app, finishing with the perceived benefits that influence the shared mobility apps usage.

3.1. MODEL AND HYPOTHESIS

3.1.1. Social Influence

Social influence can be referred to "*perceived pressures from social networks to make or not to make a certain behavioral decision*" (Cit. in page 249; Lu, J. et al., 2005). In this case, shared mobility started as an innovation system which can create uncertainty for potential adopters, so having the support from positive influential of others can give confidence to try the system (Min et al., 2019). Therefore, this study proposes:

Hypothesis 1 – The social influence has a direct positive impact on the intention to use shared mobility platforms.

3.1.2. Smart City Policy

Smart cities arise due to a dense innovation ecosystem that creates value through the use and reuse of information (Neves et al., 2020). Smart cities are categorized as intelligent, with knowledge and sustainable, with multiple stakeholders including complex operations and technological solutions to serve transportation, utilities, buildings and citizens (Shee et al., 2021). The term smart city implies the ambition and intention to improve its performance regarding urban development in some specific characteristics: economy, people, governance, mobility, environment and living. Cities are increasingly transforming themselves from traditional ways of living to "smart", so companies are working in order to be part of this innovative trend, by exploring new solutions and search for new technologies that permit cities to upgrade. Thus, companies are discovering new profitable business models to commercialize and to profit from new products and services, where some were already mentioned in this study specifically in the shared mobility trend, such as Uber and Gira (Bresciani et al., 2018). Thus, this study hypothesizes that:

Hypothesis 2 – The smart city trends convenience of using shared mobility apps has a positive impact on the intention to use.

3.1.3. Convenience

Convenience can have distinct dimensions that makes a task easier, such as the speed and ease at which consumers have access to a service or product can affect their decision-making process, as offline consumers must go through a series of tasks to select and buy a product and service, online consumers have the advantage of accessing products and services with ease and at a high speed, the provision of a user-friendly online platform can even make access to services in the sharing economy easier (Boateng et al., 2019). In the case of shared mobility apps, includes time, for example, the time a user saves when calling a uber instead of using their own vehicle, avoids spending time on the search for parking, acquisition also when firms make it easier for the user to find more solutions, faster and cheaper. Additionally, the mobile convenience increases the value for users and consequently the user satisfaction (Ozturk et al., 2016). Hence, this study hypothesizes that:

Hypothesis 3 – The convenience of using shared mobility apps has a positive impact on the intention to use.

3.1.4. Compatibility

The concept of compatibility refers to how the user feels with a service, where previous experiences with familiar technologies can affect the perceived usefulness and the

perceived ease of use. Moreover, Rogers (1995) suggests that compatibility refers to the degree to which a service is perceived as consistent with user's existing values, beliefs, habits, and experiences (Min et al., 2019). Additionally, it is a key factor in the consumer online behavior as Wu and Wang (2005) highlight that the compatibility had the most significant influence on behavioral intention in a mobile shopping context, high compatibility leads to preferable adoption of a mobile system. (Ozturk et al., 2016). Thus, this study proposes:

Hypothesis 4 – Compatibility of the user with shared mobility platforms will affect the intention to use.

3.1.5. Intention of Use

Intentions show how much effort people would do in order to perform a behavior and it is what may lead to a follow-up behavior, however, sometimes it is not sufficient for the subsequent behavior (Lo et al., 2020). Identifying the service factors that determine the intention of use and satisfaction is fundamental for the business success, it will help finding the factors that can change to improve their service. There are some factors that can positively influence the intention to use a sharing economy system again in the future. Tussyadiah (2016), a study related to the intention of use peer-to-peer accommodations, indicates that some determinants of the intention of using a peer-to-peer service is the cost savings, community belonging, familiarity, trust and utility. Additionally, consumer's purchase intention increases when the product or service has positive reviews, these reviews provide a source of trusted information for consumers. Purchasing intention and behavior in the sharing economy: Mediating effects of APP assessment (Lo et al., 2020). Thus, this study proposes that:

Hypothesis 5 – The initial intention of Portuguese to use shared mobility platforms most of the times leads to the actual use of the platform.

3.1.6. Shared Mobility App Usage

Shared Mobility App usage describes consumers attitudes toward mobile apps and in this case is important to understand the acceptance level of the user with the app, which is essential for shared mobility services. There are many features that influence the mobile apps experience, such as the perceived interactivity that refers to the control of the internal system-based efficacy, the responsiveness that refers to the external system-based efficacy, how the user gets instantaneous information and the communication feature, where the user feels that the system or medium facilitates the communication or not (Lu et al., 2019). In

transportation, the use of mobile apps can have economic, social and psychological impacts on its users, for example, they reduce the cognitive burden of the public transit options and delays, with shared mobility apps the route preference and current traffic conditions is considered (Shaheen et al., 2017).

