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The Impact of Trust and Privacy Concern on User's Intention to Use Smart Mobility : A Norwegian Perspective

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"Everything about you is being tracked-get over it"

Joel Stein

The choice of topic expresses my social position toward raising the importance of the ethical issue of the digital transformation of mobility. I aim to make a personal contribution to increasing understanding of how rapid development in technologies implemented in the urban transport system should adapt to user's privacy concerns and aid knowledge to smart mobility service providers in designing successful interfaces for their practices. From this point of view, the practitioners and the researcher must collaborate to achieve more meaningful goals.

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Abstract

In a time where emerging technologies bundled within "smart mobility" represent a new transformation of urban mobility, the practitioners and policymakers must act pro-actively to increase its acceptance among citizens. Smart mobility, largely reliant on — vast numbers of internet of things (IoT) devices, communication technology (ICT), and personal data — can raise privacy concerns. Despite increased studies on privacy concerns in other contexts, there has been little study on how various factors are related to the adoption of new technology in smart mobility. To this end and meaningful insights, this study applies a mixed-method approach to qualitative and quantitative data produced from a case study of the city of Stavanger in Norway. It draws on literature review, qualitative analysis, and quantitative analysis with urban dwellers in a smart city to develop a theoretical model integrating variables related to the user's intention to use smart mobility. The aim here is essentially to understand relationships that predict user's intention to use smart mobility. The research shows that trust and perceived risk of location information directly affect users' intention to use.

In comparison, privacy concerns have much less implication on user's intention to use smart mobility. Instead, perception of trust is the crucial determinant of their willingness to use. In particular, trust is fundamental to smart mobility service presents a pivotal driver to accelerate the digitalized transition in urban mobility. Hence, the researcher suggests that building up a trust mechanism may be cost-efficient to accelerate the transition. Norway can serve as a prototype to study the trust mechanism. The instruments and model developed in this study can help advance such a purpose.

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Chapter 1. Introduction

This chapter will present the research background of the smart mobility and technology acceptance model (TAM) developed by Davis, 1989, as both aspects form the basis of this research. It introduces the concept and benefits of smart mobility and describes TAM's purpose, followed by the research problem, aims, and objectives. Finally, the delimitation and limitation of this study and a description of the thesis structure will be the last part of this chapter. The author also adds a list of terms and definitions at the end of this chapter.

1.1 Background

"The future of mobility is smart, electric, and automated" is one of the key messages for cities' smart growth and regional development (Ydersbond et al., 2020, p. 131; Eskandrapour et al., 2019). In a time where emerging technologies bundled within "smart mobility" represent a new transformation of the mobility system, it is critical that practitioners proactively take part in these developments. It entails steering means to ensure that the benefits of innovative technologies contribute towards a sustainable mobility system and avoiding the risk of increased use of private combustion cars (Kitchin 2013; 2014). New technologies, such as the Internet of Things (IoT), information and communication technology (ICT), and digital data, seem promising to use the existing urban mobility capacity efficiently. The idea is to optimize the urban transport capacity by enabling users to access real-time information, including destination and pickup points, booking and payment system, timetables, which making the transport network more efficient, as well as reducing pollution, traffic congestion (Inguglia et al., 2020; Jeekel, 2017). Regarding smart mobility as kind of technology , the user's acceptance of smart mobility becomes a key enabler for transitioning to such a system. Against this backdrop, technology in smart mobility entails consideration of inherent privacy concerns, specifically to the service provider using personal data. Smartphone, wireless sensors network, location, and context-aware apps, which are part of some smart mobility situations, share user's location in social networks in ways that sometimes are transparent to some users, which makes privacy issues a real challenge to mobility transition (Paiva et al., 2020).

However, the relevant literature has largely ignored privacy concerns as an important subject related to smart mobility. In neighboring fields, studies have been carried out on privacy concerns. For example, the services involved in using user's location information have received much attention from information system (IS) researchers. Xu & Gupta (2009) used perceived justice, trust, and social exchange theory as the theoretical bases to examine the effects of privacy concerns on performance expectancy, effort expectancy, and intention to use location-based service. The privacy concern has been identified as a significant determinant of user's adoption. Zhao et al.(2012) drew on justice theory as the theoretical based and found that personalization, connectedness, and privacy concern affect location-based social networking user's intention to disclose location information. Ho & Chau (2013) noted that location personalization influences user's integrity trust in mobile merchants, which further influences their usage intention. Zhu et al. (2014) reported that perceived usefulness, perceived control, and institutional assurance predicts user's intention to adopt location-based recommendation agents. Despite these efforts, no studies have been done on privacy concerns in smart mobility.

This thesis aims at closing this gap. In order to capture the subject of privacy concerns in smart mobility, this study draws on the Technology Acceptance Model (TAM). This model is one of the main research tools to address the new technology by users. It is frequently used to

investigate individuals' acceptance of services involving information technology. TAM is mainly used to explain general determinants of technology adoption, and it has received considerable empirical supports for its power to offer insight into the factors affecting user's behavior intention to use a service (Chung & Tan, 2004). For example, there is notable empirical evidence proving that technology acceptance is negatively affected by perceived risk related to location information (e.g., Beresford & Stajano, 2003; Gupta & Rao, 2017; Poikela, 2020; Palos-Sanchez et al., 2017; Zhou, 2011;). In this study, this model is used to study the acceptance of smart mobility.

TAM has received attention for its capability to structure research based on different theories. Technology acceptance is constantly developing due to the rapid advancement in technology, for example, user's acceptance of different types of services or products that require personal data (e.g., Dhagarra et al., 2020; Park et al., 2017; Pavlou, 2003; Winston et al., 2016;). While technology characteristics about the individual acceptance differ from one to another, a wide range of studies has augmented TAM with other theories towards improving its specificity and explanatory power (Legris et al., 2003; Park et al., 2017). The compatibility of TAM with other theories has increased its applicability in diverse fields, which results in a significant body of research. However, the primary focus of the TAM-based literature is on design and implementation from the service provider's perspective (Holden & Karsh, 2010). Extant literature is relatively limited in understanding how users perceive technology usage and how technology is related to behavior intention (Kitchin, 2014).

