



Bachelor's Programme in Economy and Society

## Car Use: An Analysis of Motorists' Transport Decision-Making

A comparative qualitative study between Milan and Stockholm commuting zones based on the Theory of Planned Behaviour and the framework of Transport-Related Social Exclusion

By

Simone Pastori

[simone.pastori95@gmail.com](mailto:simone.pastori95@gmail.com)

### Abstract

The deep-seated role of private vehicles in our lifestyles limits the pursuit of sustainable urban development from an economic, social, and environmental standpoint. As such, this qualitative study aims to identify and explain the determinants behind the car phenomenon. Interviews are performed with non-low-income car owners in Milan and Stockholm commuting zones. The two areas depict different approaches to car use highlighting how determinants depend on the context in which they manifest. In particular, the study distinguishes between non-instrumental, e.g., attitudes, habits, and environmental awareness, and instrumental determinants, e.g., time, costs, accessibility, and public transport provision. The study concludes that instrumental determinants are affected by attitudes and habits that distort or downplay their evaluation. However, the cases of Milan and Stockholm suggest that planning and providing an efficient public transport system can reduce the magnitude of non-instrumental determinants. This leads to a more realistic recognition of car use consequences while highlighting the benefits of alternative transportation modes.

Programme Code: EOSK12

Bachelor's Thesis (15 credits ECTS)

May 2023

Supervisor: Helene Castenbrandt

Examiner: Gabriel Brea-Martinez

Word Count: 12,537

## Acknowledgements

I would like to acknowledge the fundamental help I received from those who accepted to participate in my study, offering me their time and valuable insights. I am thankful to my supervisor, who provided me with inspiring suggestions and comments on improving and refining my study. Thanks to Sweden as well, a country that gifted me with a fantastic study environment.

I am also grateful to my family, that tactfully supported me through this study and to Robert, who has always been by my side. Finally, a special thanks goes to my grandmother Maria, and she knows why.

# Table of Contents

<b>1</b>	<b>INTRODUCTION .....</b>	<b>5</b>
1.1	RESEARCH PROBLEM .....	5
1.2	BACKGROUND .....	6
1.3	RESEARCH QUESTION .....	7
1.4	OUTLINE .....	7
<b>2</b>	<b>LITERATURE REVIEW .....</b>	<b>8</b>
2.1	PREVIOUS RESEARCH.....	8
2.2	THEORETICAL APPROACH .....	11
<b>3</b>	<b>DATA AND METHODS .....</b>	<b>12</b>
3.1	DESIGN .....	12
3.2	APPLICATION OF THEORIES.....	12
3.3	SELECTION OF INTERVIEWEES .....	13
3.4	PROCEDURES.....	13
3.5	LIMITATIONS .....	14
<b>4</b>	<b>EMPIRICAL ANALYSIS .....</b>	<b>15</b>
4.1	RESULTS .....	15
4.1.1	<i>ATTITUDES</i> .....	15
4.1.1.1	Attitudes Towards Car Ownership .....	15
4.1.1.2	Attitudes Towards Car Use .....	16
4.1.1.3	Attitudes Towards Public Transport .....	16
4.1.1.4	Safety Perception .....	18
4.1.2	<i>HABITS</i> .....	19
4.1.2.1	Past Experiences .....	19
4.1.2.2	Car Ownership as a Trigger for Car Use Habits.....	20
4.1.2.3	Effort in Habits Change .....	20
4.1.3	<i>ENVIRONMENTAL AWARENESS</i> .....	21
4.1.4	<i>COSTS</i> .....	22
4.1.5	<i>TIME MANAGEMENT</i> .....	23
4.1.5.1	Time Efficiency .....	23
4.1.5.2	Time Reliability .....	24
4.1.6	<i>ACCESSIBILITY LEVELS IN THE ABSENCE OF A CAR</i> .....	25
4.1.7	<i>PUBLIC TRANSPORT INSTITUTIONAL FRAMEWORK AND POLICIES</i> .....	26
4.1.7.1	Involvement in Decision-Making.....	27
4.1.7.2	Support for Transport Policies .....	27
4.2	DISCUSSION .....	28
<b>5</b>	<b>CONCLUSIONS .....</b>	<b>32</b>
5.1	RESEARCH AIMS AND OBJECTIVES .....	32
5.2	IMPLICATIONS .....	34
5.3	FUTURE RESEARCH.....	34
5.4	CONCLUDING REMARKS .....	34
	<b>REFERENCES .....</b>	<b>35</b>
	<b>APPENDIX A.....</b>	<b>42</b>
	<b>APPENDIX B.....</b>	<b>43</b>
	<b>APPENDIX C.....</b>	<b>44</b>
	<b>APPENDIX D.....</b>	<b>46</b>

# List of figures

Figure 1. 1. Registered Passenger Cars Every 1,000 Inhabitants - 2019 (ACI, 2019; ISTAT, 2019; SCB, 2019; Trafik Analys, 2019).....6

# 1 INTRODUCTION

---

## 1.1 RESEARCH PROBLEM

Automobiles are an omnipresent part of the modern lifestyle. In Western countries, starting from the 60s, cars became widely available across all income classes, prompting a radical shift in the organisation of urban transportation networks. Indeed, private vehicles rapidly imposed themselves as the primary mode of transportation. This modal shift was encouraged by national policies prioritising road infrastructures at the expense of public transport, with public-funded car infrastructure indirectly subsidising car journeys (Martens, 2012; Mattioli et al. 2020). Verily, many cities in developed countries between the 60s and the 70s opted for an utter phasing out of their tram networks, as Mattioli et al. (2020) explicate. The authors claim that they were deemed excessively costly to maintain and uncompetitive compared to the promised potential of private motorised mobility. From the 70s until the 2000s, the automotive industry refined its marketing strategies through production differentiation and market segmentations emphasising the aesthetics of cars rather than their mere functionality. As in a vicious circle, the widespread reliance on cars shaped a car-dependent urban layout which prompted rapid growth of low-density suburbs, reducing the need for proximity to amenities and jobs (Lucas, 2009; Martens, 2012; Luz & Portugal, 2020; Mattioli et al. 2020). It is only at the beginning of the 2000s that societies started questioning the status quo of urban transportation, stressing the need for a change to tackle the negative consequences of automobiles (Mattioli et al. 2020; Saeidizand, Fransen & Boussauw, 2022).

Johnson, Currie and Stanley (2010) argue that the benefits of car use, in terms of close-to-unlimited freedom of mobility and time-flexibility, must be acknowledged. On the other hand, the negative externalities of a car-based transportation system threaten global sustainability. Cars directly impact air and noise pollution, posing a health hazard, and worsen urban quality of life, as Saidizand, Fransen and Boussaw (2022) advocate. In addition, the excessive use of private vehicles hampers economic and social sustainability. Traffic congestion leads to time-wasting and costly movement of people and freight (Mattioli et al. 2020; Saeidizand, Fransen & Boussauw, 2022), hindering cities' economic competitiveness. Even from a microeconomic perspective, private vehicles increase households' financial vulnerability through conspicuous car-related debts and expenses, as Walks (2018) explains. Additionally, road infrastructures reduce the availability of spaces for social aggregation, altering the urban landscape. At the same time, according to the World Health Organization (2018), private vehicles represent the primary cause of accidental deaths and disability.

The debate over car use has been heavily polarised. On one side, supporters of the car as a necessity negate the feasibility of any alternatives. Conversely, factions of the population favour restrictive policies to tackle car use radically without adequately addressing people’s mobility needs. While qualitative academic research has been performed to systematically analyse car use (Anable, 2005; Beirão & Cabral, 2007; Farag & Lyons, 2010; Lucas, 2009), it omits the relevance of adopting a comparative perspective between different urban contexts. The comparison facilitates the identification of patterns leading to diverse approaches to car use. Additionally, whilst the issue of mobility poverty has been widely discussed (Church, Frost & Sullivan, 2000; Lucas, 2012; Luz & Portugal, 2020; Schwanen et al. 2015; Yigitcanlar et al. 2018), a transport-related social exclusion framework, to the best of my knowledge, has not been adopted to analyse why non-low-income people rely on cars for daily mobility, even in light of other modal alternatives.

## 1.2 BACKGROUND

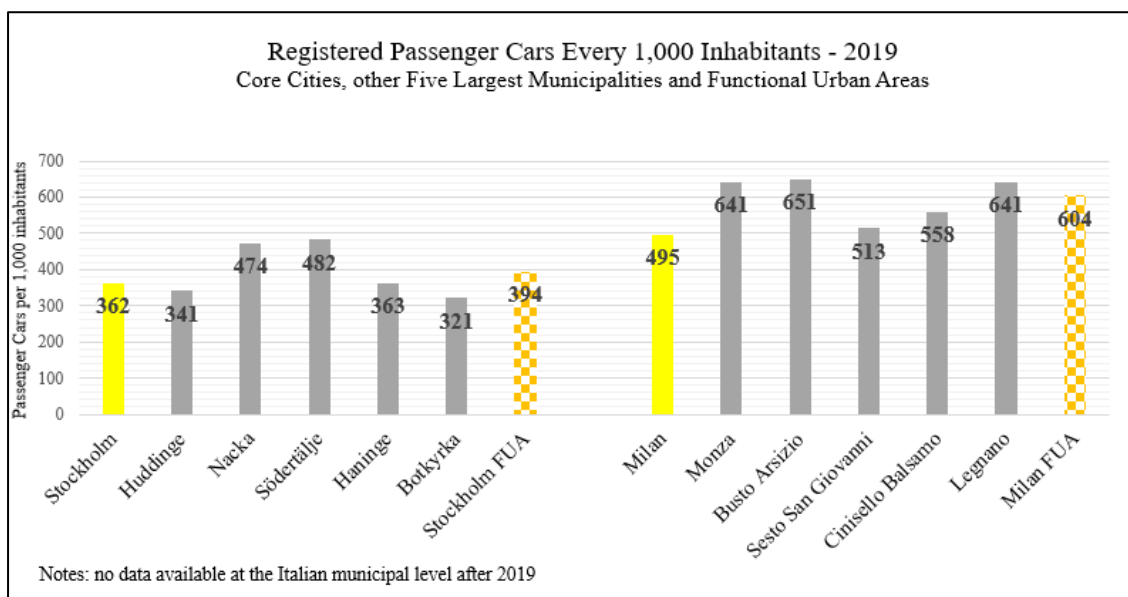


Figure 1. 1. Registered Passenger Cars Every 1,000 Inhabitants - 2019 (ACI, 2019; ISTAT, 2019; SCB, 2019; Trafik Analys, 2019)

The study focuses on two European conurbations, Milan and Stockholm. In particular, the geographical unit considered is the Functional Urban Area, known as FUA, defined by an EU-OECD joint methodology. Its delineation relies on economic parameters rather than other formal administrative units that disregard the city's economic sphere of influence. Specifically, Dijkstra, Poelman and Veneri (2019) define a *Functional Urban Area* as the sum of a core city, where most economic activities occur, and its commuting zone, characterised by towns where at least 15% of the active population commutes to the core city. The rationale behind choosing these two FUAs relies on

their similarities and differences. Both FUAs are the main economic and financial capitals of their respective countries. They exhibit a multimodal transport network with a mixture of bus and rail options and a similar institutional setting in transport planning in the hands of regional authorities rather than municipal ones. At the same time, car ownership between the two FUAs is starkly different (Figure 1.1). Additionally, Milan denotes higher levels of PM10 and PM2.5 than Stockholm, persistently exceeding the EU and WHO recommended levels (Baldi, 2019) and fatal road accidents are far more recurrent in Milan - 32 fatalities per million inhabitants - than in Stockholm - 5 fatalities per million inhabitants (Eurostat, 2020). Eventually, the two geographical units experience different traffic congestion levels, with Milan displaying an average traffic speed of 18km/h, opposite to the 32km/h of Stockholm, making Milan and Stockholm, respectively, the 5th and 160th most congested cities in the world, according to the Tomtom Traffic Index (2022).

### **1.3 RESEARCH QUESTION**

The purpose of this study is to examine the elements shaping individuals' travel behaviours, with the locus placed on car use, which is contrasted to public transport use. It aims to underline the typology of the determinants behind car use and their interrelations, whether they are instrumental or non-instrumental. Additionally, it intends to underline the determinants that justify car use in Milan and Stockholm, emphasising similar and different patterns. Understanding the main reasons behind car use provides a valuable framework to tackle excessive private motorised mobility. The thesis answers the following research question:

*What are the determinants of car use for non-low-income individuals in Milan and Stockholm commuting zones?*

### **1.4 OUTLINE**

This study continues by exposing the main empirical and theoretical literature in Section 2. Section 3 discusses the methodology applied to retrieve primary qualitative data. Section 4 presents and discusses the interviews' results with previous academic findings. Eventually, in Section 5, the study's implications, future research potentials and conclusions are shown.