3.1.7. Social Benefit

Social benefits can be an external influence that motivates the consumer to execute an action. Shared mobility shows beneficial social impacts increasing the mobility options for lower income segments, enabling household to access a vehicle without bearing the full ownership costs, an all-inclusive, pay per use and more affordable service (Shaheen et al., 2010). Some other factors such as the experience of the ride, how the vehicles can be easily parked and sometimes safer compared to public transports are also some of the benefits that user's feel when using shared mobility systems (Mattia et al., 2019). Thus, this study proposes that:

Hypothesis 6 – Shared mobility app usage has positive impact on social benefits.

3.1.8. Sustainability Benefit

The potential sustainability benefits associated with sharing economy systems are interesting particularly in the context of the increasing urbanization many countries experience today. A sustainability behavior such as reduce inner-city traffic, congestion, pollution problems in order to achieve a common objective, resulted from a need for frugal spending of the planet resources (Cohen & Kietzmann, 2014). The access to goods and services instead of ownership, promotes consumption based on assets reuse and sharing, as people pay per use, this model has the potential to reduce the unnecessary production and as more people become active participants, the demand for goods should further decrease. Transportation sector is a good example, with business models offering a convenient service or product, hoping for a future with less vehicles on the roads, less energy consumption and, hence, less carbon impact (R. Hasan and M. Birgach, 2016). Thus, this study hypotheses:

Hypothesis 7 – The use of shared mobility app has positive impact on sustainable benefits.

3.1.9. Economic Benefit

The economic factor had a strong role in the growth of the Sharing Economy, as a response to the global financial crisis and an attempt to fight over consumption. The economic benefits of having access to a service or product temporarily and avoid the costs of the ownership costs, for example, in the carsharing system, the insurance and taxation of the car is a promising approach (Henten et al., 2016). The cost savings associated with this service is helping this trend to grow. The volatile economic conditions over the last three decades have given rise to changes in consumer behavior and price consciousness is becoming the norm, with the awareness regarding purchasing decisions has heightened. Since the Sharing Economy businesses have low operational costs, it is very difficult for traditional businesses to match. Research conducted by PWC reinforce the idea that the economic factor is considered a benefit that motivates people to use sharing economy services, with 86% of the participants answering that sharing economy helps making their life more affordable (R. Hasan et al., 2016). On this basis, this study proposes that:

Hypothesis 8 – The use of shared mobility app has positive impact on economic benefits.

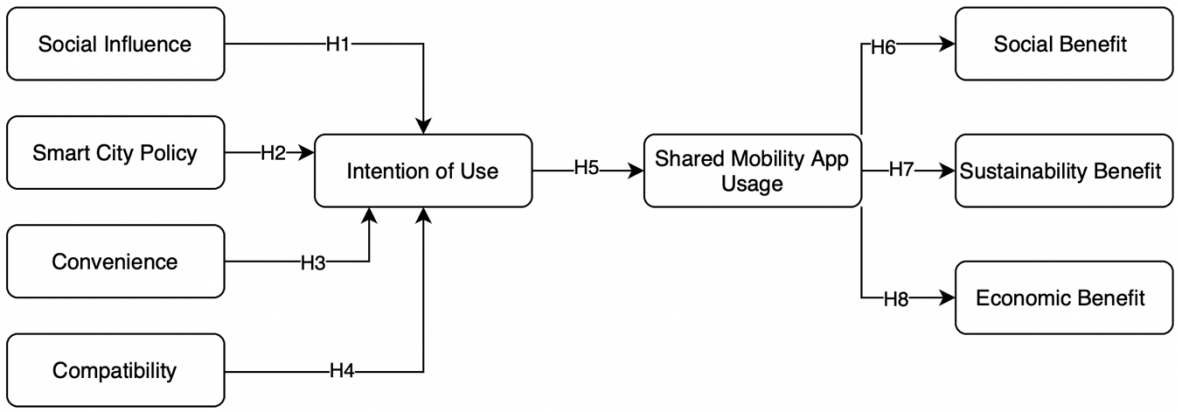

Figure 2 - Proposed conceptual model.

Table 1 - Constructs, definitions and references.