Further, while mobility is a universally used service, smart mobility turns it into the most personalized service. Smart mobility offers an unexplored context to study user's technology acceptance by using personal data and communication technologies. On the one hand, users enjoy the benefit from smart mobility. On the other hand, they may have uncertainty about unwanted economic and social consequences resulting from the misuse of personal data. Meanwhile, several scholars have argued that trust is an instrument for users to cope with uncertainty (Luhmann, 1979; Wick et al., 1999). Further, trust has been viewed as a catalyst in user-service provider transactions that provide users greater expectations of fulfilling exchange relationships (Pavlou, 2001; 2003). While few studies (Kumar et al., 2016 ; Mcknight & Chervany, 2001) have examined trust, it has received relatively less research intention than privacy concerns. Understanding trust as a use influencer is critical for smart mobility service providers to enhance users' intention towards their offering.

In light of the above, the present study attempt to test an integrated TAM and Trust model of smart mobility adoption. It aims to offer empirical significance of adoption factors in terms of causality towards future usage intention. An extended TAM has been used on account of its high explanatory power in technological acceptance in general and services or products that require personal data in particular (Dhagarra et al., 2020; Park et al., 2017; Winston, 2016). This study offers a detailed empirical study aiming at examination technology adoption by multiple perspectives about privacy and trust in smart mobility, particularly from a user-centric viewpoint is the key contribution of this study.

1.2 Problem Statement

Extant studies have drawn on information technology adoption theories such as the technology acceptance model (TAM) to examine users' behavior (Zhou, 2012; Park et al., 2017). Privacy issues regarding using ICT and personal data in various services have been extensively re-searched. However, there is little attempt to study privacy concerns in smart mobility. This study expanded upon literature regarding the acceptance of ICT technologies, privacy issues related with mobility service, and how privacy concerns and trust influence users' intention to use smart mobility in their daily lives.

1.3 Research Goal & Objectives

The primary goal of this study was to investigate the influence of privacy concerns and trust on one's intention to use smart mobility. This research better framed these issues regarding trust, privacy concerns, and variables in the context of smart mobility. The model developed for this research was based on extant literature of TAM and extended TAM. The researcher assumes that privacy concerns reflect a smart mobility user's attitude towards personal information. That says, those with high privacy concerns will feel disclosure of their personal information incurs privacy risk to them; perhaps they have uncertainty about whether their personal information is appropriately used and shared. If they do not have enough trust in service providers to mitigate these perceived privacy concerns, they may be reluctant to use smart mobility. Therefore, this study proposes that privacy concerns affect users' intention to use smart mobility.

In this study, the researcher assumes that smart mobility user's intentions may be affected by the spatial context of the service and the ownership of the device to access the service. Hence, these two dimensions are used to build a framework for select the types of smart mobility services included in this study. There are two phases of this study. In the first phase, the researcher conducted interviews with smart mobility users according to this framework. The purpose is to gather insights into their opinion of essential variables and then use their words to develop a survey instrument. In the second part of this study, the researcher uses a quantitative approach to collect data for statistical analysis and validate the instrument. That is to say; the researcher conducted a mixed-method study. The rationale for combining both qualitative and quantitative approaches is that one method should complement the other. In principle, these two studies do not measure the same thing. Therefore, their findings cannot be reported in the same manner. However, the quantitative can be made sense through qualitative findings, but if something cannot be explained clear enough by qualitative data, it is worth exploring it quantitatively (Creswell, 2002; Tashakkori & Teddlie, 1998).

From a practical perspective, the researcher will enable users to express their opinions that will help to improve smart mobility acceptance by focusing on the factors that have negative implications on their use intention. The research aims to lead to the development of the objectives as follow:

1. To review the literature regarding the privacy issues related to smart mobility services: As part of this objective, the researcher identified the gap of current privacy literature related to privacy concerns in smart mobility.

2. To understand privacy concerns from multiple aspects. From the literature review, a framework is made to capture privacy issues related to smart mobility services. The participants of this study are selected according to this framework. From the theoretical perspective, concepts that are relevant to information privacy in smart mobility are identified. They are integrated into a conceptual model. Further, the researcher conducts interviews to capture smart mobility users' reflections on these concepts.

3. To develop a survey instrument from interview data. The interview data are analyzed and generated into items, which aim to measure the implications of concepts mentioned above on user's intention to use smart mobility. These concepts serve as variables in a conceptual model. This survey instrument and the conceptual model are examined for validity and reliability using confirmatory factor analysis and multiple regression analysis via structural equation modeling.

4. To find out which variables directly impact users' intention to use smart mobility. The researcher conducts hypothesis tests to find out the variables have direct and indirect effect on users' intention to use smart mobility.

These objectives also reflect the logic to use mixed methods to conduct this study. It started with a qualitative study, where the qualitative data and analysis provide a general understanding of the research problem. Further, the findings from qualitative data are used to develop the tool for quantitative stud. It was then following up by a quantitative study, where the data collected through the online survey. In other words, this study is composed of two studies, where the qualitative and quantitative studies are used sequentially to explore the research topic.

1.4 Research Questions

The interviews comprised by four groups of smart mobility users , which were done before conducting formal survey research. This served to answer and further focus the research question presented below.

For the first, qualitative phase of this study the guiding research question is:

RQ1: What are the privacy issues in smart mobility? What are privacy concerns among smart mobility users? Do privacy concerns affect their intention to use smart mobility?

For the second, quantitative phase of this study the primary research question is:

RQ 2: From a user-centric perspective , how does privacy relevant factors and trust affect users' intention to use smart mobility ?

In order to answer the second research question, two sub-questions are formulated:

-Which factors has direct impact on user's intention to use Smart mobility ?

- Second, if any, does the relationship between privacy concerns and trust influence user's intention to use Smart ?

In this current study, the researcher proposed a researched model. This study puts a model apt for smart mobility forwards to identify relationships between relevant factors affecting intention to use technology by smart mobility users. To more appropriately capture users' intention to use smart mobility, qualitative interview sessions with smart mobility users were conducted. Based on the interview results, the researcher develops a questionnaire to examine the proposed research model. Structural equation model (SEM) is employed to analyze the structural relationship, using a survey based on 187 respondents' responses to the age group of 19- 50, academics at the University of Stavanger, in Norway.