## 2 LITERATURE REVIEW

---

### 2.1 PREVIOUS RESEARCH

Car use cannot be solely explained by analysing instrumental determinants, meaning the factors that can be objectively quantified. The analysis of non-instrumental determinants, intended as subjective factors, is, indeed, vital for an encompassing understanding of the phenomenon (Anable, 2005; Beirão & Cabral, 2007; Forward, 2019; Hernandez, 2018; Jensen, 1999; Mattioli et al. 2020; Miller, 2001; Saeidizand, Fransen & Boussauw, 2022). Precisely, attitudes towards car use, referred to as the bundle of personal preferences, prejudices and reputations, depend on the socio-cultural context (Jensen, 1999; Lucas, 2009; Mattioli et al. 2020; Van Acker, Mulley & Ho, 2019). Strong attitudes to automobility, in turn, lead to the conceptualisation of the car as a mobility requirement (Anable, 2005; Jensen, 1999; Mattioli et al. 2020), to the point that people sense an emotional attachment to their private vehicle, creating attitudinal obstacles for any modal shifts (Maxwell, 2001; Quaglione et al. 2019). On the contrary, attitudes towards public transport are often negative. As Ashmore et al. (2019) advocate, public transport is perceived as socially inferior compared to private mobility, with cars perceived as an element of class distinction. Lucas (2009) confutes the idea that class distinction is a sufficient element to justify negative attitudes towards public transport. Instead, she emphasises how these are affected by prejudices around public transport, which is seen as burdensome to utilise. On the other hand, she does not distinguish between different modes of public transportation, while Ashmore et al. (2019) highlight that rail-based transport modes are connotated by positive attitudes as they are perceived as safer and more dynamic than buses.

Rather than focusing on attitudes per se, other scholars have studied how attitudes affect the formation of travel habits. Indeed, a “lock-in effect” (Quaglione et al. 2019, p.25) occurs when a path dependency is denoted in transport-related decisions. Car use becomes an unconscious action in individuals’ lives, reinforcing the behaviour itself (Forward, 2019; Lucas, 2009; Maréchal, 2016; Quaglione et al. 2019; Simma & Axhausen, 2001; Song, Diao & Feng, 2021). This generates habits whose magnitude depends on the attitudes towards the car and its alternatives, as explained by Maréchal (2016). He adds that the strength of a habit can be deconstructed into two components: propensity and continuity. He says that the former refers to the responsiveness of habits to external stimuli, with stronger habits being less receptive to any changes. In contrast, he adds that the latter refers to the likelihood of a habit to repeat over time. Furthermore, either change in the household composition or the mere acquisition of a car stimulate further car use habits, inducing the adoption of a car-dependent routine (Clark, Chatterjee and Melia, 2016; Lucas, 2009; Mattioli et al. 2020; Nolan, 2010; Quaglione et al. 2019; Simma & Axhausen, 2001; Song, Diao & Feng, 2021). Moreover, past



events affect current car use. A path dependency of childhood travel behaviours is identified, with individuals accustomed to car use during childhood being more inclined to reiterate this behaviour during adulthood (Farag & Lyons, 2010; Van Acker, Mulley & Ho, 2019). However, scholars advocate that adequate information availability about the functioning of public transport can substantially reduce the effort required to overcome attitudinal and habitual obstacles (Farag & Lyons, 2010; Gardner & Abraham, 2007).

Additionally, environmental awareness could facilitate the transition towards a less car-dependent society. Quaglione et al. (2019) affirm that a shift from an individualistic perspective of mobility towards a collective one is achievable by increasing cultural participation. They state that enhancing societal ties eases the incorporation of negative externalities within the individual's transport decision-making. Other scholars dissent with this optimistic view advocating that individuals inherently tend to adopt travel behaviours that prioritise personal benefits rather than collective ones, deemphasising the importance of environmental awareness with respect to other determinants, such as time (Anable, 2005; Beirão & Cabral, 2007; Jensen, 1999; Maxwell, 2001).

Time is, indeed, pivotal in modal transport choices; however, non-instrumental determinants often affect its quantification. According to De Donnea (1972), time efficiency, the fastest way to complete a journey, is affected by the satisfaction with the time spent on a certain means of transport. As such, a means of transport is preferred when its marginal value, comprising the value of the time saved and the satisfaction with the journey time, at least equals the additional costs for choosing that mode (De Donnea, 1972; Truong & Hensher, 1985). On the other hand, other scholars argue that the value of travel time is not merely dependent on the time saved. However, it is influenced by time reliability, defined as the possibility to foresee the duration of the journey and respond to disruptions (Asensio & Matas, 2008; Bivina, Landge & Kumar, 2016; Small, 2012). A solid subjective element exists in assessing time reliability as individuals evaluate late/early arrivals and lack of control over potential disturbances differently, as Asensio & Matas (2008) describe. Gardner and Abraham (2007) distinguish time management based on the nature of journeys. Based on empirical evidence, they state that for functional journeys, cars are deemed more time efficient and reliable, whereas for leisure-related journeys, the instrumental variable of time is disregarded, allowing attitudes and habits to prevail over the choice of transportation mode.

The pursuit of time efficiency and reliability is balanced with the cost of opting for a specific mode of transport. However, the instrumental evaluation of costs is often altered by habits that distort the perception of car journeys' marginal costs (Mattioli et al. 2020; Simma & Axhausen, 2001). Indeed, the notoriously high cost of purchasing a vehicle is corresponded to a relatively low marginal cost at the point of utilisation. On this subject, Gardner & Abraham (2007) discuss the concept of the car as a

sunk cost, intended as a cost whose value cannot be recovered and whose related fixed expenses arise independently of its use. The authors, indeed, describe how individuals tend to use cars to minimise the impact of their purchase value. Additionally, individuals show a significant difficulty in including costs occurring on different timescales when calculating car-rides' marginal cost, underestimating private mobility costs, and further reinforcing the habitual use of cars to the detriment of public transport (Gardner & Abraham, 2007; Simma & Axhausen, 2001).

Given the tendency to underestimate car costs, public transport requires an efficient institutional framework capable of responding to citizens' needs. Fiorio, Florio & Perucca (2013) state that local public transport can be characterised as a natural monopoly affected by economies of scale, implying high fixed costs and limited competition. However, while it is economically unfeasible to introduce competition on the same routes, competitive tendering promotes innovation, quality, and profitability (Arrigo & Di Foggia, 2015; Fiorio, Florio & Perucca, 2013). Fiorio, Florio & Perucca (2013) advocate that this is the Swedish case where competitive service contracts regulated by a local transport authority increase ridership, perceived quality, time reliability and information availability, favouring a modal shift away from cars. Contrarily, institutional and regulatory frameworks severely affect providers' efficiency in Italy (Arrigo & Di Foggia, 2015; Asquer, 2011). The repeated renewal of tendering without any competitive bidding in favour of municipally and regionally owned companies, often occurring in contexts of poor transparency, reduces the incentives to innovate, integrate and optimise the public transport sector (Arrigo & Di Foggia, 2015; Asquer, 2011). This results in a fragmented service with operators serving small geographical areas and stagnant ridership levels, as Asquer (2011) explains.

In addition to tendering practices, the interaction between formal and informal institutions is vital for public transport to compete with private mobility (Hirschhorn et al. 2020; Hrelja et al. 2017; Rye et al. 2018). Mekala and MacDonald (2018) describe that high transaction costs can arise between public entities when designing transportation policies. Indeed, in many European countries, including Sweden and Italy, regional authorities oversee the planning of transportation services, while municipal entities have exclusive control over land use (Hirschhorn et al. 2020; Hrelja et al. 2017; Rye et al. 2018). This is the gap where informal institutions intervene. They complement - in some instances, substitute - formal institutions by favouring interactions and negotiations between different stakeholders, including citizens who are customarily excluded from formal institutions (Hirschhorn et al. 2020; Hrelja et al. 2017; Rye et al. 2018). Specifically, Hirschhorn et al. (2020) assert that thriving informal institutions promote "institutional entrepreneurship" (p.3), seen as the influence that some actors can exercise to innovate existing institutions. Similarly, Trivellato et al. (2018) stress the importance of leadership expertise to promote policies aiming at "public value creation" (p.311) to bridge the gap between formal and informal institutions. Empirically, the launch of the congestion

charges in both Milan and Stockholm demonstrates how municipal authorities developed synergies with public transport agencies and operators to implement restrictive measures against car use while succeeding in maintaining public policy support (Kottenhoff & Freij, 2009; Trivellato et al. 2018).

## **2.2 THEORETICAL APPROACH**

To comprehend how car use manifests, two theories model this thesis. The theory of planned behaviour, referred to as TPB, is applied here to mobility. Ajzen (1991), who pioneered this theory, argues that individuals' behaviours are not unpredictable, and the co-existence of three different elements can explain them. He asserts that, for a future behaviour to concretise, individuals should display a positive attitude towards it, the social and normative constructs surrounding the individual should favour its adoption, and, finally, the individual should consider himself/herself able to handle it. This theory is relevant as it suggests that the underlying structure of a particular behaviour can be identified, even when individuals execute their behaviour subconsciously. However, scholars have criticised the lack of consideration for the indirect elements that affect the formation of a specific behaviour with a particular reference to the role of habits (Anable, 2005; Farag & Lyon, 2010; Forward, 2019). Indeed, habits inhibit individuals' ability to control and alter their decision-making, reducing the magnitude of the three necessary conditions highlighted by Ajzen (1991). Additionally, TPB has already been applied to the analysis of travel behaviours, proving its effectiveness in structurally understanding individuals' mobility choices (Anable, 2005; Farag & Lyon, 2010; Forward, 2019).

The second theoretical framework employed is transport-related social exclusion, known as TRSE. It is especially Church, Frost & Sullivan (2000) and Kenyon et al. (2003) that, with their seminal papers, define TRSE, stating that it refers to the reduced participation in different aspects of an individual's socio-economic life due to insufficient accessibility to transportation. After these seminal papers, other scholars have further investigated this concept, though agreeing on three main features; TRSE is, indeed, dynamic, multidimensional, and non-binary (Church, Frost & Sullivan, 2000; Lucas, 2012; Luz & Portugal, 2020; Schwanen et al. 2015; Yigitcanlar et al. 2018). They assert that TRSE levels can vary over time, particularly influenced by a lifecycle effect. Plus, they discuss how multidimensionality spans from the fact that different components of TRSE can be identified. While they apply different classification methods, they reach similar conclusions, identifying how TRSE can affect access to jobs, education, social networks, goods, services, and involvement in institutional decision-making. In turn, they argue that it is non-binary, stressing the existence of gradations of TRSE, distinguishing it from material poverty that is characterised by a binary state. Despite the differentiation between public and private mobility to assess individuals' accessibility levels is often disregarded, some scholars question the assumption that the ownership of private vehicles is sufficient

to prevent TRSE (Lucas, 2012; Lucas, 2019; Schwanen et al. 2015). They argue that excessive reliance on cars can be a response to perceived TRSE, especially when public transport does not constitute a viable option to guarantee minimum accessibility levels. They emphasise the necessity of prioritising a redistributive approach towards transportation, with a particular focus on public transport, rather than merely adopting an individualistic approach which has so far assumed that mobility issues can be resolved using automobiles.

As a result, applying the aforementioned theories provides a solid framework that, with the support of the empirical literature, allows this qualitative analysis to investigate the determinants engendering car use. A distinction is performed between non-instrumental determinants - attitudes, habits, and environmental awareness - and instrumental ones - time, costs, accessibility, and public transport provision. Eventually, this study will contribute to the existing literature by empirically studying two geographical areas previously not analysed and by dynamically examining how certain determinants interact with each other.

## **3 DATA AND METHODS**

---

### **3.1 DESIGN**

Face-to-face semi-structured interviews are considered the best option for collecting primary qualitative data for this study since no data concerning the determinants of car use is available for Milan and Stockholm, especially their commuting zones. However, despite face-to-face interaction being preferred to facilitate a spontaneous flow of the dialogue, time and geographical constraints required performing three interviews online, although this different modality did not hamper the validity and relevance of the results (Appendix B). Regarding the interviews, the semi-structured character allows the respondents to provide additional information without limiting the discussion to the researcher's questions, an aspect particularly relevant for a topic concerning everyone's daily life. Focus groups were considered as well, but they were deemed unsuitable for this study as participants might refrain from publicly disclosing certain information regarding their travel behaviours.