Construct	Definition	Reference
Social Influence	*"Can be referred to perceived pressures from social networks to make or not to make a certain behavioral decision."*	(Lu, J. et al., 2005)
Smart City Policy	*"The term implies the ambition to improve a city performance regarding urban development in the specific characteristics, focusing in six "smart" characteristics that are relevant: economy, people, governance, mobility, environment and living."*	(Haindlmaier, G., Giffinger, R., & Gudrun, H., 2010)
Convenience	*"Different dimensions that make a task easier, there are distinct dimensions such as the speed and ease at which consumers have access to a service or product and the provision of a user-friendly online platform."*	(Boateng et al., 2019)
Compatibility	*"The degree to which a service is perceived as consistent with user's existing values, beliefs, habits, and experiences".*	Rogers (1995)
Intention of use	*"Identifying the service factors that determine the intention of use and satisfaction is fundamental for the business success, it will help finding the factors that can change to improve their service."*	Lo et al., 2020)
Shared Mobility App Usage	*"Describes consumers attitudes toward mobile apps, in this case in the mobility, the use of mobile apps can have some benefits, such as reducing the cognitive burden of the public transit options and delays."*	(Lu, D., Lai, I. K. W., & Liu, Y., 2019)
Social Benefit	*"Can be an external influence that motivates the consumer to execute an action, in this case for example, enabling household to access a vehicle without bearing the full ownership costs, an all-inclusive, pay per use and more affordable service."*	Shaheen et al., 2010
Sustainability Benefit	*"The access to goods and services instead of ownership, promotes consumption based on assets reuse and sharing, as people pay per use, this model has the potential to reduce the unnecessary production."*	R. Hasan and M. Birgach, 2016
Economic Benefit	*"The volatile economic conditions over the last three decades have given rise to changes in consumer behavior and price consciousness is becoming the norm, with the awareness regarding purchasing decisions has heightened."*	R. Hasan et al., 2016

4. EMPIRICAL STUDY

To understand the motivations and barriers to use shared mobility apps in Lisbon, qualitive and quantitative methods were used.

In order to validate quantitatively this study's research model a questionnaire was applied. The measurement items, were adapted from the literature review, the independent variables, the drivers (Convenience, Social influence, Compatibility, Smart cities trend) that leads users to the intention of use shared mobility apps and then the dependable variables, benefits those users take from their experience (Economic, Sustainable and Social benefits).

4.1. SAMPLING DESIGN PROCESS

The questionnaire was designed based on the structural model measurements in figure 2, then translated into Portuguese and once the preliminary questionnaire has been developed and approved according to the regulations of the Ethics Committee of NOVA IMS and MagIC Research Center, a small sample of respondents were chosen to identify and eliminate potential problems. This sampling process is called pilot testing and respondents were requested to make notes and provide recommendations of all the questionnaire aspects.

The target population for this research was people who use or used shared mobility apps in Lisbon, with more than 18 years old. The questionnaire was shared through social media and had a total of 238 participants, of which 182 were from people belonging to the target population, although due to some incomplete questionnaires only 127 were considered. Regarding their shared mobility apps preference, there's a tendency to Uber, Bolt, Lime and Gira. The study also reports that most people opt for this trend in Lisbon for its convenience, as well as to avoid parking issues.

Table 2 - Sample characteristics.

Sample Characteristics		n = 132
Gender		
Male	61	47%
Female	69	53%
Age		
20-29	77	59%
30-39	12	9%
40-49	12	9%
50-59	24	18%
60 or older	5	4%
Instruction level completed		
High School (undergraduated students)	22	17%
Bachelor	46	35%
Master	59	45%
Doctorate	3	2%

Table 3 - Translated questions and references for the study.

Measurment items	Reference
Shared transports are easy to find.	(Kathuria et al., 2020)
Using shared mobility apps made my work/school (professional) commute easier.	(Shi & Yan, 2016)
The use of shared mobility apps facilitated my leisure commute.	(Shee et al., 2021)
Once I start using shared mobility apps, I find it hard to stop.	(Venkatesh et al., 2003)
Shared mobility can be hard to use.	(Kathuria et al., 2020)
At the current time in my life, the use of shared transports makes more sense than owning a vehicle.	(Venkatesh et al., 2012)
The use of shared mobility apps is cheaper than using my own vehicle	(Venkatesh et al., 2012)
Compared with owning a transport, shared transports are more environmentally friendly.	(Hajishirzi et al., 2022)
Shared mobility apps are convenient.	(Kathuria et al., 2020)
I find shared mobility apps easy to use.	(Kathuria et al., 2020)
I face difficulties while moving around in Lisbon	(Kathuria et al., 2020)
It's easy to find information about how to use shared mobility apps	(Kathuria et al., 2020)
The use of shared mobility apps improved my social well-being of individual and community.	(Shee et al., 2021)
The use of shared mobility transports is a good value for the money.	(Venkatesh et al., 2012)
Using shared mobility apps is pleasant.	(Venkatesh et al., 2003)
I started using shared mobility apps because people who are important for me also use it.	(Venkatesh et al., 2003)
I will encourage others to use shared mobility apps.	(Kathuria et al., 2020)
I will tell others about the benefits of using shared mobility apps.	(Kathuria et al., 2020)
I intend to use shared transports in the next 5 months.	(Venkatesh et al., 2003)
I intend to use shared transports in the next 5 years.	(Venkatesh et al., 2003)

4.2. MEASUREMENT MODEL RESULTS

Measurement is a process that involves numbers, in this case we use concepts such as compatibility and intention of use so the model of PLS-SEM was applied. This model enables the examination of relationships among measured variables and latent variables.