1.5 Delimitations and limitations

As an explorative study, this study aims to gain a rich understanding of the research topic. The mixed methods combine different data types, which is considered the most appropriate approach to achieve this purpose. However, this method requires much more time and effort for data collection and analysis, limiting the researcher's capacity to collect quantitative data from a diverse population. Further, the researcher assumed that people who have relatively high education (i.e., master or Ph.D. student) in energy management, energy transition, city planning fields are more likely to have the knowledge and willingness to complete the survey. These criteria led to limited sample size and bias. To conclude above, the result should not be generalized to any specific population.

The single case study also limits the scope of understanding the research topic. First, the researcher composed a framework to determine the sampling regarding the spatial context of the smart mobility service. However, the original contribution of this research gets somewhat de-limited by this framework. The choice of types of smart mobility is limited to electric vehicles to reduce the "combustion cars" on the road in the urban area offered by "smart-car-based mobility." Therefore, the shared-bike and electric kick scooters are not included.

Further, this is a case study based on a high-trust society. In other words, the context of this study limits the applicability of the result and instrument of this study. Therefore, both the result and instrument should not apply to another context directly. Instead, the researcher suggests that this study should serve as a reference for further study or a unit of comparative study.

1.6 Relevance and significance

The privacy issues regarding technology use pose an ethical issue in most modern contexts where information and communication technology is used. There is a large body of literature covering many contexts but little effort to study privacy concerns in smart mobility. According to Rahimi & Jetter (2015), while most using existing theories have passed the test of time, there is a compelling need for new and more empirical theories regarding technology acceptance. Supposed that smart mobility is a new type of technology, there is a need to expand the current privacy model to conduct this study. Further, many studies found that privacy and trust are always concerned with service involved collection and use of personal data in various contexts. Dhagarra et al. (2020), Pavlou (2003), and Dinev & Hart (2006) found that trust plays a key role that mitigates user's privacy concerns. However, these studies are conducted in a society where trust is low. Therefore, there is little knowledge about the implication of privacy concerns on users' intention to use a service in a high trust society. In order to fill up this gap, this study aims to understand privacy concerns in smart mobility by a case study in a high trust society-Norway. The Norwegian society has characterized by high trust in many studies (e.g., Kääriäinen, 2007: OECD, 2013; Runhovde, 2010; Thomassen & Kääriäinen, 2016; Thomassen et al., 2014). Previous studies point out that there are various trust sources in Norwegian society, for example, a strong sense of shared group membership and a high level of trust in government (e.g., Thomassen and Kääriäinen, 2016). It offers a unique context to conduct a case study of privacy concerns.

1.7 Structure of the thesis

In light of the above, the present study attempts to explore privacy concerns in smart mobility. The following section reports details of the theoretical background leading to sample selection framework and theoretical model, review of extant studies on privacy concerns related to adopting technologies in diverse settings. It is following by chapter 3, where the framework and conceptual model are present. Methodology and method adopted for research execution are presented in chapters 4 and 5, respectively. Chapter 6 presents the data analysis procedures and key findings, followed by discussing the research findings in line with the research questions in chapter 7. Finally, the implication for smart mobility service providers and other practitioners, limitations, and future research recommendations are concluded in section 8 at the end of this study.

1.8 Definition of Terms

There are concepts used in a wide range of literature with no clear agreement on their use. Their definition as used in the thesis is in the following introduction.

IS is an abbreviation of " Information system (IS) and information technology (IT) are often considered synonymous, in this study, these terms are used interchangeably . However, Information system is an umbrella term from the systems, people and process designed to create, store, manipulate, distribute and disseminate information. The field of information systems bridges business and computer science.

IT is an abbreviation of "Information Technology", in other words, IT is a term that collectively refers to information processing technologies such as the Internet and other information communication technologies and computers. It appears to mean almost the same as ICT mentioned later, but it tends to point to the technology itself rather than ICT.

IoT is an abbreviation of "Internet of Things". It is not a general communication device but refers to the technology and method of connecting with the Internet with the "things" around you. The technologies that connect to the Internet, such as smart phone and smart home, that have not been connected to the Internet until recently make up "IoT technology" (Baik et al., 2006).

ICT is an abbreviation of "Information and Communication Technology" . ICT is used in almost the same sense, but as "Communication" is included along the way, it is used as a term that focuses more on how to use IT, rather than to refer to the technology itself.

IPC is an abbreviation of "Information privacy concerns", which refers to the right to control information by deciding the amount of information to provide , when and how such information is provided and used, and who can use the information (Belanger et al., 2002).

Personal data , according to Data protection law (GDPR), it refers to 'information that can be used to identify a person such as a name, an identification number, location data, a consumer profile, or one or more factors specific to that person.‘ This entails all the information required by smart mobility service are included.

Smart City refers to an urban area that uses ICT to collect data. Insights gained from that data are used to manage assets, resources and services efficiently; in return, that data is used to improve the operations across the city. This includes data collected from citizens, devices, buildings and assets that is then processed and analyzed to monitor and manage traffic and transportation systems, power plants, utilities, water supply networks,information systems, schools, libraries, hospitals, and other community services (McLaren et al, 2015).

Smart Mobility refers to integrating all modes of transportation via information and communication technology. According to Groth, it refers to “the smart phone-to switch flexibility between new interconnected mobility services such as car sharing, ridesharing, bus, ferry or train (2019, P.56).” In many literatures, the term “smart mobility” is used interchangeably with “intelligent transport system (ITS)”. ITS refers to mode of transport, according to the directive of the European Union 2010/40/EU, made on July 7, 2010, it’s defined as “ a systems in which information and communication technologies are applied in the field of road transport, including infrastructure, vehicles and users, and in traffic management and mobility management, as well as for interfaces with other modes of transport.”