### **3.2 APPLICATION OF THEORIES**

Theories of TPB and TRSE are used to prepare the structure of the interviews. In such a manner, the risk of addressing topics merely guided by his intuition, which personal biases might influence, is

reduced. Firstly, TPB is applied to investigate how individuals form their transport-related decisions and how these are affected by attitudes, habits, and the assessment of instrumental determinants. Secondly, an adaptation of TRSE is employed. Indeed, rather than the notion per se, the perception of the risk of being affected by TRSE is considered. Among the TRSE frameworks available, Luca's (2012) model is deemed the most suitable for this research as its focus centres around the socio-economic implications of a limited accessibility rather than the practical obstacles faced in accessing transportation. The main areas covered by Lucas (2012) and used for this thesis are the following: work, education, social networks, access to goods and services, and involvement in decision-making.

### **3.3 SELECTION OF INTERVIEWEES**

Convenience sampling was deemed the most feasible sampling technique for this thesis. With the help of two intermediaries in Milan and Stockholm, potential interviewees not belonging to the researcher's social network were contacted via email. During this first contact, the interviewees were informed about the generalities of the topic addressed, and the consent form was preliminary sent to ensure their acceptance of the conditions. The consent form (Appendix A) specifically pointed out the protection of the anonymity and the utilisation of the data raised for the sole purpose of this study. Other than the need to transparently communicate the terms and conditions of the interviews, no other ethical issues are identified within this study.

Eventually, eleven participants were involved in this study, five in Milan and six in Stockholm (Appendix B). All participants were in good physical health and were either employed or self-employed. They resided in the commuting zones and owned private vehicles. The locus was placed on individuals whose travel behaviours depended on their assessment of instrumental and non-instrumental determinants, and they were not constrained by economic circumstances. For this reason, low-income people were excluded using the EU definition of "people at risk of poverty and social exclusion" (Eurostat, 2022, n.a.). Secondly, people affected by physical disabilities were not involved as they face different mobility constraints which make car use, in some instances, inevitable. Lastly, only the inhabitants of the FUAs' commuting zones were interviewed. Indisputably, they experience reduced public transport coverage and lower frequency than the core cities, making the identification of their challenges significant for the study.

### **3.4 PROCEDURES**

Before administering the interviews, a pilot interview - whose results are not included in this research - was performed to assess the questions' feasibility, effectiveness, and relevance while quantifying the

required time. Furthermore, the pilot interview served to test the recording devices and two different transcription tools. To underline the comparability perspective of this research, the timing of the interviews was relevant. All the interviews conducted in Italy preceded the ones performed in Sweden (Appendix B). Based on the information from the Italian participants, further questions were successfully posed to the Swedish participants, de facto utilising the first five interviews as a building block for the last six.

During the interviews, two distinct blocks, whose order was strictly respected, were identified (Appendix C). The first one, related to the application of TPB, served to identify the interviewees' transport decision-making. This initial section employed photo elicitation tools to facilitate the extraction of the required information since mobility decisions are often taken subconsciously (Appendix D). The second part elaborated on the notion of TRSE, particularly relevant to verify the consistency of the first answers and to question the vitality of a car as a fundamental means of transport. Within each block, the order of the questions remained flexible to accommodate the natural flow of the conversation.

### **3.5 LIMITATIONS**

Two significant assumptions are adopted. Firstly, public transport is identified as the main alternative to private vehicles, disregarding the role of non-motorised options, such as cycling or walking. Secondly, the necessity of highly mobile lifestyles is not questioned. While scholarly debates around proximity, rather than mobility, are intensifying, this study assumes that individuals' needs for mobility will remain unchanged over time.

Additionally, this study has a limited scope to investigate the causality of the phenomenon behind car use. Indeed, it does not investigate whether the quality of public transport is a reflection per se of the societal and cultural attitudes towards it. In this case, the provision of public transport services is considered a mere consequence of public institutions' decisions.

Interviewees might have been affected by biases in answering the questions, especially those depicting high levels of car dependency. However, the second section of the interviews concerned the application of TRSE, functioning as a tool to test the answers' consistency. Also, analysing biases in travel behaviours is precisely one of the aims of this study.

Furthermore, two different languages are employed for interviews. The Italian respondents were interviewed in their native language, whereas English was used with the Swedish interviewees. While English proficiency in Sweden is notoriously high, some interviewees have relied on an essential - albeit effective - vocabulary, possibly limiting their ability to convey all the shades of their views.

Finally, generalising this thesis's conclusions, either at the city level or theoretical level, would be misleading. This is due to a limited number of interviewees who are not a statistically representative population sample. Also, the respondents are residing in various areas of the commuting zones. As such, they might benefit from varying levels of transportation infrastructures.

## 4 EMPIRICAL ANALYSIS

---

### 4.1 RESULTS

This section aims to expose the interviews' results, highlighting similarities and differences between individuals in Stockholm and Milan Functional Urban Areas and distinguishing between non-instrumental and instrumental determinants.

#### 4.1.1 ATTITUDES

##### 4.1.1.1 *Attitudes Towards Car Ownership*

The respondents were shown pictures of various car models associated with different income classes and asked to discuss their views on the car as an element of class distinction. The interviewees deny owning a particular car model to project their economic conditions. For instance, S.P5 considers the car as an element of class distinction preposterous, saying that "it can be a little bit silly to buy a car just to show how rich you are", arguing that pragmatism is behind the choice of a car model, preferring features such as boot capacity and safety (SP.5, S.P6).

Contrarily, many respondents (M.P4, M.P5, S.P2) highlight the role of social identity in possessing a specific car. The car is perceived as an object capable of reflecting the belonging to a certain subculture intended as a statement of an individual's values, tastes, and preferences. However, M.P4 distinguishes between the utilitarian and the leisure-oriented functions of cars, believing that the expression of social identity is utterly irrelevant if the car is used solely for functional journeys. In addition, M.P5 refers to the car as a national symbol. When shown the picture of a Fiat Panda, the interviewee shows affection towards it, arguing that this model is:

an icon that travelled through decades. Our grandparents had it, ... our parents and ... it remains a guarantee. It has always existed, it is Italian, it is a symbol of our country (own translation)

As such, conceiving the car as a statement of individuality or belonging to a national culture implies that attitudes towards the car as an object are not merely affected by its functionality. On the contrary, they are influenced by aesthetic features which enhance the positive attitudes towards automobility.

#### ***4.1.1.2 Attitudes Towards Car Use***

Since it is not sufficient to analyse the car as an object per se, the interviews also investigated the attitudes towards the action of driving. Some interviewees (M.P2, M.P4, S.P2, S.P3, S.P5) describe driving as enjoyable, destressing and adrenaline-filled. A distinction occurred again between functional and leisure journeys. The former is connotated with a lower level of enjoyment due to traffic congestion, while the latter is associated with feelings of freedom and amusement. M.P2 states that “the pleasure of driving is equally important to the functional benefits of owning a car” (own translation). Similarly, M.P4 asserts that “[d]riving is creating a bond with the car, something that you can never have with public transport” (own translation). M.P5 and S.P6 also highlight how moments spent on cars embody an extension of the private sphere of life, making the car an integral part of adulthood and family life. Positive attitudes towards driving, in turn, make car use appealing.

Whilst the positive elements associated with driving are preponderant over the negative ones, the respondents agree that traffic congestions and roadblocks are a source of stress. Besides, M.P1 and M.P5 express frustration due to the attention levels required due to the erratic behaviours of some road users. It is, then, possible to underline a general inconsistency in the answers: most interviewees show very positive or satisfactory attitudes towards driving, highlighting their feeling of freedom and independence. However, they depict an individualistic approach to transport-related decisions. Road disruptions are described as elements caused by other road users without accepting that the collective freedom of driving leads to reduced freedom of personal mobility through high congestion levels.

#### ***4.1.1.3 Attitudes Towards Public Transport***

The interviewees were asked to express their opinions on public transport through photo-elicitation strategies. To overcome potential prejudices and biases, for every means of transport - bus, train, and subway, two pictures were displayed, one having a very positive representation of the means, the other depicting a very negative one. A clear polarization between the respondents in Milan and Stockholm is visible. Indeed, the Milan respondents express a generally negative view of public



transport. In contrast, the ones in the Stockholm commuting zone reveal an overall positive opinion concerning public transport.

Specifically, Stockholm interviewees have a generally positive perspective on the local bus network, except for S.P2, who admitted to seldom using buses. At the same time, overcrowding problems and poor time reliability emerged in the answers (S.P1, S.P3, S.P4, S.P5, S.P6). On the other hand, all the interviewees in Milan assert that the system is untrustworthy and disorganized, and the rolling stock is dirty, obsolete, and not environmentally friendly. It is also important to disclose that all of the interviewees in Milan exclusively used the local bus network during their schooling years. Therefore, their opinions are based on prejudices and the system's reputation. This is a vital aspect in understanding why the interviewees in the Milan commuting zone are more prone to rely on private vehicles for short-distance journeys. Negative attitudes to public transport services strengthen car-dependent behaviours.

Regarding rail-based means of transport, mainly trains and subways, the interviewees have better judgements, particularly concerning the subway. All interviewees associate the subway with a symbol of city-wide accomplishment, modernity, and dynamism. However, none of them linked the use of this means of transport with feelings of enjoyment. More diverging opinions transpired concerning commuter trains, mostly considered reliable, fast and not crowded (M.P1, M.P2, M.P5, S.P3, S.P4, S.P5, S.P6). On the other hand, S.P1 expresses frustration due to the recurrence of strike actions, saying that:

[during the last winter] [t]here has been a lot of troubles with the *Pendeltåg*. A lot of trains have been cancelled and it made me really annoyed... So recently, I've thought about taking the car instead

M.P4, additionally, stresses the low quality of the service provided by the regional train company arguing that "the situations of regional trains in Lombardy ... remains critical ... with frequent cancellations and widespread lack of care for the rolling stock" (own translation). Interestingly, S.P1 and M.P4 are the only interviewees relying daily on commuter trains for their journey to work, having worse views of this transport mode than the other interviewees.

A bias can then be denoted between buses and trains, particularly among the Italians. M.P5 expresses a feeling of discomfort in using the bus "because it serves all the neighbourhoods in the city, as such you don't know who will get on" (own translation), without voicing the same worry for rail services whose users are also distributed along the entire socio-economic spectrum. As such, while the Italian

interviewees negate the importance of the car per se as a class distinction element, the use of buses symbolizes the belonging to a low-income class unable to afford a private vehicle.

#### **4.1.1.4 Safety Perception**

The issue of safety perception - both in the sense of road safety and crime perception - has been discussed. For all the respondents, public transport implies a broader degree of physical safety than cars, although S.P3 and S.P5 express their concerns about bus drivers' behaviour behind the wheel. Nevertheless, Stockholm interviewees do not express particular worries about driving, a feeling of trust ensured by their cars' technological and safety equipment (S.P1, S.P3, S.P5, S.P6). The entirety of the Italian interviewees, contrarily, are negatively affected by other motorists' behaviours, increasing their feeling of unsafety. M.P2 recognises that "it is on cars that the vast majority of road accidents' deaths occur, everybody knows that" (own translation). However, they accept road risks as they deem the risk of driving inferior to the benefits arising from it.

For what matters crime perception, the interviewees feel securer in the enclosed space of their cars. On the other hand, M.P1 and M.P4 express concerns about their vehicles being vandalised or stolen when parked in some crime-ridden areas. This worry is significant as it triggers a modal shift in them. They opt for public transportation to avoid exposing their car to the risks of theft or damage. M.P1 argues that:

when you park your car, you never know what could happen [...] as such I sometimes use the train to minimise the risk of my car being vandalised (own translation)

M.P4 reiterates the concept by explaining that he opts for public transport modes when heading to unsafe areas. Indeed, he says that:

the Central Station area is possibly the most dangerous of all, so if you left you parked your car ..., it would mean getting your car stolen (own translation)

A noticeable polarisation of the interviewees' views in Milan and Stockholm regarding crime perception on public transport. Indeed, while all interviewees find evening and night times more crime-ridden, the Stockholm respondents tend to almost dismiss these time differences. S.P5, however, shows concerns for her family, rather than herself, due to the presence of people on board consuming substances and the perceived risk of terrorism in crowded environments. However, the Milan interviewees show high interpersonal distrust on public transport. While M.P1, M.P3 and M.P3 only highlight the risk of being victims of petty crimes, M.P4 and M.P5 disclose fear as women or for women due to the perceived risk of being affected by violent sex crimes. M.P5 says that:

as a woman, I have some qualms when travelling on public transport, [...] so if I had to choose, I'd rather opt for the car (own translation)

Without being able to internalise externalities, motorists will likely overestimate the benefits of using automobiles and underestimate the risks. Indeed, while the risk of being affected by crime is preponderant when discussing public transport, they persistently underestimate the risks of fatal road accidents. Contemporarily, the already negative attitudes towards public transport in Milan are worsened by the low safety perception, making potential users particularly receptive to harmful publicity.