(Joseph F. Hair et al., 2014) explains when analyzing the PLS-SEM results, a certain criterion should be followed. First of all, examine the measure's reliability and validity according with the formative and reflective measurement model specification. The internal consistency reliability should be around 0.60 and 0.70 the AVE (Average variance extracted), but only three items showed these values, Compatibility, Intention of Use and Social Benefits.

Table 4 - Internal consistency reliability and convergent validity.

	Cronbach's alpha	Composite reliability (rho_a)	Compositve reliability (rho_c)	Average variance extracted (AVE)
Compatibility	0.652	0.674	0.85	0.74
Intention of Use	0.846	0.857	0.896	0.683
Social Benefit	0.643	0.66	0.847	0.735

Then, the heterotrait-monotrait (HTMT) ratio of the correlations with all the values were under 0.90 and the cross-loading with every item presented had higher values of loadings regarding their construct than any other construct, suggesting the model exhibits convergent validity. Following the Fornell-Larcker criterion, the average variance extracted should be higher than the construct's highest squared correlation with other (Table 5).

Table 5 - Discriminant validity, Fornell-Larcker criterion.

	Compatibility	Convenience	Economic Benefit	Intention of Use	Shared Mobility App Usage	Smart City Policy	Social Benefit	Social influence	Sustainability benefit
Compatibility	0.86								
Convenience	0.262	1							
Economic Benefit	0.259	0.344	1						
Intention of Use	0.46	0.431	0.388	0.826					
Shared Mobility App Usage	0.529	0.219	0.371	0.565	1				
Smart City Policy	0.302	0.454	0.392	0.436	0.292	1			
Social Benefit	0.566	0.272	0.303	0.56	0.557	0.293	0.857		
Social Influence	0.006	-0.007	0.235	0.14	0.197	0.08	0.116	1	
Sustainability Benefit	0.096	0.04	0.155	0.185	0.025	0.211	0.033	0.133	1

When checking the collinearity table and analyzing the variance inflation factor (VIF), where values of 0.20 or lower and a VIF of 5 and higher indicates a potential collinearity problem, it was not the case on this study (Joseph F. Hair et al., 2014).

4.3. STRUCTURAL MODEL EVALUATION

The structural model analyzes the hypothesized relationship between the constructs (Figure 3). To understand if the constructs have a positive path, the P values of the hypothesis should be $P < 0,10$ (Table 6). The results suggest that all the driver's hypothesis of leading to the intention of use are significant, especially the direct effect the construct compatibility has with the intention of use, showing a very significant result ($p = 0$), except for the hypothesis that perceives that social influence has a direct impact on the intention of use (H1) and should be rejected ($p > 0.10$). Regarding the influence that the level of intention has when using shared mobility app (H6) the results suggest a positive and very significant path ($p = 0$). Additionally, the social (H7) and economic (H9) benefits showed a very significant path, on the contrary the sustainable benefit should be rejected (H7).

Table 6 - Path coefficients hypothesis results.

	Hypothesis results	Path coefficient	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV)	P values	
H1	Social Influence – Intention of use	0.123	0.121	0.074	1.658	0.097	NS
H2	Smart city Policy – Intention of use	0.214	0.21	0.095	2.257	0.024	*
H3	Convenience – Intention of use	0.248	0.243	0.094	2.628	0.009	**
H4	Compatibility – Intention of use	0.329	0.337	0.08	4.12	0	***
H5	Intention of use – Shared mobility app usage	0.565	0.569	0.062	9.066	0	***
H6	Shared mobility app usage – Social benefit	0.557	0.56	0.063	8.782	0	***
H7	Shared mobility app usage – sustainability benefit	0.025	0.024	0.094	0.264	0.792	NS
H8	Shared mobility app usage – Economic Benefit	0.371	0.372	0.082	4.507	0	***

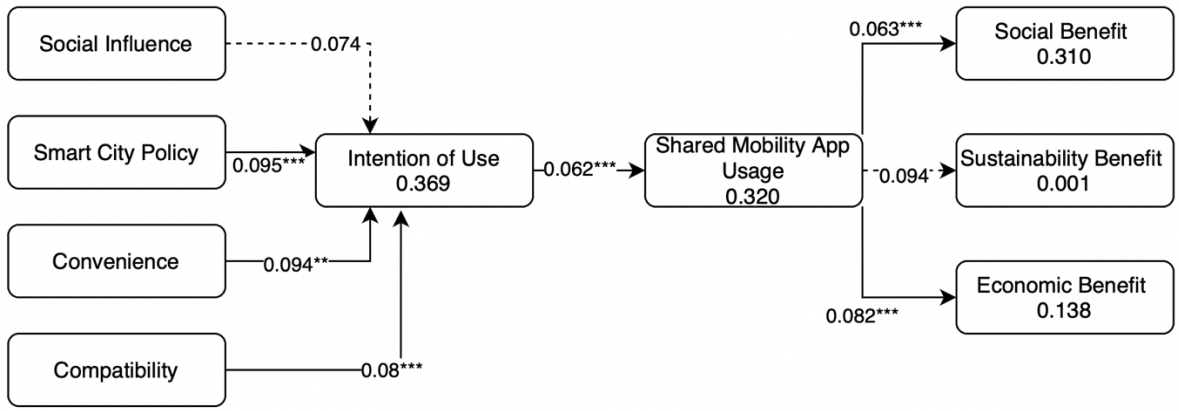

Figure 3 - Structural model results.