Summary

Chapter 1 presented the research problem of privacy and trust effects on user's intention to use smart mobility. Specifically, the researcher's goal was to explore the effect of privacy concerns and trust on the intention of users to use smart mobility. This investigation was divided into two phases, based on the contribution of the mixed method. Phase One was a qualitative study, where the literature review offers theoretical ground for sample selection framework and conceptual model. In Phase Two, an instrument for collecting quantitative data to test the conceptual model was developed.

Chapter 2 Literature review

The research gaps that this study seek to address are related to key research streams namely, (a) privacy in smart mobility, (b) TAM, and. (c) privacy concerns and trust. Now the relevant and recent literature for each of these tree streams will be presented.

2.1 Privacy concern related to smart mobility

Extant literature studies the impact of privacy concerns on various services, e.g., e-commerce, online transaction, smart home, e-health, etc. However, the privacy researchers kept their attention away from smart mobility. Hence, there is little empirical evidence about how people experience their privacy in smart mobility. In order to fill up this knowledge gap, the researcher identified that privacy could be related to the service per se and the use of information.

Privacy concern in relation to different spatial context of services

There are diverse types of smart mobility services, one of the dimensions that can raise privacy concerns is the spatial context of the service. For example, when one travels in a car, he moves in a private space that distinguishes himself from the public space; when he takes a bus, he does not distinguish between himself and the public. The spatial difference has been identified as relevant to privacy concerns. However, it has received relatively more minor attention in the field of privacy studies. According to Clark & Greenleaf (2017), privacy is described as "individual's personal space."

Further, "privacy of location and space" is described as "individuals have the right to go wherever they wish …, without being tracked or monitored (Finn & Wright, 2010, p. 236)." Moreover, Donath (2014) mentions that privacy is contextual and different from place to place. For example, one may be comfortable naked in his spouse but not in a public space. One may feel secure to do something in his own space than a shared space. In this sense, perceived privacy concerns are associated with the spatial context; therefore, people carry out different activities in different spaces. Hence, privacy can also regard as a right to be alone in a personal space (i.e., car) move freely in public space without been tracked. From this perspective, individual's privacy concerns are related to whether they can cut themselves from the public while moving from A to B and no fear of identification, monitoring, or tracking while traveling.

Now that private space is connected to public space by technology, e.g., smart mobility. Car users are cut off from the public while they are on the road traffic. The private space they enjoy in the vehicle distinguishes them from bus users who move among public members. The researcher tends to understand whether privacy concerns of space may lead users to choose different mobility services.

Privacy concern in relation to ownership of device to access the services

There is empirical evidence that shows that the ownership of a device is a clear-cut factor of privacy concern. Regarding the smart mobility, Derek notes that "drivers who own their vehicles are more unwilling to be tracked than drivers who drive vehicles that are owned by companies (Derek, 2017, p. 59)" in his study in Finland. In this study, companies that own fleets of cars and provide a service to their customers generally do not face resistance from their customers about the tracking. Tracking is accepted as part of the service, and their customers' need to use the car is prioritized over private information. However, the other study of car-sharing adoption intention among users in Ghana (Sub-Saharan Africa) finds that privacy is one of the key factors to users' daily travel choices (Acheampong, 2020). Although these contradictory findings may have something to do with the geographic context, they both point out that privacy concerns may have something to do with ownership.

According to the type of "smart mobility" chosen in this study, the EV and shared cars are "people who move in vehicle/ cut off from the public." The only difference between them is the ownership of the vehicle. The ownership among bus users is determined by the "tool" they use to purchase a bus ticket. Those who use the smartphone app to buy the ticket are considered the "owner" of the device. On the contrary, those who use bus cards regard as no ownership of the tool.

Privacy concerns related to Information (IPC)

Smart mobility refers to the use of information technology to increase transport network efficiency in the cities (Noy & Givoni, 2018; Guedes et al., 2018). The other development alone is that the transport system collects and generates enormous data from sensors, vehicles, software to underpin smart mobility. A great deal of personal data is collected and carelessly distributed by service providers and third parties. As a result, the right to control one's personal information has gained importance and generated much discussion (Buchana et al., 2007).

Information privacy concern in (IPC) smart mobility can arise by the types of data, purpose, and usage of data. In addition, the demographic factors of individuals are also related to IPC.

Types of data

The different types of data reflect varying degree of sensitivity in the process of data collection. For example, medical, financial and civic data is considered as more sensitive than information like gender, nationality or age (BCG, 2013, Cranor et al, 2000; Eurobrameter, 2011; Infosys 2013). This entail that certain types of data required by smart mobility provider are more or less sensitive than other. Users who engage with services that only require basic information (e.g., bus card only require name and email) should be less sensitive about the information privacy than those who engage in service requiring various personal data (e.g., shared car). However, people have less consistent sensitivities when it comes to what they consider as sensitive information. For example, some people regard data like consumption behavior are highly private, while others may think they are trouble-free. It depends on user’s perceived risk in relation to the types of data required. In this study, the sensitivity about data will be discussed along the four quadrants defined by the framework (which will be explained in the next chapter).

Many users are happy to disclose personal information about themselves for service exchanges (Le Vine et al., 2014). However, there is empirical evidence point out the different types of information related the level of sensitivity, which may influence one’s acceptance of service. For example, Prabhakar et al (2003) claim that the acceptance of using data from iris scan is less acceptable than data of face recognition; Zhou (2011, p.213))revealed that location information can lead to the feeling of been tracked, which may, in turn, affect one’s willingness to accept a service because of the perceived risk.

Also, there is increasing anxiety about the possibility of aggregate diverse types of data into highly users' profiles (Tene & Polonetsky, 2012). All these points out that concern of privacy is related to types of information. Thus, the user' sensitivities about different types of data are included as an aspect to discuss the privacy concern in the data collection.

Purpose and usage of data

The purpose of data can raise the user's concern about privacy. People assess what the data is used for and their benefits by providing their data. The existing literature points out people are more willing to share their data when the benefits are of immediate personal relevance (e.g., service or commercial benefits) than the benefits related to a collective good or social goal, e.g., national safety (Acquist et al. 2013; Sanquist, 2008). In this study, the immediate good refers to instant online purchase (bus app), the instant message of bus, nearest & available shared card, and GPS. In other words, privacy concern is related to user's perceived benefits and perceived usefulness.