## **4.1.2 HABITS**

Transport-related decisions are often taken subconsciously. Based on TPB, the interviews have been analysed to extract information concerning their travel habits. To avoid formulating questions leading to biased answers, the interviewees have been asked to generally discuss their childhood and adulthood travel behaviours.

### ***4.1.2.1 Past Experiences***

Starkly different answers are visible between the interviewees in Milan and Stockholm regarding their travel behaviours as children. Indeed, every Stockholm respondent asserts that, during their childhood, the management of their travel habits was independent of their parents. Indeed, as children, they felt at ease moving in their surroundings - predominantly on foot and by bicycle. Furthermore, none of them disclose any safety concerns for themselves or from their parents. Contrarily, the car was the predominant mode for the interviewees in Milan during their childhood and early adolescence. At the same time, buses were exclusively used for school journeys during late adolescence. On this subject, M.P2 says that "honestly [in my family] they never introduced me to the culture of public transport" (own translation). At the same time, M.P1 and M.P5 talk about their parents' distrust for other road users, preferring to take care of their children's mobility needs directly. Additionally, whilst the Stockholm respondents generally have positive feedback for their childhood experiences with public transport, some interviewees in Milan report negative experiences with buses (M.P1, M.P2). M.P2 stresses the lack of respect for common rules on-board buses by other riders, while M.P1 narrates that he has:

a memory of those broken and run down buses, very polluting, with a black cloud of smoke coming out from the muffler, ... and overcrowded ... [T]he service was terribly organized (own translation)

It is also important to underline that the comments from M.P1 and M.P2 were made when asked to discuss their opinions on public transport, without even reaching the moment they were supposed to converse about their childhood or adolescence experiences. Adverse past events shape current attitudes, reinforcing car use habits. Conversely, as S.P1 recounts, living car-free for many years enhanced his awareness of both the availability and the quality of public transport, reducing the magnitude of his car use habits. Positive experiences promote positive current attitudes towards alternative modes of transport, making modal shifts more achievable.

#### ***4.1.2.2 Car Ownership as a Trigger for Car Use Habits***

The answers show how the ownership of the car per se can promote more car-dependent travel behaviours. S.P4 claims that she used to ride buses, but since she now owns a car, she refrains from riding buses as she is accustomed to driving her vehicle. S.P6 exclaims that “[I] have the car in the garage, so [I] use it!”, while M.P5 and S.P5 admit to occasionally using the car purely out of idleness, despite other options being available. At the same, S.P1 felt that having a car acted as an incentive to relocate from the core city to its commuting zone, a choice that triggered a more car-dependent lifestyle. In this case, car ownership is not a response to certain mobility needs; it is the root of further mobility. Eventually, further habits develop in connection to the ownership of private vehicles. Habits such as listening to music or enjoying moments of private life in an enclosed space (M.P2; M.P5; S.P2; S.P5) reinforce the habitual use of the car itself.

#### ***4.1.2.3 Effort in Habits Change***

The interviews highlight that the organizational efforts to utilize public transportation are perceived as higher once car use habits are established. Based on the answers received, two main barriers to change can be distinguished: childcare and information-raising efforts. Firstly, childcare implies an additional planning process in terms of journey management. Voluminous items, such as strollers, extra luggage and larger groceries, discouraging a modal shift towards public transport (M.P3; S.P4; S.P5).

Likewise, the effort to coordinate the children’s activities timeline – mostly the extracurricular ones - fortifies the reliance on the car (M.P2; S.P4; S.P5). M.P2 states that she is such “acclimated to using the car” (own translation) that, given her lifestyle and family duties, she would hardly accept shifting to public transport, even following a radical improvement of the service. Secondly, S.P2 states that:

I'm so used to go with the car, so I'm not familiar with where all the bus stops are... [I]t's a lot of hassle to take the bus

The effort to collect information for the utilization of public transport deserves attention. If this information collection process is deemed excessively time-consuming or unintuitive, motorists reiterate their car-dependent habits without contemplating alternative options. This is a crucial element for the car dependency of the interviewees in the Milan commuting zones. They all assert that they are unaware of any ICT tools to retrieve information about their towns' bus network. M.P1 recognizes the difficulty of purchasing a bus ticket and consulting the timetables explaining that:

I don't think there's any bus app. ... I would try and look for a website then, if they even have it! ... Otherwise, I would look for a newspapers' agency to buy the ticket, but I'd have to hope that it's opened (own translation)

Not providing intuitive information about public transport impacts its attitudes towards it. It does not make it sufficiently competitive with the well-established car travel habits, as the effort to acquire basic information is deemed too costly.

#### **4.1.3 ENVIRONMENTAL AWARENESS**

Environmental sustainability is fundamental in understanding how motorists' car use might be affected. To test the sensitivity and awareness of the topic, interviewees were asked to elaborate on their opinions on the meaning of environmental sustainability and climate change. As expected, all interviewees state the need to act immediately to prevent further damage caused by climate change by adopting a sustainable lifestyle. However, a lack of consistency between the desires to act and their concretization into actions characterizes the entirety of the interviewees. M.P2 defines "surreal" (own translation) reprogramming her travel behaviour as a response to climate change, as she deems this change pragmatically incompatible with her job- and family-related duties. Moreover, while showing more mitigated opinions, all the other interviewees admit to not adapting their travel habits based on environmental concerns.

While car use remains unchanged and the environment is never the primary reason for altering the modal choice, a sense of guilt (S.P5) and responsibility (S.P4) is conveyed while driving. In contrast, a sense of accomplishment (M.P1) is felt when using public transport. M.P1 states that:

firstly, I think about the costs .... If I opt for the train, then I say to myself 'also, I will pollute less!' They even write that on the tickets! ... [I]t is not something that I immediately think about, though (own translation)

Environmental awareness is deemed influential when purchasing a new vehicle despite not impacting car use, although only S.P1, S.P2 and S.P3 own an electric car. All the other interviewees affirm assessing the option of an electric car, but it was considered excessively costly. However, unlike the low environmental impact, S.P2 argues that the decision depended on government tax rebates. Despite its higher purchase price, S.P1 and S.P3 feel that environmental friendliness was the primary driver behind the car choice. At the same time, owning an electric vehicle reinforces the car use habits of S.P3, acting as a pretext for not opting for public transport modes. She answers that:

if I didn't have an electrical car, ... I would have thought ... more to use public transport. [...]  
But now, when I have this electric car, I think it's the same

This signals the failure to consider other externalities besides the environmental ones caused by excessive reliance on private mobility. Despite technological improvements that can partially overcome negative environmental externalities, they cannot tackle the social and economic ones.

#### **4.1.4 COSTS**

The perception of travel costs can affect modal choices. All the interviewees provide accurate answers about the cost of a bus/train ride from their town to the centres of Milan and Stockholm. However, when asked to consider the cost components of a car ride, all interviewees recognise the complexity of such a calculation. Nevertheless, while listing the costs of a car ride, variable costs, e.g., fuel, parking, and congestion tolls, are emphasised compared to the fixed - or yearly - ones, e.g., insurance, ordinary and extraordinary maintenance, traffic tickets, depreciation, and government taxes. In this regard, some interviewees entirely omit yearly costs when quantifying the cost of a car journey (M.P2, M.P4, M.P5, S.P5). Although all respondents are aware that car rides are arbitrarily more costly than public transport journeys, the disregard of yearly costs - either partially or totally - persistently leads to an underestimation of the costs of car journeys.

Additionally, car use is perceived as appealing since, in most cases, no monetary transaction is needed. S.P4 claims that "you don't pay every time when you go with your car", while a monetary transaction is due when boarding a bus. Also, S.P6 argues that since her partner does not hold a public transport monthly ticket, purchasing an additional bus ticket when a car is available in the household is deemed pointless. On the contrary, M.P1 argues that the motorways' tolls are the main incentive to ride trains when heading to Milan. At the same time, S.P3 asserts that congestion charges and expensive parking are significant reasons for commuting to work by public transportation. This signifies that a modal shift towards other options is encouraged whenever a transaction is necessary.

#### 4.1.5 TIME MANAGEMENT

The allocation of time between work, leisure and family care is vital for transport decision-making. As the interviews show, the relationship between time and the modal transportation choice is complex. Indeed, habits and attitudes often subjectively affect the critical components in assessing travel time, namely efficiency and reliability.

##### 4.1.5.1 *Time Efficiency*

Regarding time efficiency, the respondents in both cities considered the car the most effective way to shorten travel times. S.P5 underlines the incompatibility between the work schedule, particularly night shifts, and the low bus frequency during late hours. M.P1 stresses bus lines' ineffectiveness in reaching his workplace, making public transport alternatives extremely uncompetitive. He says that:

I could use a bus that takes almost one hour to get to [work], while it takes me ten to fifteen minutes by car. If only a more direct bus line existed, I would seriously consider leaving the car home (own translation)

Furthermore, the ability to flexibly coordinate childcare and work duties along the same route is seen as decisive in modal choices. S.P4 explains that time efficiency "was not so important, but now [with a child] time is everything", conceiving the car as the best response to the pressure of childcare activities. The same applies to S.P5. However, advantages in time efficiency are also identified in the use of public transport. Indeed, S.P1 argues that public transport is the most suitable solution to efficiently use travel time "because you can sit on the train, and you can [work]. You can answer emails, you can check your phone...". M.P1 reiterates that travelling by train allows him to study, making travel time more valuable, while "when you drive, you just drive, it is dead time" (own translation). As such, it is possible to denote how diverse lifestyles and forms of households lead to different perceptions of time efficiency.

A distinction based on journey type emerged. For functional journeys, it is also relevant to highlight that M.P3 and S.P2, the only two business owners, depict a stronger tendency to monetise travel time. Indeed, travel times required to visit customers and suppliers directly reflect their income. S.P2 states that if he did not own a car, "I couldn't do half of the things I do during a normal workday [and] time is money". At the same time, employees cannot unlimitedly extend the number of hours worked as these are bounded to labour collective agreements. They reallocate saved travel time to leisure and family care rather than work. On the contrary, time efficiency is not a necessary aspect of leisure journeys but a component of the leisure activity itself. M.P4, for instance, argues that driving for

leisure is almost "therapeutical" (own translation) as it occurs in preparation for a pleasant event. As such, time efficiency in this context is disregarded.

#### **4.1.5.2 Time Reliability**

The interviewees express their concerns over the reliability - or lack of - of different transportation modes, although a clear pattern between Stockholm and Milan cannot be highlighted. Non-instrumental factors, particularly habits and attitudes, impact the assessment of time reliability. In general, the car is perceived as a superior mode in terms of the ability of the motorist to control time and promptly respond to potential disruptions (M.P3, S.P2, S.P3, S.P5). M.P3 and S.P2 argue that navigation applications that crowdsource user data accurately communicate traffic conditions, providing a sense of control over time. Additionally, S.P2 asserts, "I know how traffic flows. I always book my meetings [...] when the traffic settles down". As such, the perceived ability to foresee other road users' habitual travel patterns and navigation tools strengthens the link between car and time reliability. Moreover, some interviewees reveal a sense of powerlessness for disruptions occurring with public transport (M.P2, S.P3, S.P5). S.P5 says that "yesterday the bus skipped my bus stop. So ... I was late!", while M.P2 says that "if they stop the subway, you just have to wait. There is nothing you can do" (own translation). Being passengers rather than drivers causes a feeling of unreliability and helplessness, even in those cases when public transport is deemed more time efficient than private transport.

At the same time, other interviewees stress the stronger perception of the time reliability of public transport given its scheduled routes. In this regard, S.P1 affirms that:

When I take the commuter train, I always know it takes 11 minutes for me to go [work]. In my mind, I'm set to that time limit ... With the car, it's more unpredictable because of traffic and accidents

Also, scheduled routes function as a tool to self-discipline the time optimism of car use, with traffic persistently causing longer journeys' duration than expected (M.P4, M.P5). Rather than the schedule, S.P4 judges public transport as more reliable due to the quality of urban infrastructures physically separating public and private transport, allowing the former to be less subjected to traffic delays. Mixed answers are given concerning the perception of time reliability. It is important to note that time reliability and the ability to face travel disruptions are perceived as critical elements for not opting for public transportation. On the other hand, except for S.P1, even the interviewees who assert the superiority in time reliability for public modes of transport do not deem this element a sufficient condition to alter their car use habits.