5. RESULTS AND DISCUSSION

From the eight hypotheses proposed, six hypotheses are empirically supported, as seen in Figure 3. Hypothesis 2 is supported suggesting that smart city policy is arising in Lisbon as a solution to the city traffic and hypothesis 3 is supported so we can conclude that convenience of using shared mobility apps, such as ease and a cheaper solution leads to the intention of use. Additionally, Hypothesis 4, compatibility is how the service is perceived as consistent with the user's values, habits and experiences, which is also supported. However, the findings suggest that social influence (Hypothesis 1) does not have a direct relation with the intention of use. (Min et al., 2019) supports that new experiences can create uncertainty for potential adopters and showed how positive influential of others can be a driver and give confidence to new adopters, what was also expected on this study. But in fact, this study supports that the main drivers for people to use shared mobility apps is for its convenience, compatibility and most of the respondents admitted that most of the times is to avoid traffic and move faster around the city, which can start as an impulsive and fast solution and not directly an influence by others.

Then, referring to the initial intention of use that leads to the actual use of a shared mobility platform there's a positive influence. When analyzing the benefits that influence the use of shared mobility apps, the finds suggests that social and economic factors predict better the intention when using shared mobility apps. Prior studies, (e.g., Chuah et al., 2021; Cohen & Kietzmann, 2014; Hasan & Birgach, 2016), showed the sustainable potential benefits associated with sharing economy as a solution, especially in growing cities. However, the findings suggest that sustainability benefits don't affect on this case. It is difficult to prove the reason of this result but is possible that when people need to move around, the sustainability factor is not the priority yet. For example, (Ampudia-Renuncio et al., 2018) a study in Madrid that analyzed the impact of Car2go a free-floating carsharing system in Spain showed that even though this service is a sustainable solution for the city, other benefits are preferred, such as reliability, as frequency and punctuality, meaning the acceptable walking distance to book the car, depending on the period time of the day, when is more congestion in the city the system is less competitive.

6. CONCLUSIONS AND FUTURE WORKS

In this paper, the literature review synthesized the state of knowledge on the sharing economy behavior and more specifically sharing mobility in Portugal, which is currently expanding, since it's an important strategy to achieve intelligent and sustainable urban mobility in Lisbon. The main goals of the research were to understand what drives people to use shared mobility apps in Lisbon and to identify user's awareness of the main benefits. The research model was proposed based on the literature review and then analyzed, where the results showed that people in Lisbon are concerned about the mobility due to traffic and have some difficulties when travelling around the city, this service has competitive advantage for the convenience, compatibility and is perceived as a fast and cheap solution instead of choosing public transports, walking or using a taxi.

The present research follows a quantitative model, which indicates the possible behavior of Portuguese users of shared mobility apps in Lisbon through a framework to capture different constructs and turning the answers in quantitative data. However, a more comprehensive approach that distinguishes users that rarely use these services or who only tried once of daily and experience users would provide different results, which can be a theoretical implication. Additionally, the study focuses on specific drivers and benefits selected based on literature review that effect the results, but as observed many studies show different benefits that could be analyzed, such as reliability (Ampudia-Renuncio et al., 2018).

As practical implications, this study was carried after COVID-19 outbreak that affected the global economy and shared mobility apps were no exception in times where people should be isolated to avoid this contagious health disease, the idea of sharing a service was not an option, what may slowdown this model business. On the other hand, Lisbon's City Hall is making changes, such as increasing infrastructures through the city, making the transport card free for users under 23 and above 65 which only included public transports and now includes some shared mobility apps as an alternative, strong factors to increase the use of shared mobility apps in Lisbon on the next years.

This study has certain limitations associated with the current research which provide the research gap for future studies. The results support the idea that shared mobility app users feel benefits when using this service, such as social benefits, for example when using this apps for fun and economic benefits when comparing the price of using a shared transport with their own. However, the results do not support the effect of sustainability benefits for shared mobility apps users, in this case future works can explore how the sustainability factor is not one of the main reasons why users choose shared mobility apps in Lisbon, if there are other benefits when using this trend, how to motivate people using more shared transports in Lisbon, and how can businesses innovate in this trend. These are only some of the new paradigms that would be interesting to study on the future.