The other aspect that may raise privacy concerns is whether the data is used for other purposes outside the primary purpose it was first collected, which is described as secondary use by Belanger et al. (2002). For example, users of the shared car give personal information to use a car, but the shared-car company uses it for analysis to develop their own business. This may have something to do with user's control over data where they have less control about how the other party uses one's data. There is a case in the Netherlands that shows public suspicions about the secondary use of their data. The ING bank announced to share its client data with commercial parties, which arouse public anger and result in ING withdrew its plan (see Van Gaal, 2014). The other case is the data-sharing scheme of the UK Health Service. When the medical record is shared with a commercial third party, namely the insurance company, there were over 700,000 people chosen not to participate in the scheme as the results (Dominiczak, 2015). These cases illustrate the secondary use may be considered as a threat to privacy. Thus, the privacy concern will be discussed from these two perspectives in this process.

Demography

Information privacy concerns (IPC) can differ among individuals according to their demographic factors, e.g., age, educational attainment, gender, and civil status (Bergström, 2015; Campbell, 1997). There are many studies on the relationship between gender and IPC, but there is no consensus on whether it affects IPC. On the one hand, several studies reveal that females are relatively higher IPC than men (e.g., Omarzu, 2000; Sheenhan, 1999; Graeff & Harmon, 2002). That says female is less likely to exchange personal information on their purchasing habits (Litt & Hargitti, 2014). On the contrary, other studies have revealed that gender is not a significant factor in IPC (e,g., Jensen et al., 2005; Zhang et al., 2013; Zukowski & Brown, 2007). Similarly, age is the other contested demographic factor. While many studies find that age and IPC are not significant (e.g., Graeff & Harmon, 2002; Pain et al., 2007; Walrave et al., 2012; Youn, 2009; Zeissig et al., 2017; Zukowski & Brown, 2007), several studies revealed younger people are more likely to reveal important personal information online environment (e.g., Pain et al., 2017; Rainie et al., 2013; Walrave et al., 2012). In addition, Bergström (2015) has found that the implication of age on IPC varies from case to case, where IPC decreases as age increases about using social media but increased considering the debit card. Moreover, education has been identified as relevant to IPC. However, the relationship between the two is not clear. Zukowski & Brown (2007) found that the higher level of education, the lower the IPC, but others found the opposite (Blank et al., 2014; Sheehan, 2002). Finally, the civil status is suggested as relevant to IPC. Blank et al.

(2014) revealed that single individuals are more sensitive about their online privacy than those who are/were in partnership. Further, Park (2015) research revealed that men have a considerable higher tendency to protect their data than women if they are married. In other words, marriage is a factor that has a significant influence on IPC for men.

In addition, the demographic factors on users' trust in service suppliers are also related to IPC (Smith et al., 1996). The study by Phytheema (2018) revealed that demographic factors such as age and education significantly impact user's trust in mobile shopping apps. However, factors such as gender and civil status show no significance in this study.

The differences in research objectives, situations, and context may cause inconsistency. It is also possible that the research limitations such as the demographic characteristics and the small sample size can also lead to different results in different studies. As a result, the relationship between demographic factors remains unclear. Therefore, this study added these factors as an attempt to test the relationship between demographic characteristics and IPC.

2.2 Technology acceptance (TAM)

There are various models and theories developed have been developed to address the questions of adoption of new technology by end-users in the past, for example, Task Technology Fit (TTF) (Junglas et al., 2008), Theory of Reasoned Action (TRA) (Fishbein & Ajzen; 1975), Theory of Planned Behavior (TPB)(Ajzen, 1991), Technology Acceptance Model (TAM) (Junglas & Watson, 2008; Davis 1986; 1989), Unified Theory of Acceptance and Use of Technology (UTAUT) (Xu & Gupta, 2009; Venkatesh et al., 2003), Technology Readiness Index (TRI) (Parasuraman & Colby, 2015; Parasuraman, 2002). TAM, as a research stream, is a widely deployed model and received extensive empirical support through studies predicting the use of information systems (Adams et al., 1992; Agarwal & Prasad, 1997; Chau, 2001; Davis, 1989; 1993; Davis & Venkatesh, 1996; Davis et al., 1989; Gao & Bai; 2004; Hwang, 2005; Kim et al., 2017; King & He. 2006; Mathieson, 1991; Park et al., 2014; 2017; Taylor & Todd, 1995; Venkatesh, 1999; 2000; Venkatesh & Davis, 1996; Venkatesh & Marris, 2000;). The model is based on the theory of reasoned action (TRA) as a psychological approach that measures the power of an individual's intention to perform a particular behavior (Fishbein & Ajzen, 1975). TRA posits that the intent of an individual (e.g., attitude and subjective norms) to engage in a behavior is the primary determinant of whether the individual engages in that behavior (Cammock et al., 2009). In comparison to TRA that explains intents, TAM focuses on a particular kind of behavior, i.e., the rational acceptance of technology by the users. TAM posits an individual's perceptions and how these perceptions influence the individual's intentions (Liu & Chen, 2009).

The original TAM involves two variables to influence the dependent variable behavioral intentions (BI): perceived ease of use (PEU) and perceived usefulness (PU). The former is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance, " while the latter is defined as "the degree to which a person believes that using a particular system would be free of effort (Davis, 1989. p. 320). "

TAM has been applied in a different context with different technologies(e-commerce, hospital information systems, tourist information, advertisement). Divergent external factors such as age, gender, anxiety, computing support, experience, relevance, personal innovativeness have been studied in the context of TAM (Lee et al., 2003).TAM has received empirical support in predicting technology acceptance and uses in different settings (Dabholkar, 1996; Dabholkar & Bagozzi, 2002; Yan et al., 2016). Although there is no attempt to apply it to smart mobility, it has been applied to study service aspects that require location information. For example, mobile navigation, location-based travel information/advertisement, real-time traffic information. They may help to improve user's experience and facilitate their behavior intention (Zhou, 2011). Nevertheless, due to the collection and utilization of location information, smart mobility may arouse user's privacy concerns, which negatively affect their usage intention (Dhar & Varshney, 2011). Users may be concerned about whether service providers properly collect, store, and use their location information. As evidenced by the studies mentioned above, privacy concerns exist in a wide range of services that require users' location information, which can affect their usage intention. Accordingly, external factors can integrate into TAM to study the technology acceptance in smart mobility. This research tries to fill up the gap and disclose their fluences.