#### 4.1.6 ACCESSIBILITY LEVELS IN THE ABSENCE OF A CAR

By investigating accessibility obstacles that individuals expect to face when solely relying on public transportation, additional determinants of car use can be identified. A demarcated pattern is highlighted between the two cities' respondents. While the Swedish interviewees assert that the absence of a car would imply the need for more accurate planning and reduced time efficiency, the Italian ones disclose that this absence would seriously compromise their minimum accessibility levels. All the respondents in the Milan commuting zone argue that the unavailability of a private vehicle would hinder their access to the job market, significantly restricting their job-seeking range. M.P4 argues that he would be forced to limit the job search to Milan, forcing him to exclude the commuting zone due to inadequate public transport. Furthermore, M.P2 says:

[without my own car] I would have to rely on someone else driving me to work... I would be forced to look for a job in ... the immediate proximity of my place, but there aren't a lot of opportunities here... The local bus network only serves students and their time needs, not the workers' ones (own translation)

Eventually, M.P1, who attends an evening bachelor's programme, adds that:

it would be impossible to combine job and university... [W]ithout the car, I would be forced to give up my studies (own translation)

Even S.P3 and S.P4 argue that lacking a car would affect their ability to access the job market and participate in on-the-job training activities. However, they do not mention the impossibility of doing so; instead, they refer to it as an unpleasant inconvenience. S.P3 argues that a job in the Stockholm commuting zone implies too many interchanges, while S.P4 states that the remoteness of training centres requires a multitude of lengthy bus rides. Contrarily, S.P1 and S.P5 affirm that the access to the job market is unrelated to owning a car. S.P5 states that "in Stockholm, we have quite a lot of buses and trains. I don't think that [having a car] matters when looking for a job".

A significant issue among Italian respondents is preserving their social networks. Indeed, they agree on the difficulty of reaching friends and family when they live in suburban areas and the impossibility of conducting any nightlife-related activities due to the inexistence of night public transport. On the other hand, every Stockholm respondent confirms the availability of public transport alternatives to visit friends and family, despite highlighting the need for better personal planning when lacking a car. S.P6 recognises that while the main reason for owning a car is the convenience of reaching her social network, other alternatives are available, even if she deems them time inefficient. It is also curious to note that, for social gatherings, the choice of public transport is already perceived as an act of responsibility with respect to the car when the consumption of alcohol is involved (S.P3, S.P4).

For what matters access to goods, the interviewees in both cities acknowledge the presence of other options, even if the unavailability of a car would cause hindrances. Concerning grocery shopping, some respondents argue that online home deliveries would be an appealing alternative (M.P3, M.P4, S.P3). In contrast, others would consider local grocery stores despite their average higher prices and a limited choice of products (M.P1, M.P2, M.P5, S.P2, S.P4, S.P6). Similar answers are given for retail shopping. M.P1, M.P2 and S.P5 underline that a time-optimisation of this form of shopping would be required, limiting its frequency while concentrating the purchase of items to a few occurrences. The respondents are also willing to trade the excess in shopping costs, in terms of delivery expenses and higher local prices, in exchange for the saved money for not owning a car.

While access to goods implies the need to re-adapt lifestyles, access to services is occasionally severely restricted when lacking a private vehicle. It is especially healthcare that raises the main concerns for M.P2 and S.P5. Indeed, as S.P5 says:

[my family and I] were thinking about trying to live car-free for a while. And then [healthcare] was one aspect of why we wanted one car, in case something should happen to our children or ourselves

The access to cultural venues, however, is not deemed restricted by the lack of a private vehicle as most venues are in Milan and Stockholm downtowns with efficient links with the commuting zones. On the contrary, the lack of a night bus network (M.P1) and public transportation deficiencies in the Milan commuting zone (M.P4) could constitute a barrier to full access to the cultural sphere of life.

The respondents in Milan, as such, see the car as a requirement to preserve their accessibility levels in terms of work, education, and social networks. Contrarily, the interviewees in Stockholm, both the regular public transport riders and those exhibiting strong car-dependent behaviours, accept public transport as a viable alternative to preserve minimal accessibility. Except for S.P5, they conceptualise the car as a tool to enhance time efficiency when it comes to family and work duties (S.P2, S.P3, S.P4, S.P6) or a mere luxury that one can afford (S.P1), refuting the idea of the car as a necessity.

#### **4.1.7 PUBLIC TRANSPORT INSTITUTIONAL FRAMEWORK AND POLICIES**

The decision-making process through which institutions set transport-related investment goals and interact with various stakeholders can affect car use. In addition, transport policies can incentivize or restrict particular travel behaviours. Citizens' involvement in drafting these policies and support are crucial elements in comprehending people's perception of the effectiveness of a particular transportation network.

#### **4.1.7.1 Involvement in Decision-Making**

Throughout the interviews, various opinions emerged concerning the overall satisfaction with the transportation network. Some differences can be highlighted between the respondents in both cities. Respondents in Milan criticise the need for more pragmatism in planning the transportation system that, in its current state, does not reflect people's needs. Firstly, M.P1 and M.P3 are doubtful about the investment priorities set by regional and national entities. Indeed, they argue that in the last decades, investments have been oriented to developing the motorway network rather than improving the local bus system. They contest the necessity of those investments that they deem excessively expensive and worthless for motorists. In particular, they refer to the construction of the *Pedemontana* motorway. M.P1 says:

I think they wanted to improve the traffic flow around Milan, but today [*Pedemontana*] remains virtually unutilised. It's an investment that served very few motorists, a waste of money (own translation)

Secondly, M.P5 questions the unresponsiveness of the bus network, unable to accommodate the needs of the sprawling commuting zone, serving town centres rather than the industrial and commercial estates. Thirdly, M.P1, M.P2 and M.P3 disclose their frustration with the technological equipment of bus providers. They refer to the burdensome purchase of tickets, not possible online for certain companies (M.P1, M.P2), and the lack of on-board information (M.P1, M.P3). Lastly, M.P1 expresses dissatisfaction with the fragmentation of the bus network, leading to uncoordinated schedules and unintegrated ticketing systems.

On the contrary, some Stockholm interviewees complain about the lack of improvement in road infrastructures causing chronic bottlenecks (S.P3, S.P4). In contrast, others convey high satisfaction with the public transport network (S.P1, S.P3, S.P6). S.P6, additionally, underlines the receptiveness of public transport to the new needs of the functional urban area, arguing that investment in bus and subway lines is being carried out to face the increasing population in the commuting zone. Only S.P5 believes that improvements are required to the bus network to improve its reliability, though without referring to an utter infrastructural inadequateness.

#### **4.1.7.2 Support for Transport Policies**

To comprehend the interviewees' opinions concerning transportation policies restricting car use, they were asked to discuss their experiences with the congestion charges in Stockholm and Milan city centres. Most interviewees approve of this tax to curb air pollution, reduce traffic congestion, and improve residents' quality of life, especially considering the wide availability of public transport alternatives in the areas involved. It is only M.P4 that contests the tax as an elitist approach to urbanity. He argues that its effects are felt differently depending on an individual's income, with high-income individuals potentially preserving their car use habits due to the low impact this tax exercises on their finances. Additionally, S.P3 and S.P6 assert that better transparency is required to communicate how and if the extra revenues are reinvested in the transportation network. However, when asked the hypothetical question of extending the congestion charge into the commuting zones, only S.P1 would accept it without requiring any implementations in public transport provision. At the same time, others would consider approving these restrictive measures exclusively posterior to the improvements of the public transportation system (M.P2, M.P3, M.P5, S.P3, S.P5), showing their inclination to hypothetically alter their car travel habits if adequate alternatives are supplied.

## **4.2 DISCUSSION**

A common denominator between the answers in Milan and Stockholm can be highlighted. Indeed, the determinants' categories cannot be analysed statically; their interrelationship requires a profound comprehension. Non-instrumental determinants, particularly attitudes and habits, distort the quantification of the instrumental ones, making a merely utilitarian approach to explain car use insufficient (Minhans, Chatterjee & Popli, 2020; Gardner & Abraham, 2007; Hernandez, 2018; Lucas, 2009; Quaglione et al. 2019). This is consistent with the underpinning TPB that dissects the formation of certain behaviours in different components, emphasising the impact of personal and societal attitudes together with the ability to control them (Ajzen, 1991; Anable, 2005; Forward, 2019).

Scholars stress the car's significance as a tangible expression of an individual's attitudes, making its ownership appealing (Anable, 2005; Lucas, 2009; Mattioli et al. 2020; Quaglione et al. 2019), an aspect confirmed by all interviewees. Mattioli et al. (2020) also discuss the car - and its various brands and models - as an element of class distinction, though all respondents refute this idea. Nevertheless, some Italians emphasise the ownership of a car per se - disregarding its different models - as an element of class distinction compared to those individuals unable to afford one. Ashmore et al. (2019) reach similar conclusions. However, their study advocates that in developing countries, rather than developed ones, the ownership of the car is still connotated with belonging to a middle- or high-income class while, in this research, two areas in developed countries are analysed.

On the other hand, based on the interviews, it is possible to denote how negative attitudes towards public transport, especially for non-rail-based means, can trigger positive attitudes towards cars as an inevitable response (Ashmore et al. 2019; Minhans, Chatterjee & Popli, 2020). This is the case of the Italian respondents, who generally perceive public transport alternatives negatively and show markedly unfavourable attitudes towards bus services rather than rail ones. In addition to car ownership, car consumption - in the form of driving - play a key role. Indeed, as some interviewees argue, car use is a matter of freedom, independence, and an extension of their private sphere of life, highlighting to need to comprehensively consider all the reasons at the roots of positive attitudes towards automobility (Jensen, 1999; Mattioli et al. 2020). It is, then, vital to understand how attitudes influence travel habits, committing individuals to car use.

Firstly, attitudes can form travel habits resistant to modal shifts, denoting a path dependency from past behaviours and experiences. The Italian respondents narrate that, during childhood, journeys were mainly dependent on the parents and performed by car. Contrarily, the Swedish interviewees say that their journeys were predominantly executed autonomously on foot, by bike or by public transportation. They exhibit a higher propensity to use and positive attitudes to public transport than the Italians. In this regard, scholars have identified how present patterns of consumption of transportation are associated with past consumption, especially those related to travel behaviours of the childhood household (Maréchal, 2016; Mattioli et al. 2020; Van Acker, Mulley & Ho, 2019). Van Acker, Mulley & Ho (2019) describe the long-lasting impact of experiences on present travel behaviours: negative experiences on public transport, as is the case for some Italians, lead to persisting negative attitudes towards it, erecting barriers for any modal shifts.

Secondly, car ownership is intrinsically a sufficient conditioning element to commit individuals to further car use, inducing habit formation (Mattioli et al. 2020; Simma & Axhausen, 2001; Song, Diao & Feng, 2021). This adapted lifestyle manifests through the relocation to suburban residential areas (S.P1), where the availability of public transport is limited, or the adoption of a highly mobile daily routine, especially when children are present in the household (S.P4; S.P5; M.P2). Clark, Chatterjee and Melia (2016) confirm that car ownership can unconsciously affect individuals' lifestyles, refuting the argument that car ownership is solely a response to particular needs. It is, therefore, attitudes and habits that lead to a biased evaluation of the instrumental determinants of transport-related decisions.

Positive attitudes and habits patterns favouring cars instead of public transport, more common among the respondents in Milan than Stockholm, lead to a process of "selective attention on information" (Quaglione et al. 2019, p.25). According to Quaglione et al. (2019), individuals tend to underestimate the costs and risks of car use as they are accustomed to it while overestimating its benefits. The interviewees downplay or even accept the risks connected to driving while they express concerns about being victims of crime on public transport. In addition, car-related costs are persistently

underestimated. Many interviewees disregard entirely or partially the monthly and yearly fixed costs of owning a car, solely focusing on the variable ones, leading to an overall underestimation of the costs compared to the benefits and the costs of alternative modes. Studies highlight the complexity for individuals to consider private vehicle costs across different timescales, leading to the perception of the car being cheaper - or equally costly - at the point of use than public transport alternatives (Gardner & Abraham, 2007; Mattioli et al. 2020; Maxwell, 2001; Simma & Axhausen, 2001).