BIBLIOGRAPHICAL REFERENCES

Akande, A., Cabral, P., & Casteleyn, S. (2020). Understanding the sharing economy and its implication on sustainability in smart cities. In *Journal of Cleaner Production* (Vol. 277). Elsevier Ltd. https://doi.org/10.1016/j.jclepro.2020.124077

Albuquerque, V., Andrade, F., Ferreira, J., Dias, M., & Bacao, F. (2018). Bike-sharing mobility patterns: a data-driven analysis for the city of Lisbon. *EAI Endorsed Transactions on Smart Cities*, 169580. https://doi.org/10.4108/eai.4-5-2021.169580

Ampudia-Renuncio, M., Guirao, B., & Molina-Sanchez, R. (2018). The impact of free-floating carsharing on sustainable cities: analysis of first experiences in Madrid with the university campus. In *Sustainable Cities and Society* (Vol. 43, pp. 462–475). Elsevier Ltd. https://doi.org/10.1016/j.scs.2018.09.019

Anders Hansen Henten, & Iwona Maria Windekilde. (2016). *Transaction costs and the sharing economy*.

Angus, A., & Westbrook, G. (2020). Top 10 Global Consumer Trends 2020. *Euromonitor International*.

Aparicio, J. T., Arsenio, E., Santos, F. C., & Henriques, R. (2022). LINES: muLtImodal traNsportation rEsilience analysis. Sustainability, 14(13), 7891.

Aparicio, J. T., Trinca, M., Castro, D., & Henriques, R. (2021, June). Vehicle Smart Grid Allocation using Multi-Agent Systems sensitive to Irrational Behavior and Unstable Power Supply. In 2021 16th Iberian Conference on Information Systems and Technologies (CISTI) (pp. 1-6). IEEE.

Baptista, P., Melo, S., & Rolim, C. (2014). Energy, Environmental and Mobility Impacts of Car-sharing Systems. Empirical Results from Lisbon, Portugal. *Procedia - Social and Behavioral Sciences*, *111*, 28–37. https://doi.org/10.1016/j.sbspro.2014.01.035

Belk, R. (2007). Why not share rather than own? *Annals of the American Academy of Political and Social Science*, *611*(1), 126–140. https://doi.org/10.1177/0002716206298483

Belk, R. (2014). You are what you can access: Sharing and collaborative consumption online. *Journal of Business Research*, *67*(8), 1595–1600. https://doi.org/10.1016/j.jbusres.2013.10.001

Boateng, H., Kosiba, J. P. B., & Okoe, A. F. (2019). Determinants of consumers' participation in the sharing economy: A social exchange perspective within an emerging economy context. *International Journal of Contemporary Hospitality Management*, *31*(2), 718–733. https://doi.org/10.1108/IJCHM-11-2017-0731

Botsman, R., & Rogers, R. (2010). *What's Mine Is Yours: The Rise of Collaborative Consumption*. Harper Collins.

Bresciani, S., Ferraris, A., & del Giudice, M. (2018). The management of organizational ambidexterity through alliances in a new context of analysis: Internet of Things (IoT) smart city projects. *Technological Forecasting and Social Change*, *136*, 331–338. https://doi.org/10.1016/j.techfore.2017.03.002

Caspersen, E., & Navrud, S. (2021). The sharing economy and consumer preferences for environmentally sustainable last mile deliveries. *Transportation Research Part D: Transport and Environment*, *95*. https://doi.org/10.1016/j.trd.2021.102863

Chuah, S. H. W., Tseng, M. L., Wu, K. J., & Cheng, C. F. (2021). Factors influencing the adoption of sharing economy in B2B context in China: Findings from PLS-SEM and fsQCA. *Resources, Conservation and Recycling*, *175*. https://doi.org/10.1016/j.resconrec.2021.105892

Cohen, B., & Kietzmann, J. (2014). Ride On! Mobility Business Models for the Sharing Economy. *SAGE Journals*.

Dabbous, A., & Tarhini, A. (2021). Does sharing economy promote sustainable economic development and energy efficiency? Evidence from OECD countries. *Journal of Innovation and Knowledge*, *6*(1), 58–68. https://doi.org/10.1016/j.jik.2020.11.001

Gao, S., Jing, J., & Guo, H. (2017). The Role of trust with car-sharing services in the sharing economy in China: From the consumers' perspective. In *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)* (Vol. 10281, pp. 634–646). Springer Verlag. https://doi.org/10.1007/978-3-319-57931-3_51

Haindlmaier, G., Giffinger, R., & Gudrun, H. (2010). Smart cities ranking: An effective instrument for the positioning of the cities ACE 12 SMART CITIES RANKING: AN EFFECTIVE INSTRUMENT FOR THE POSITIONING OF CITIES? ACE: Architecture, City and Environment = Arquitectura, Ciudad y Entorno [en línea SMART CITIES RANKING: AN EFFECTIVE INSTRUMENT FOR THE POSITIONING OF CITIES? *Año IV*, 7–25. http://wwwcpsv.upc.es/ace/Articles_n10/Articles_pdf/ACE_12_SA_10.pdfAccessUPCommons:http://hdl.handle.net/2099/8550

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, *19*(2), 139–152. https://doi.org/10.2753/MTP1069-6679190202

Hajishirzi, R., Costa, C. J., & Aparicio, M. (2022). Boosting Sustainability through Digital Transformation's Domains and Resilience. *Sustainability (Switzerland)*, *14*(3). https://doi.org/10.3390/su14031822

Hasan, R., & Birgach, M. (2016). *Critical success factors behind the sustainability of the Sharing Economy*.