2.3 Privacy concern and trust

With the increasing and growing personalization of smart services, service providers are increasingly focusing on understanding the users better, thus leading to the proliferation of consumer information. While most users welcome the increased convenience and personalization as natural outcomes, it is not possible there is no one concerned about privacy associated with their personal information (Lanier & Saini, 2008). Privacy concern has been typically defined as concern for the loss of privacy and the need for protection against unexpected use of personal information (Smith et al., 1996). Individuals are found more concerned about their privacy when information is used without their knowledge or permission or when the intention of using personal information is unclear (Phelps, 2000).

Trust, on the other hand, has received a great deal of attention in relevant studies. According to Rousseau et al. (1998), it is described as "a psychological state comprising of the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another under conditions of risk and interdependence." Trust is essentially needed in uncertain situations since it eventually implies accompanying risks and becoming susceptible to trusted parties (Hosmer, 1995). It has been identified as a catalyst of transactions providing service receivers with expectations of fruitful exchange relationships with service providers (Pavlou, 2003). The empirical evidence shows that once users trust the service provider, they are more willing to offer personal information in exchange for service (Miller & Bell, 2012). That says information sensitivity and privacy concerns may interplay with trust. Likewise, researchers have extensively explored trust and privacy concern, as variables in research models, and their influence on behavior intention (Beresford, 2003; Culnan, 1993; Hong et al., 2004; Myland & Friday, 2003; Malhotra et al., 2004; Phelps et al., 2000; Pavlou, 2003; Röcker, 2010; Xu et al., 2009). However, none of the studies are done in the context of smart mobility. According to Dhagarra et al. (2020), it would be fruitless to apply existing items to assess users' response by espousing inferences from studies carried out in other services because of various distinct characteristics of studies service. Hence, this study develops its instrument to access users' behavior intention.

Summary of What we know and do not Know about the Topic

The theory development regarding privacy in smart mobility has lagged. Zhou (2010) investigated a specific use example of the adoption of location-based service. Since smart mobility is a type of location-based mobility service, the investigation here extended this model. By adding variables relevant to privacy concerns in smart mobility, the researcher investigates different privacy aspects of smart mobility. Furthermore, it considers the viewpoint of the users as well. The researcher conducted both interview and survey to test and validate a model for predicting behavior intention to smart mobility usage.

Chapter 3 Research framework and Model

This section presents the research framework and research model. First, the researcher presents the research framework for selecting participants for this study. Second, a research model based on TAM is extended by incorporating variables: Trust, Privacy Concerns, Perceived Risk of Use of Personal Information, Location Information in addition to TAM variables: Ease of Use and Behavior Intention.

3.1 Sampling Framework for Selecting Participants

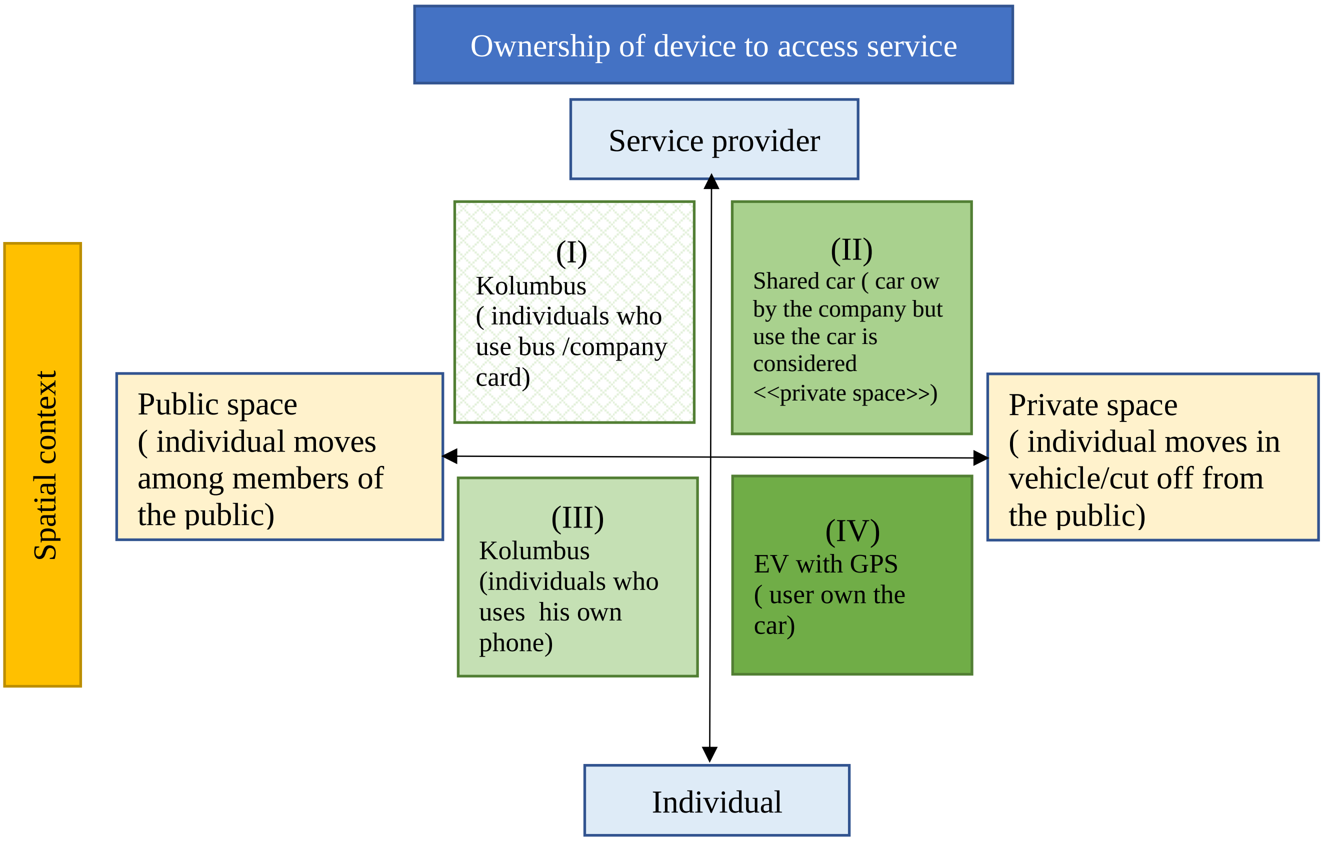
As mentions in the last chapter, there are two dimensions identified as relevant to build up a privacy framework according to smart mobility: concerns differ concerning the spatial context in different types of smart mobility, which distinguish between private and public space (i.e., individuals use a car which cut-off from the members of the public, individuals use bus who moves among members of public). The other dimension is concerned with the difference of ownership of the device to access service, distinguished between the device owned by the service provider and individual. (i.e., cars owned by the service company and individual; bus card owned by Kolumbus and mobile telephone owned by an individual). These spatial and owner-ship dimensions form a 2 x 2 framework (see Figure 3.1). According to the logic of the framework, the smart mobility entity that fit in this framework is Kolumbus (bus service provider), Hyre (shared-car service provider) and Tesla owner (electric car owner). The other entity of smart mobility, such as electric scooters or bicycles, is excluded from this study because their attributes differ from the automobile.