The issue of costs and benefits occurring along various timescales also reflects on the judgment of immediate individual benefits in relation to future collective costs, especially concerning the negative environmental externalities of car use. Indeed, while the interviewees recognise the long-term environmental threats from car use, they admit to not altering their car use habits, in line with the findings of Beirão and Cabral (2007). As Anable (2005) advocates, tensions exist when balancing and assessing the immediate and individual benefits of using private vehicles with the long-term negative consequences caused by collective behaviours. Nevertheless, some interviewees experience “environmental anxieties” (Maxwell, 2001, p.204; S.P4; S.P5) for car use in terms of a sense of guilt and responsibility, proving that some individuals encounter an ethical dilemma in their transport decision-making, although it does not concretise in a modal shift.

Time management, normally a quantifiable determinant, is not unbiased from attitudes and habits. It is predominantly time reliability that is affected by attitudes and habits. For some interviewees (M.P3, S.P2, S.P3, S.P5), the direct control of a private vehicle confers a higher perceived ability to respond to disruptions along the road. However, the same respondents admit to persistently be time optimistic when relying on their private vehicles, as frequent roadblocks and accidents extend the expected journey duration. In line with these findings, Gardner and Abraham (2007) argue that public transport is often deemed unreliable due to the lack of personal control over the means, while Small (2012) expounds that technological improvements in the form of in-vehicle amenities and navigation systems promote an augmented feeling of control over time on automobiles. As such, the tendency to overestimate the time reliability of car rides is confirmed (Asensio & Matas, 2008; Bivina, Landge & Kumar, 2016; Gardner & Abraham, 2007).

On the contrary, the assessment of time efficiency presents a mixture of instrumental and non-instrumental aspects. It is both the potential to contemporarily combine more activities along a single journey and the minimisation of travel time to reallocate it to other purposes that rationally influence the selection of transportation mode. In this regard, De Donnea (1972) explicates that the perception of time efficiency increases if more activities can be consumed simultaneously, as is the case for childcare with cars (M.P2; S.P4, S.P5) and work/study on public transport (M.P1, S.P1). Additionally, the minimisation of travel time is perceived as significant in opting for a specific means of transport. Small (2012) advocates that individuals are willing to pay additional travel costs even if time can be

saved and reallocated to family care (S.P4, S.P5), work (M.P3, S.P2) or leisure (S.P3). The literature, however, does not neatly distinguish how different individuals tend to reallocate saved travel time. About the interviews, a pattern can be highlighted with business owners (M.P3, S.P2) showing a tendency to monetise retained travel time by transferring it to work and employees reallocating it to family and leisure activities. However, non-instrumental determinants can relativise the importance of time efficiency. Firstly, the scope of the journeys, respectively functional and leisure-related, is relevant, with higher attention devoted to the time efficiency of the former rather than the latter (De Donnea, 1972; Gardner & Abraham, 2007; Small, 2012). Secondly, the attitudes towards different modes of transport lead to a different perception of time: if individuals have a negative attitude towards public transport, the value of time spent on it is deemed lower and less productive (De Donnea, 1972; Truong & Hensher, 1985).

While it is fundamental to analyse the determinants of car use and how non-instrumental factors affect the instrumental ones, it is vital to understand the quality of the main modal competitor of private mobility, namely public transport. A demarcated pattern can be highlighted between the answers from the Swedes and Italians. In particular, the Italians assert that, while improvements have yet to be implemented in the public transport system, questionably beneficial road investments have been prioritised. In this regard, Mattioli et al. (2020) show how road investments are often prioritised to respond to increasing motorisation levels, despite their counteractive effect of favouring further private mobility. Additionally, the literature supports the Italian respondents' dissatisfaction with public transport. The Italian transportation sector is hindered by a lack of technological modernisation and responsiveness due to a regulatory framework that sets barriers to entry to competitors, with tenders automatically extended to municipally or regionally owned companies without any market competitive procedures, reducing the incentive to innovate the service provision (Arrigo & Di Foggia, 2015; Asquer, 2011; Fiorio, Florio & Perucca, 2013). The system also favours the existence of small companies operating in relatively limited geographical, hindering the creation of a fully integrated and appealing transport network, increasing coordination and transaction costs, and reducing profitability due to the difficulty in pursuing economies of scale (Arrigo & Di Foggia, 2015; Asquer, 2011; Mekala & MacDonald, 2018).

On the contrary, the Swedes mainly express discontent with some chronic disruptions occurring on road infrastructures while showing high satisfaction with the quality of public transportation. The literature supports their perception of a high-quality public transport sector. Hrelja et al. (2017) advocate that this is attributable to an efficient interplay between formal and informal institutions. Indeed, the latter can complement or substitute the former by reducing transaction costs between public authorities, improving the involvement of stakeholders to set common socio-economic, and emphasising citizens' mobility needs (Hirschhorn et al. 2020; Hrelja et al., 2017; Mekala & MacDonald, 2018; Rye et al. 2018).

Different levels of public transport provision can, in turn, lead to opposite risk perception of transport-related social exclusion between the Italian and Swedish respondents. Indeed, according to the Italians, from an accessibility standpoint, the lack of a private vehicle restricts life opportunities in terms of work, education, and social networks (Church, Frost & Sullivan, 2000; Lucas, 2012; Lucas, 2019; Schwanen et al. 2015; Yigicanlar et al. 2018). The Italian respondents highlight the starkly different availability of public transport between the core city - Milan - and its commuting zones. As Church, Frost & Sullivan (2000) explicate, intra-commuting zone journeys are more arduous than the core city-commuting zone ones, exposing the inhabitants of the commuting belts to a higher risk of transport-related social exclusion. This problem, however, does not emerge from the Swedish respondents residing in the commuting belts, as they deem public transport options an efficient safety net in case of lacking a private vehicle (Schwanen et al. 2015). Notwithstanding the satisfaction of Swedish respondents with public transport, the fear of not being to access a particular aspect of their life, primarily healthcare when children are in the household (S.P5), can be a sufficient reason to justify car ownership, underlying the non-binary and dynamic character of TRSE (Lucas, 2012; Luz & Portugal, 2020; Schwanen et al. 2015; Yigicanlar et al. 2018).

Eventually, appropriate restrictive policies targeting cars assisted by ex-ante improvements from public transport providers have already been positively accepted by most interviewees - except for M.P4, as is the case for the congestion charge in both core cities. Attitudes and habits are, indeed, not perennial. In this regard, scholars underline the significance of providing clear and straightforward information on the functioning of the public transport networks, both for its anticipated planning and for the on-board experience (Frag & Lyons, 2010; Fiorio, Florio & Perucca, 2013; Gardner & Abraham, 2007; Hirschhorn et al. 2020). Information availability, according to Maréchal (2016), diminishes the magnitude of travel habits by easing the transition from a mode to another one. If individuals are induced to utilise a new transportation mode, and they deem this experience positive, their attitudes towards public transport can be revamped, reducing the effort to alter habitual car use.

## **5 CONCLUSIONS**

---

### **5.1 RESEARCH AIMS AND OBJECTIVES**

Although cars have been widely accepted as deep-seated components of our lives and urban landscapes for the last sixty years, since the 2000s, societies have questioned how excessive reliance



on private motorized mobility threatens social, economic, and environmental sustainability (Lucas, 2009; Martens, 2012; Luz & Portugal, 2020; Mattioli et al. 2020; Saeidizand, Franssen & Boussauw, 2022). As such, this qualitative thesis aims to examine the determinants of car use by studying and comparing individuals' experiences in two different urban contexts, Milan and Stockholm. By excluding low-income individuals, this analysis isolates potential economic constraints that would otherwise limit the personal freedom of choice of transportation mode. Additionally, the application of TPB explains the direct (Ajzen, 1991; Forward, 2019) and indirect elements that in behavioural decision-making, while the use of TRSE framework test individuals' behavioural response to an absence of a private vehicle (Lucas, 2012). The thesis, in turn, aims to address the following research question:

*What are the determinants of car use for non-low-income individuals in Milan and Stockholm commuting zones?*

Although individuals perceive and assess the determinants of car use differently, it can be extracted that it is primarily attitudes, habits, accessibility and - partially - time efficiency that explain car use. While acknowledging their importance, the respondents have downplayed the impact of environmental awareness, costs, and time reliability in their transport decision-making.

Differences in car use in the two commuting zones are highlighted. The Stockholm interviewees display weaker habits in car use, making them more inclined to alter their current travel behaviours. This is primarily due to general positive attitudes towards public transport, whose provision is conceived as sufficient to preserve minimal accessibility levels. On the contrary, respondents in Milan depict positive attitudes and habits towards car use. This can only be partially explained by socio-cultural factors, as the quality of public transport - in terms of coverage and frequency - is perceived as insufficient to provide both adequate levels of social inclusion and a time-efficient alternative to car use.

Shared patterns are also identified. Firstly, an individualistic approach to mobility is denoted. All interviewees do not consider the negative externality of car use a sufficient element to prompt a modal shift. Secondly, non-instrumental factors, with a particular reference to attitudes and habits, affect the perception of instrumental factors, making their quantification biased. Respondents display difficulty in rationally assessing costs, time reliability and - partially, time efficiency, with a tendency to overestimate the benefits of car use while downplaying its disadvantages.

## **5.2 IMPLICATIONS**

Despite the limitations of this study (Section 3.5), its findings can provide insight into the travel behaviours of car owners. From a policymaking standpoint, this research emphasises the necessity of considering non-instrumental elements when analysing car use. Attitudinal and habitual obstacles can hinder the effectiveness of policies merely targeting instrumental factors. From an academic perspective, it is primarily the holistic and comparative approach that provides a different perspective with respect to other studies exclusively focusing on a limited set of determinants and examining one or similar urban contexts. From a socioeconomic standpoint, this thesis highlights the main determinants - and their interrelations - that should be tackled to curb car use while easing a modal shift to sustainable transportation modes.

## **5.3 FUTURE RESEARCH**

This qualitative research could be repeated following potential public transport structural reforms in Milan, isolating the impact of attitudes and habits - and their influence on other instrumental factors - from the availability of a feasible public transport alternative. An opposite perspective could also be employed. Rather than focusing on car owners, a qualitative study could be performed with individuals living car-free, understanding the elements prompting their decision. Eventually, quantitative studies could be executed to examine the relationship between car use and the quality of transportation in Milan and Stockholm, understanding the magnitude of this relationship compared to less quantifiable cultural and societal elements.

## **5.4 CONCLUDING REMARKS**

This study contributes to the existing empirical literature qualitatively addressing car use (Anable, 2005; Beirão & Cabral, 2007; Lucas, 2009) by highlighting the influence of non-instrumental determinants over instrumental ones. However, while acknowledging its limitations (Section 3.5), it also shows that car use attitudes and habits are not static, but their strength and intensity are strictly related to the context in the urban context in which they manifest. Providing a valid complementary - or supplementary - alternative, mainly in terms of public transport services, can reduce the effort to modify and alter car use.