Hossain, M. (2021). The effect of the Covid-19 on sharing economy activities. *Journal of Cleaner Production*, *280*. https://doi.org/10.1016/j.jclepro.2020.124782
Introducing Sustainable and smart mobility for all. (n.d.). www.civitas.eu

Joseph F. Hair, Jr., M. Hult, G. T., M. Ringle, C., & Sarstedt, M. (2014). *A Primer on Partial Least Squares Structural Equation Modeling*.

Kathuria, S., Tandon, U., Ertz, M., & Bansal, H. (2020). Social vacation: Proposition of a model to understand tourists' usage of social media for travel planning. *Technology in Society*, *63*. https://doi.org/10.1016/j.techsoc.2020.101438
Lo, F. Y., Yu, T. H. K., & Chen, H. H. (2020). Purchasing intention and behavior in the sharing economy: Mediating effects of APP assessments. *Journal of Business Research*, *121*, 93–102. https://doi.org/10.1016/j.jbusres.2020.08.017

Lu, D., Lai, I. K. W., & Liu, Y. (2019). The consumer acceptance of smart product-service systems in sharing economy: The effects of perceived interactivity and particularity. *Sustainability (Switzerland)*, *11*(3). https://doi.org/10.3390/su11030928

Lu, J., Yao, J. E., & Yu, C. S. (2005). Personal innovativeness, social influences and adoption of wireless Internet services via mobile technology. *Journal of Strategic Information Systems*, *14*(3), 245–268. https://doi.org/10.1016/j.jsis.2005.07.003

Mattia, G., Guglielmetti Mugion, R., & Principato, L. (2019). Shared mobility as a driver for sustainable consumptions: The intention to re-use free-floating car sharing. In *Journal of Cleaner Production* (Vol. 237). Elsevier Ltd. https://doi.org/10.1016/j.jclepro.2019.06.235

Mergulhao, M., Palma, M., & Costa, C. J. (2022). A Machine Learning approach for shared bicycle demand forecasting. In 2022 17th Iberian Conference on Information Systems and Technologies (CISTI) (pp. 1-6). IEEE.

Min, S., So, K. K. F., & Jeong, M. (2019). Consumer adoption of the Uber mobile application: Insights from diffusion of innovation theory and technology acceptance model. *Journal of Travel and Tourism Marketing*, *36*(7), 770–783. https://doi.org/10.1080/10548408.2018.1507866

Narasimhan, C., Papatla, P., Jiang, B., Kopalle, P. K., Messinger, P. R., Moorthy, S., Proserpio, D., Subramanian, U., Wu, C., & Zhu, T. (2018). Sharing Economy: Review of Current Research and Future Directions. *Customer Needs and Solutions*, *5*(1–2), 93–106. https://doi.org/10.1007/s40547-017-0079-6

Neves, F. T., de Castro Neto, M., & Aparicio, M. (2020). The impacts of open data initiatives on smart cities: A framework for evaluation and monitoring. *Cities*, *106*. https://doi.org/10.1016/j.cities.2020.102860

Novikova, O. (2017). *Technology Innovation Management Review* (Vol. 7, Issue 8). www.timreview.ca

Ozturk, A. B., Bilgihan, A., Nusair, K., & Okumus, F. (2016). What keeps the mobile hotel booking users loyal? Investigating the roles of self-efficacy, compatibility, perceived ease of use, and perceived convenience. *International Journal of Information Management*, *36*(6), 1350–1359. https://doi.org/10.1016/j.ijinfomgt.2016.04.005

Passenger mobility statistics. (2021). *Eurostat Statistics Explained*. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Passenger_mobility_statistics#Mobility_data_for_thirteen_Member_States_with_different_characteristics

Philip, H. E., Ozanne, L. K., & Ballantine, P. W. (2015). Examining temporary disposition and acquisition in peer-to-peer renting. *Journal of Marketing Management*, *31*(11–12), 1310–1332. https://doi.org/10.1080/0267257X.2015.1013490

Rogers, E. M. (n.d.). *Diffusion of preventive innovations $*.

Shaheen, S. A., Bansal, A., Chan, N., & Cohen, A. (2017). Mobility and the sharing economy: Industry developments and early understanding of impacts. In *Low Carbon Mobility for Future Cities* (pp. 213–240). Institution of Engineering and Technology. https://doi.org/10.1049/PBTR006E_ch10

Shaheen, S., P. Cohen, A., & Martin, E. (2010). Carsharing parking policy. Transportation Research Record. *SAGE Journals*.