It worth to note that, while different spatial context determines the sampling, they also brought about three different data sets, which allow the researcher to compare the results across these three datasets.

The researcher explored these aspects by interview users according to this framework. The actual placement of users in one of four quadrants is based on the mobility service one engaged with and the ownership of the device used to access the chosen service. The four quadrants in this framework represent distinct user groups.

Figure 3.1

Privacy Issues in Relation to Smart Mobility (Framework for select types of service in this study)



3.2 Research Model and Hypotheses

As mentioned earlier, the proposed research model is based on TAM. However, two variables form original models are not included. The perceived usefulness and attitude are not included. Mobility is an essential part of most people everyday life, which must be useful in the first instance to be adopted (Kowatsch, 2012, P. 269). Further, the variable "privacy concerns" stands for the attitude variable. It asks about the attitude towards smart mobility technology with a focus on privacy risks. Therefore , these two variables (perceived usefulness and attitude) are not included into this model.

In the empirical implementation, the below concepts are divided into concepts that ask about the general attitude / social norm, and one concept that applies to three specific service providers.

Intention to Use and its Determinants

Perceived ease of use

The perceived ease of use refers to the individual's perception about effortless use of the service (Davis, 1989), previous studies have found that ease of used is vital for acceptance, as familiarity with technology and skill to use technology are likely to be significant with diverse services (Park et al., 2017; Kim et al., 2017). There is extensive literature that has established empirical and theoretical evidence that perceived ease of use directly and positively influence behavior intention to use (Dabholkar & Bagozzi , 2002; Dabholkar, 2002; Davis, 1989; Venkatesh, 1999; Szajna, 1996). Therefore, in line with these findings, this study hypothesizes the following:

H1: Perceived ease of use (PEU) is positively associated with Intention to Use (IU) to use smart mobility service.

Privacy concerns and technology acceptance in smart mobility

Privacy concerns has often been cited as one of the key reasons of behavior intention (Dinev & Hart, 2006; Malhotra et al., 2004; Stewart & Segars, 2002). Recently, it has gained significance as enormous data-driven services process, explored and exploit personal information (Dinev & Hart, 2005). Privacy often represents a general attitude in the information systems literature, which reflect one's behavior intention to use a service (Stewart & Segars, 2002). In this study, the privacy concern represents a general attitude towards using a technology and share personal information (Honein-Haidar et al., 2020; Milne & Boza, 1999). There is also an empirical study found that privacy concern has negative impact on behavior intention (Dinev & Hart, 2005). In the worst case, privacy concerns of information may even cause individuals to avoid obtaining certain service (Dhagarra et al., 2020). Despite growing research interest in privacy concerns, there are lack of empirical evidence as to how privacy concerns affect acceptance of smart mobility.

There are, of course, many different aspects of privacy. Regarding to personal information collected by smart mobility service providers , the privacy concerns can further captured by perceived risk . Perceived risk is the degree to which individuals believe that if they make online purchases, they will suffer losses caused by loss control over secondary use of personal information and their location information.The former refers to users where " the information is collected from individuals for one purpose is used for another (Smith et al., 1996, p.171)". As noted by Solove (2006, p.520) "[t]he potential for secondary use generates fear and uncertainty over how one's information will be used in the future, creating a sense of powerlessness and vulnerability." The later refers to the type of information that can reveal one's location or mobility history. All these aspects also reflect the social norms as part of the Theory of Planned Behavior (TPB)(Ajzen, 1991). Social norms refer to the shared understandings of actions that are obligatory, permitted, or forbidden in a group or people or larger cultural context (Cummins ,1996). In this sense, privacy intervention is regards as unwanted behavior. Several studies (Abrahamse & Steg, 2009; Guagnano et al., 1995) have discussed the positive correlation between norms and behavioral intentions in other contexts. For example, Culnan (1993) found that people who are less sensitive about unauthorized secondary use of information have more positive attitude towards behavior intention.

This study follows the perception that privacy concerns reflect a social norm that has an impact on user's assessment of lack of control of their personal information, which can affect individual's behavioral intentions :
H2: perceived privacy concerns (PC) is negatively associate with Intention to Use (IU) smart mobility.

H3: perceived risk of secondary (SU) use of personal information is negatively associated with Intention to Use (IU) in smart mobility.

H4: perceived risk related to location information (LI) is negatively associated with Intention to Use (IU) in smart mobility.