## REFERENCES

---

- ACI (2019). Parco Veicolare Circolante per Categoria - Comunale. Available online: [https://www.asr-lombardia.it/asrlomb/it/14022comuniparco-veicolare-circolante-categoria-comunale?t=Tabella&restrictBy=CACLIVELLO\\_TERRI1116512879=Comune,CCANNO\\_63889777=2019,CCTERRITORIO\\_811872728=Milano%7CMonza%7CBusto%2520Arsizio%7CSe sto%2520San%2520Giovanni%7CCinisello%2520Balsamo%7CLEgnano](https://www.asr-lombardia.it/asrlomb/it/14022comuniparco-veicolare-circolante-categoria-comunale?t=Tabella&restrictBy=CACLIVELLO_TERRI1116512879=Comune,CCANNO_63889777=2019,CCTERRITORIO_811872728=Milano%7CMonza%7CBusto%2520Arsizio%7CSe sto%2520San%2520Giovanni%7CCinisello%2520Balsamo%7CLEgnano) [Accessed 9 April 2023]
- Ajzen, I. (1991). The Theory of Planned Behavior, *Organizational Behavior and Human Decision Processes*, vol. 50, n. 2, pp. 179-211, Available online: <https://www.sciencedirect.com/science/article/pii/074959789190020T> [Accessed 29 March 2023]
- Anable, J. (2005). 'Complacent Car Addicts' or 'Aspiring Environmentalists'? Identifying travel behaviour segments using attitude theory, *Transport Policy*, vol. 12, pp. 65-78, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 2 April 2023]
- Arrigo, U., & Di Foggia, G. (2015). The scope of public organisations with productive functions: insights from the inefficiency of Italian local public transport, *European Journal of Government and Economics*, vol. 4, n. 2, pp. 134-154, Available online: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2710051](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2710051) [Accessed 5 May 2023]
- Asensio, J., & Matas, A. (2008). Commuters' valuation of travel time variability, *Transportation Research Part E*, vol. 44, pp. 1074-1085, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 6 April 2023]
- Ashmore, D. P., Pojani, D., Thoreau, R., Christie, N., & Tyler, N. A. (2019). Gauging differences in public transport symbolism across national cultures: implications for policy development and transfer, *Journal of Transport Geography*, vol. 77, pp. 26-38, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 15 February 2023]
- Asquer, A. (2011). Liberalization and regulatory reform of network industries: A comparative analysis of Italian public utilities, *Utilities Policy*, vol. 19, n. 3, pp. 172-184, Available online: [https://www.sciencedirect.com/science/article/pii/S0957178711000312?casa\\_token=kSD-XPIQ0SMAAAAA:Mi7Q\\_zDdIixDLZ6AbV4YYJ0erL62ZsfFW8uMjgU11dAeFcQ4xsgHEI2e0hiAQGdfpi3gPa1H7f8](https://www.sciencedirect.com/science/article/pii/S0957178711000312?casa_token=kSD-XPIQ0SMAAAAA:Mi7Q_zDdIixDLZ6AbV4YYJ0erL62ZsfFW8uMjgU11dAeFcQ4xsgHEI2e0hiAQGdfpi3gPa1H7f8) [Accessed 22 April 2023]

- Baldi, C. (2019). A Milano e Torino il record di morti premature per inquinamento dell'aria, *La Stampa*, 9 March 2019, Available online: <https://www.lastampa.it/topnews/primo-piano/2019/03/09/news/a-milano-e-torino-il-record-di-morti-premature-per-inquinamento-dell-aria-1.33686411/> [Accessed 19 May 2022]
- Beirão, G., & Cabral, S. (2007). Understanding attitudes towards public transport and private car: A qualitative study, *Transport Policy*, vol. 14, pp. 478-489, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 28 March 2023]
- Bivina, G. R., Landge, V., & Kumar, S. (2016). Socio Economic Valuation of Traffic Delays, *Transportation Research Procedia*, vol. 17, pp. 513-520, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 6 April 2023]
- Church, A., Frost, M., and Sullivan, K. (2000), Transport and social exclusion in London, *Transport Policy*, vol. 7, pp. 195-205, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 14 March 2023]
- Clark, B., Chatterjee, K., & Melia, S. (2016). Changes in level of household car ownership: the role of life events and spatial context, *Transportation*, vol. 43, pp. 565-599, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 14 April 2023]
- De Donnea, F. X. (1972). Consumer Behaviour, Transport Mode Choice and Value of Time: some micro-economic models, *Regional and Urban Economics*, vol. 1, n. 4, pp. 355-382, Available online: <https://www.sciencedirect.com/science/article/pii/0034333172900255> [Accessed 6 April 2023]
- Dijkstra, L., Poelman, H., and Veneri, P. (2019), The EU-OECD definition of a functional urban area, working paper, 2019/11, OECD Regional Development Working Papers, pp. 1-19, available online [https://www.oecd-ilibrary.org/urban-rural-and-regional-development/the-eu-oecd-definition-of-a-functional-urban-area\\_d58cb34d-en](https://www.oecd-ilibrary.org/urban-rural-and-regional-development/the-eu-oecd-definition-of-a-functional-urban-area_d58cb34d-en) [Accessed 12 March 2023]
- Eurostat (2020). Fatal road accidents in EU regions, available online: <https://ec.europa.eu/eurostat/en/web/products-eurostat-news/-/edn-20211121-1> [Accessed 19 May 2022]
- Eurostat (2022), Living conditions in Europe - poverty and social exclusion, available online: [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Living\\_conditions\\_in\\_Europe\\_\\_poverty\\_and\\_social\\_exclusion&oldid=584082#:~:text=In%202021%2C%2095.4%20million%20people,21.7%20%25%20of%20the%20EU%20population.&text=The%20risk%20of%20poverty%20or,%25%20compared%20with%2020.7%20%25](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Living_conditions_in_Europe__poverty_and_social_exclusion&oldid=584082#:~:text=In%202021%2C%2095.4%20million%20people,21.7%20%25%20of%20the%20EU%20population.&text=The%20risk%20of%20poverty%20or,%25%20compared%20with%2020.7%20%25) [Accessed 16 March 2023]

- Farag, S., & Lyons, G. (2010). Explaining public transport information use when a car is available: attitude theory empirically investigated, *Transportation*, vol. 37, pp. 897-913, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 3 April 2023]
- Fiorio, C. V., Florio, M., & Perucca, G. (2013). User satisfaction and the organization of local public transport: Evidence from European cities, *Transport Policy*, vol. 29, pp. 209-218, Available online: [https://www.sciencedirect.com/science/article/pii/S0967070X13000917?casa\\_token=tdAu1KrB8yoAAAAA:OHigN\\_DKJdjre9ruIUm3drKamj9H0macbz-V3fhaeoo\\_2WQIQ-n0O1gc\\_ixPGjxDmI9FrCbAz9Q](https://www.sciencedirect.com/science/article/pii/S0967070X13000917?casa_token=tdAu1KrB8yoAAAAA:OHigN_DKJdjre9ruIUm3drKamj9H0macbz-V3fhaeoo_2WQIQ-n0O1gc_ixPGjxDmI9FrCbAz9Q) [Accessed 9 May 2023]
- Forward, S. E. (2019). Views on Public Transport and How Personal Experiences Can Contribute to a More Positive Attitude and Behavioural Change, *Social Sciences*, vol. 8, n. 47, pp. 1-23, Available online: <https://www.mdpi.com/2076-0760/8/2/47> [Accessed 29 March 2023]
- Gardner, B., & Abraham, C. (2007). What drives car use? A grounded theory analysis of commuters' reasons for driving, *Transportation Research Part F*, vol. 10, n. 3, pp. 187-200, Available online: [https://www.sciencedirect.com/science/article/pii/S136984780600088X?casa\\_token=VolGuro1W68AAAAA:EpOiN8F5QhDIGZR99j0hl3eFBYaF8ZHMNdH7AdDOEXQfuNdcKrUI2hiNzJCNNu3a2QSmhEEpSIY](https://www.sciencedirect.com/science/article/pii/S136984780600088X?casa_token=VolGuro1W68AAAAA:EpOiN8F5QhDIGZR99j0hl3eFBYaF8ZHMNdH7AdDOEXQfuNdcKrUI2hiNzJCNNu3a2QSmhEEpSIY) [Accessed 3 April 2023]
- Hernandez, D. (2018). Uneven mobilities, uneven opportunities: Social distribution of public transport accessibility to jobs and education in Montevideo, *Journal of Transport Geography*, vol. 67, pp. 119-125, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 2 May 2023]
- Hirschhorn, F., van de Velde, D., Veeneman, W., & ten Heuvelhof, E. (2020). The governance of attractive public transport: Informal institutions, institutional entrepreneurs, and problem-solving know-how in Oslo and Amsterdam, *Research in Transportation Economics*, vol. 83, pp. 1-11, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 5 May 2023]
- Hrelja, R., Monios, J., Rye, T., Isaksson, K., & Scholten, C. (2017). The interplay of formal and informal institutions between local and regional authorities when creating well-functioning public transport systems, *International Journal of Sustainable Transportation*, vol. 11, n. 8, pp. 611-622, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 5 May 2023]
- ISTAT (2019). Popolazione Residente Totale per Classe di Età 1.1. - Comunale, available online: <https://www.asr-lombardia.it/asrlomb/it/11125comunipopolazione-residente-totale-classe-di->

[età-al-11-comunale?t=Tabella&restrictBy=CCLIVELLO\\_TERRI1116512879=Comune.CCANNO\\_63889777=2019](#) [Accessed 9 Aprile 2023]

- Jensen, M. (1999). Passion and heart in transport — a sociological analysis on transport behaviour, *Transport Policy*, vol. 6, pp. 19-33, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 11 April 2023]
- Johnson, V., Currie, G., & Stanley, J. (2010). Measures of Disadvantage: is Car Ownership a Good Indicator?, *Social Indicators Research*, vol. 97, n. 3, pp. 439-50. Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 16 February 2023]
- Kenyon, S., Lyons, G., and Rafferty, J. (2002), Transport and social exclusion: investigating the possibility of promoting inclusion through virtual mobility, *Journal of Transport Geography*, vol. 10, pp. 207-219, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 13 March 2023]
- Kottenhoff, K., & Brundell Freij, K. (2009). The role of public transport for feasibility and acceptability of congestion charging – The case of Stockholm, *Transportation Research Part A*, vol. 43, pp. 297-305, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 8 May 2023]
- Lucas, K. (2009), Actual and perceived car dependence: Likely implications of enforced reductions in car use for livelihoods, lifestyles, and well-being, *Transportation Research Record*, vol. 2118, pp.815, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 25 February 2023]
- Lucas, K. (2012). Transport and social exclusion: Where are we now?, *Transport Policy*, vol. 20, pp. 105-113, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 20 February 2023]
- Lucas, K. (2019). A new evolution for transport-related social exclusion research?, *Journal of Transport Geography*, vol. 81, pp.1-4, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 19 February 2023]
- Maréchal, K. (2016). An Analysis of the Role Played by Habits in Urban Transportation: Insights from Veblenian Evolutionary Economics, *Journal of Transport Economics and Policy*, vol. 50, n. 2, pp. 205-221, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 1 April 2023]

- Martens, K. (2012). Justice in transport as justice in accessibility: applying Walzer's 'Spheres of Justice' to the transport sector, *Transportation*, vol. 39, pp. 1035-1053, Available online: <https://link.springer.com/article/10.1007/s11116-012-9388-7> [Accessed 2 May 2023]
- Mattioli, G., Roberts, C., Steinberger, J., & Brown, A. (2020). The political economy of car dependence: A systems of provision approach, *Energy Research & Social Science*, vol. 66, pp. 1-18, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 19 February 2023]
- Maxwell, S. (2001). Negotiations of Car Use in Everyday Life, in Miller D. (eds), *Car Cultures*, London: Routledge, pp. 203-222
- Mekala, G. D., & MacDonald, D. H. (2018). Lost in Transactions: Analysing the Institutional Arrangements Underpinning Urban Green Infrastructure, *Ecological Economics*, vol. 147, pp. 399-409, Available online: [https://www.sciencedirect.com/science/article/pii/S0921800916315105?casa\\_token=TVTb7117TfwAAAAA:OsBWqVkcXwX60BguBUW1VE-mPQ9mVVcIKF5rTooYAR4ACD TP9fRRf z8w GeBI6bLnxLMFHm9s](https://www.sciencedirect.com/science/article/pii/S0921800916315105?casa_token=TVTb7117TfwAAAAA:OsBWqVkcXwX60BguBUW1VE-mPQ9mVVcIKF5rTooYAR4ACD TP9fRRf z8w GeBI6bLnxLMFHm9s) [Accessed 8 May 2023]
- Miller, D. (2001). Driven Societies, in Miller D. (eds), *Car Cultures*, London: Routledge, pp. 1-33
- Minhans, A., Chatterjee, A., & Popli, S. (2020). Public Perceptions: an important determinant of transport users' travel behaviour, *Human Geographies – Journal of Studies and Research in Human Geography*, vol. 14, n. 2, pp. 177-196, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 5 April 2023]
- Nolan, A. (2010). A dynamic analysis of household car ownership, *Transportation Research Part A*, vol. 44, pp. 446-455, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 29 April 2023]
- Quaglione, D., Cassetta, E., Crociata, A., Marra, A., & Sarra, A. (2019). An assessment of the role of cultural capital on sustainable mobility behaviours: Conceptual framework and empirical evidence, *Socio-Economic Planning Sciences*, vol. 66, pp. 24-34, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 23 April 2023]
- Rye, T., Monios, J., Hrelja, R., & Isaksson, K. (2018). The relationship between formal and informal institutions for governance of public transport, *Journal of Transport Geography*, vol. 69, pp. 196-206, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 8 May 2023]