Shee, H. K., Miah, S. J., & de Vass, T. (2021). Impact of smart logistics on smart city sustainable performance: an empirical investigation. *International Journal of Logistics Management*, *32*(3), 821–845. https://doi.org/10.1108/IJLM-07-2020-0282

Shi, P., & Yan, B. (2016). Factors affecting RFID adoption in the agricultural product distribution industry: empirical evidence from China. *SpringerPlus*, *5*(1). https://doi.org/10.1186/s40064-016-3708-x

Shuqair, S., Pinto, D. C., & Mattila, A. S. (2021). An empathy lens into peer service providers: Personal versus commercial hosts. *International Journal of Hospitality Management*, *99*. https://doi.org/10.1016/j.ijhm.2021.103073

Tuncer, S., & Brown, B. (2020). *E-scooters on the Ground: Lessons for Redesigning Urban Micro-Mobility*.

Tussyadiah, I. P. (2016). Factors of satisfaction and intention to use peer-to-peer accommodation. *International Journal of Hospitality Management*, *55*, 70–80. https://doi.org/10.1016/j.ijhm.2016.03.005

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. In *Quarterly* (Vol. 27, Issue 3).
Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly: Management Information Systems*, *36*(1), 157–178. https://doi.org/10.2307/41410412
Yuen, K. F., Thai, V. v., & Wong, Y. D. (2016). Are customers willing to pay for corporate social responsibility? A study of individual-specific mediators. *Total Quality Management and Business Excellence*, *27*(7–8), 912–926. https://doi.org/10.1080/14783363.2016.1187992

Zhu, G., So, K. K. F., & Hudson, S. (2017). Inside the sharing economy: Understanding consumer motivations behind the adoption of mobile applications. *International Journal of Contemporary Hospitality Management*, *29*(9), 2218–2239. https://doi.org/10.1108/IJCHM-09-2016-0496

APPENDIX A

Measuring items	Reference
Shared transports are easy to find.	(Kathuria et al., 2020)
Using shared mobility apps made my work/school (professional) commute easier.	(Shi & Yan, 2016)
The use of shared mobility apps facilitated my leisure commute.	(Shee et al., 2021)
Once I start using shared mobility apps, I find it hard to stop.	(Venkatesh et al., 2003)
Shared mobility can be hard to use.	(Kathuria et al., 2020)
At the current time in my life, the use of shared transports makes more sense than owning a vehicle.	(Venkatesh et al., 2012)
The use of shared mobility apps is cheaper than using my own vehicle	(Venkatesh et al., 2012)
Compared with owning a transport, shared transports are more environmentally friendly.	(Hajishirzi et al., 2022)
Shared mobility apps are convenient.	(Kathuria et al., 2020)
I find shared mobility apps easy to use.	(Kathuria et al., 2020)
I face difficulties while moving around in Lisbon	(Kathuria et al., 2020)
It's easy to find information about how to use shared mobility apps	(Kathuria et al., 2020)
The use of shared mobility apps improved my social well-being of individual and community.	(Shee et al., 2021)
The use of shared mobility transports is a good value for the money.	(Venkatesh et al., 2012)
Using shared mobility apps is pleasant.	(Venkatesh et al., 2003)
I started using shared mobility apps because people who are important for me also use it.	(Venkatesh et al., 2003)
I will encourage others to use shared mobility apps.	(Kathuria et al., 2020)
I will tell others about the benefits of using shared mobility apps.	(Kathuria et al., 2020)
I intend to use shared transports in the next 5 months.	(Venkatesh et al., 2003)
I intend to use shared transports in the next 5 years.	(Venkatesh et al., 2003)

APPENDIX B

	Compatibility	Convenience	Economic Benefit	Intention of Use	Shared Mobility App Usage	Smart City Policy	Social Benefit	Social influence	Sustainability benefit
Compatibility	0.86								
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Sustainability Benefit	0.096	0.04	0.155	0.185	0.025	0.211	0.033	0.133	1

NOVA IMS | Ethics Committee - APPROVED

This is to certify that
Project No.: **STAT2022-9-119320**
Project Title: **ACCESS OVER OWNERSHIP: MOBILITY SECTOR IN PORTUGAL**
Principal Researcher: **Carolina Santos**

according to the regulations of the Ethics Committee of NOVA IMS and MagIC Research Center this project was considered to meet the requirements of the NOVA IMS Internal Review Board, being considered **APPROVED** on 9/11/2022.

It is the Principal Researcher's responsibility to ensure that all researchers and stakeholders associated with this project are aware of the conditions of approval and which documents have been approved.

The Principal Researcher is required to notify the Ethics Committee, via amendment or progress report, of
- Any significant change to the project and the reason for that change;
- Any unforeseen events or unexpected developments that merit notification;
- The inability of the Principal Researcher to continue in that role or any other change in research personnel involved in the project.

Lisbon, 9/11/2022

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