- Saeidizand, P., Fransen, K., & Boussauw (2022). Revisiting car dependency: A worldwide analysis of car travel in global metropolitan areas, *Cities*, vol. 120, pp. 1-13, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 25 April 2023]
- SCB (2019). Folkmängden i Sveriges kommuner 1950-2022. Available online: [https://www.scb.se/hitta-statistik/statistik-efter-amne/befolkning/befolkningens-sammansattning/befolkningsstatistik/#\\_TabelleriStatistikdatabasen](https://www.scb.se/hitta-statistik/statistik-efter-amne/befolkning/befolkningens-sammansattning/befolkningsstatistik/#_TabelleriStatistikdatabasen)
- Schwanen, T., Lucas, K., Akyelken, N., Cisternas Solsona, D., Carrasco, J., and Neutens, T. (2015), Rethinking the links between social exclusion and transport disadvantage through the lens of social capital, *Transportation Research Part A*, vol. 74, pp. 123-135, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 13 March 2023]
- Simma, A., & Axhausen, K. W. (2001). Structures of commitment in mode use: a comparison of Switzerland, Germany and Great Britain, *Transport Policy*, vol. 8, pp. 279-288, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 5 April 2023]
- Small, K. A. (2012). Valuation of travel time, *Economics of Transportation*, vol. 1, pp. 2-14, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 6 April 2023]
- Song, S., Diao, M., & Feng, C. (2021). Effects of pricing and infrastructure on car ownership: A pseudo-panel-based dynamic model, *Transportation Research Part A*, vol. 152, pp. 115-126, Available online: [https://www.sciencedirect.com/science/article/pii/S0965856421002056?casa\\_token=EhDlbC60yW8AAAAA:qd0KZbaZpDlwzDtkWCoR0DOdwISFazeDpP4xBGdOfyL323NhclgwJDBWtrmzBQZQug-29PscL7o](https://www.sciencedirect.com/science/article/pii/S0965856421002056?casa_token=EhDlbC60yW8AAAAA:qd0KZbaZpDlwzDtkWCoR0DOdwISFazeDpP4xBGdOfyL323NhclgwJDBWtrmzBQZQug-29PscL7o) [Accessed 2 May 2023]
- TomTom (2022). Tomtom Traffic Index: Ranking 2022. Available online: <https://www.tomtom.com/traffic-index/ranking/> [Accessed 15 May 2022]
- Trafik Analys (2019). Fordon i trafik efter fordonsslag och kommun vid slutet av år 2019. Available online: <https://www.trafa.se/vagtrafik/fordon/>
- Trivellato, B., Mariani, L., Martini, M., & Cavenago, D. (2018). Leading knowledge mobilization for public value: The case of the congestion charge zone (Area C) in Milan, *Public Administration*, vol. 97, pp. 311-324, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 7 May 2023]
- Truong, T. P., & Hensher, D. A. (1985). Measurement of Travel Time Values and Opportunity Cost from a Discrete-Choice Model, *The Economic Journal*, vol. 95, pp. 438-451, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 5 April 2023]



Van Acker, V., Mulley, C., & Ho, L. (2019). Impact of childhood experiences on public transport travel behaviour, *Transportation Research Part A*, vol. 130, pp. 783-798, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 8 April 2023]

Walks, A. (2018). Driving the poor into debt? Automobile loans, transport disadvantage, and automobile dependence, *Transport Policy*, vol. 65, pp. 137-49. Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 17 February 2023]

World Health Organization (2018). Global status report on road safety 2018. Available online: <https://www.who.int/publications/i/item/9789241565684> [Accessed 4 April 2023]

Yigitcanlar, T, Mohamed, A., Kamruzzaman, M., & Piracha, A. (2019). Understanding Transport-Related Social Exclusion: A Multidimensional Approach, *Urban Policy and Research*, vol. 37, n. 1, pp. 97-110, Available through: LUSEM library website: <http://www.lusem.lu.se/library> [Accessed 16 February 2023]

# APPENDIX A

---

## INTERVIEW CONSENT FORM

The undersigned \_\_\_\_\_ (referred to as **interviewee**) confirms his/her willingness to participate in the interview conducted by **Simone Pastori** (referred to as **interviewer**) concerning the writing of the bachelor's thesis at the stated institution/programme:

*Lund University, Sweden – Bachelor of Science in Economy and Society – EOSK12*



**LUNDS**  
UNIVERSITET

The interviewee agrees with and understands the following points:

1. RECORDING
  - a. The interview will be recorded in its entirety
  - b. Only the interviewer can access the recordings
  - c. Direct quotations extracted from the recording can be included in the thesis
2. RIGHT TO ANONYMITY
  - a. In the thesis, the interviewee will be referred to using a code indicating the geographical area (S for Stockholm and M for Milan) and a number.  
Ex. **S.P1** = Stockholm Participant 1
  - b. For this interview, the code used to identify the interviewee is \_\_\_\_\_
3. DATA
  - a. The qualitative information raised will be used exclusively within the scope of the aforementioned bachelor's thesis
  - b. The interviewee has the right to request a pdf copy of the thesis once completed and submitted to Lund University
    - i. If interested, please state the email address at which the thesis will be delivered  
\_\_\_\_\_

The undersigned \_\_\_\_\_ accepts the terms and conditions listed above.

\_\_\_\_\_  
Place and Date

---

Interviewer's signature

---

Interviewee's signature

## APPENDIX B

<b>INTERVIEWEES' CODING AND INTERVIEWS' SCHEDULE</b>				
<b>INTERVIEWEES' CODES</b>	<b>AGE</b>	<b>GENDER</b>	<b>INTERVIEW TYPE</b>	<b>INTERVIEW DATE</b>
<b><u>MILAN COMMUTING ZONE</u></b>				
<b>M.P1</b>	28	Male	Face-to-face	08-04-2023
<b>M.P2</b>	41	Female	Face-to-face	08-04-2023
<b>M.P3</b>	30	Male	Face-to-face	11-04-2023
<b>M.P4</b>	30	Male	Online	13-04-2023
<b>M.P5</b>	36	Female	Online	13-04-2023
<b><u>STOCKHOLM COMMUTING ZONE</u></b>				
<b>S.P1</b>	44	Male	Face-to-face	19-04-2023
<b>S.P2</b>	50	Male	Face-to-face	19-04-2023
<b>S.P3</b>	44	Female	Face-to-face	21-04-2023
<b>S.P4</b>	32	Female	Face-to-face	23-04-2023
<b>S.P5</b>	34	Female	Face-to-face	23-04-2023
<b>S.P6</b>	54	Female	Online	25-04-2023

# APPENDIX C

---

## Interview Structure

### PART 1

1. Based on the pictures that you see, tell me your perceptions about:
  - a. the car as a status symbol
  - b. driving
  - c. buses
  - d. trains
  - e. subways
2. Time
  - a. Complete the sentence: the time I spend driving while commuting to work is .....
  - b. In terms of time spent on functional journeys, what are the factors that you prefer about driving compared to public transport?
  - c. Complete the sentence: the time I spend while driving for leisure is...
  - d. in terms of time spent to reach a leisure destination, what are the factors that you prefer about driving compared to public transport?
3. Desire for control/personal space concerns:
  - a. Control
    - i. Do you feel in control of your time and space while travelling by car?
    - ii. Do you feel in control when travelling on public transport?
  - b. Perception of safety
    - i. Do you feel safe while driving and owning a car?
    - ii. What about public transport?
4. Monetary cost perception:
  - a. What is the cost of a single journey by bus to \*this location\*?
  - b. What is the cost of a single journey by car to \*this location\*?
  - c. Have you ever done this calculation before?
  - d. Whether you said yes or no, how did you get to this amount? Which components of the cost have you considered?
  - e. How do you feel about congestion charges in the core city? Should they be expanded in the suburbs?
5. Environmental awareness:
  - a. Complete the sentence:  
Environmental sustainability is ...  
Climate change is...

- b. If you say that you care about the environment, what do you do to reduce your CO2 footprint when taking a transport-related decision?
  - c. How important is the environmentally-friendliness factor when buying a car, accounting for higher purchasing costs?
6. Tell me how you used to move around your surroundings as a child, especially how you used to reach school and meet friends and family

## PART 2

### 7. Life Chances

- a. In terms of work opportunities:
  - i. When looking for a new workplace, is the location important? Do you consider the availability of public transport?
  - ii. Would you feel any impact on your job-seeking range?
- b. In terms of education opportunities:
  - i. Based on your previous schooling years, did you feel that the lack of specific modes of transport restricted your choices?
  - ii. Based on your current education opportunities, e.g., training courses, could you have the same degree of access to them?

### 8. Social Networks

- a. In terms of your relationships:
  - i. Based on the places where you usually gather with family and friends, would you feel any impact?
  - ii. What aspects would you feel forced to sacrifice?

### 9. Access to Goods: tell me how your shopping habits would change in the absence of a car.

### 10. Access to Services

- a. In terms of healthcare, would you perceive any change in your ability to access healthcare services?
- b. In terms of cultural opportunities, do you feel that your access to cultural venues would be restricted, unchanged or improved?

### 11. Involvement in Decision-Making

- a. In terms of your daily transport decisions:
  - i. Do you feel involved in how policymakers shaped your local transport system (both in terms of public transport and car infrastructures)?
  - ii. Have you been provided with adequate information concerning alternative modes of transportation other than your car?

## APPENDIX D

---

### Photo Elicitation Strategies for Interviews

- a. Cars as a status symbol



Picture 1: Fiat (n.d.), Fiat Panda, Fiat Italy website, available online: <https://www.fiat.com/fiat-panda/panda/colors> [Accessed 17 March 2023]



Picture 2: Volkswagen (n.d.), Volkswagen Golf, Volkswagen Sweden website, available online: <https://www.volkswagen.se/sv/modeller/golf.html> [Accessed 17 March 2023]



Picture 3: Land-Rover (n.d.). Range Rover Sport, Land-Rover Sweden website, available online: [https://www.landrover.se/?gclid=CjwKCAjw5dqgBhBNEiwA7PryaJxpNA37kRjo0dke5mAwv6-LQ3otXnhTSH68PqKZIUvFR6\\_RTEvR6xoCIDEQAvD\\_BwE](https://www.landrover.se/?gclid=CjwKCAjw5dqgBhBNEiwA7PryaJxpNA37kRjo0dke5mAwv6-LQ3otXnhTSH68PqKZIUvFR6_RTEvR6xoCIDEQAvD_BwE) [Accessed 17 March 2023]

- b. Perception of driving



Picture 4: Cabral, P. (2012), Sao Paulo: A city with 180km traffic jams, BBC News, Available online: <https://www.bbc.com/news/magazine-19660765> [Accessed 17 March 2023]



Picture 5: Sauers, C. (2023). Australia's epic 1,077km road trip, BBC Travel, Available online: <https://www.bbc.com/travel/article/20230315-tanami-track-australias-epic-1077km-road-trip> [Accessed 17 March 2023]

### c. Perception of buses



Picture 6: CNN (2014). Why taking the bus is the way forward, CNN Business, Available online: <https://edition.cnn.com/2014/09/22/business/gallery/bus-rapid-transit/index.html> [Accessed 17 March 2023]



Picture 7: ANSA (2022), Bus sempre più green, entro l'anno gara per elettrici, ANSA Italy, available online: [https://www.ansa.it/canale\\_motori/notizie/eco\\_mobilita/2022/08/09/bus-sempre-piu-green-entro-lanno-gara-per-elettrici\\_4aad655d-fc49-4a4e-bb84-0895f55fcc9b.html](https://www.ansa.it/canale_motori/notizie/eco_mobilita/2022/08/09/bus-sempre-piu-green-entro-lanno-gara-per-elettrici_4aad655d-fc49-4a4e-bb84-0895f55fcc9b.html) [Accessed 17 March 2023]

#### d. Perception of trains



Picture 8: Regione Lombardia (2019), Trasporti, presentato primo dei 176 nuovi treni acquistati da Regione. Fontana: 'rivoluzione' annunciata sta partendo, Regione Lombardia, available online: <https://www.regione.lombardia.it/wps/portal/istituzionale/HP/lombardia-notizie/DettaglioNews/2019/12-dicembre/2-8/trasporti-presentato-primo-dei-176-nuovi-treni-acquistati-da-regione-fontana> [Accessed 17 March 2023]



Picture 9: BBC (2015), Top 10 most crowded trains named, BBC News, available online: <https://www.bbc.com/news/business-34195309> [Accessed 17 March 2023]

#### e. Perception of subways





Picture 10: adnkronos (2022), Roma, fumo su binari metro B a Termini, andkronos cronaca, available online: [https://www.adnkronos.com/roma-fumo-su-binari-metro-b-a-termini\\_4pVELrud85mcuQVW7xvXEi](https://www.adnkronos.com/roma-fumo-su-binari-metro-b-a-termini_4pVELrud85mcuQVW7xvXEi) [Accessed 17 March 2023]



Picture 11: The Construction Index (2021), NCC picked for Stockholm subway station, The Construction Index international news, available online: <https://www.theconstructionindex.co.uk/news/view/ncc-picked-for-stockholm-subway-station> [Accessed 17 March 2023]