Trust

Trust has long been regarded as a widely acknowledged in influencing user’s behavior in adopting of technology (e.g., Amoako-Gyampah & Salam, 2004; Gefen & Straub, 2002; Ha & Stoel, 2009; Jarvenpaa et al., 1999; Moon & Kim, 2001; Pavlou, 2003; Sánchez Alcón et al., 2016; Song & Zahedi, 2002; Xu, et al., 2012; Xu et al., 2009) Smart mobility involves using user’s personal information to suggest the most suitable travel mode. Some service (e.g., car renting) require the users to give access to personal information even previous driving history to service providers (i.e., shared car). Handling over personal information to service providers is predicated upon trust, which is identified as a key factor in acceptance of technology in diverse studies (Ba & Paulov, 2002). Further, trust is the defining factor in such exchanges, where the environment is uncertain (i.e., internet or service providers behavior). The present work relates trust to the user‘s confidence in the service provide . Based on the definition developed in prior research, the trust can be described “ the confidence that personal information collected by the service provider will be handled competently, reliably and safely “ (Dinev & Hart, 2006, p.64). In this study, trust is a concept that addressing relation between mobility user and three different service providers (i.e., a-Kolumbus, b- Hyre, c-Tesla) beside the other four generic concepts. That is to say, there will be three data set to test the same model. Further, trust relation at the same time operationalizes the spatial context, so one company stands for one spatial context (see chapter 2).

In another instance, Kowatsch & Maass (2012) includes trust in the research model in the context of IoT service. Though he fails to show the positive impact of trust on the behavior intention, it is assumed the problem stems from the sample size rather than the hypothesis. That says trust should be presumed as positively associated with behavior intention. In line with the existing literature, this study has incorporated trust into TAM.

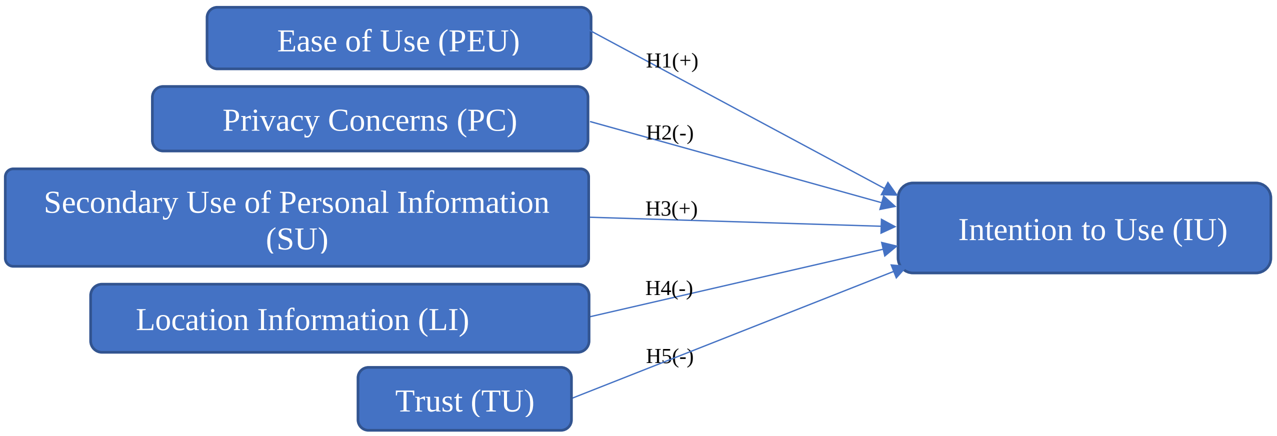
Three hypotheses are made as following:

H5: Trust (TU) is positively associated with Intention to Use (IU) to use technology in smart mobility.

Intention to Use

Under the TPB and the TAM, it is known that the attitude towards behavior is a fundamental determinant of behavior intention (Ajzen, 1991; Davis et al., 1989). Within smart mobility, it is also possible to assert that a better user's general attitude towards a service will result in a higher likelihood of providing personal information in exchange with that service. That says Intention to Use is a construct that mediates the impact on the willingness to provide personal information. Accordantly, the hypotheses (H1-5) are proposed and illustrated in Figure 3.2. The rationale is that an individual would not provide his personal information to a particular service provider without intention to use that service (Ajzen, 1991).

Figure 3.2
Research model



Note. The proposed conceptual model comprising of related variables.

Summary

The framework captures the privacy issues related to smart mobility services, which distinct services by the spatial context of the service and the ownership of the device that the user used to access the service. The assumption is that privacy issues related to the service per se may affect his choice. On the other hand, the proposed model presents the factors related to IPC in smart mobility. The assumption is that users have privacy concerns related to ease of use, trust, privacy concerns, perceived risk of using personal information, and location information, which may affect their intention to use smart mobility.

Chapter 4 Methodology & Research Design

This chapter presents the philosophical assumption underpinning the design of the research. It begins with the researcher's philosophical assumption underpinning the research approach's choice, followed by the research strategy and design.

4.1 Research Approach

The researcher follows the pragmatism paradigm to develop the knowledge of the research (Morgan, 2014). This philosophical position reflects the belief that knowledge is used to deal with the world's change where one issue should be captured by multiple empirical evidence (Creswell & Clark, 2018). From this perspective, the methodology chosen should allow the researcher to collect more than one type of data to answer the research question.

To begin with, the nature of this research explorative. According to Hellevik (1995), abductive research strategy best fits the situation where the researcher of the current study confronted, where the problem area is significantly ambiguous, complex, and has little knowledge of the topic. After reading a considerable volume of literature on technology acceptance, the researcher found herself in knowledge gaps regarding smart mobility and TAM. According to Danermark et al. (1997), abductive research strategy is a logic of investigation where the researcher seeks to interpret and re-contextualize social phenomena within the frameworks of a given social structure or pattern. This is in line with the researcher's idea to establish an understanding of privacy concerns in smart mobility through the theoretical lenses of TAM.

Further, the pragmatist perspective, the abductive approach, can combine the strength of both the deductive and the inductive approach (Dudovskiy, 2016). The abductive approach generally starts by applying different types to determine the result, where data is redefined and evaluated along the way. As the essence of the abductive approach is to combine different interpretations and explanations, this study uses the mixed method, which allows the researcher to use more than one way to arrive at the result.

In this study, the research attempt to explore an unknown topic in a case where there is no available instrument. A few scholars suggest using mixed method in exploratory instrument design (Bryman, 2006, Creswell & Plano Clark, 2011; Collins et al., 2006; Crede & Borrego, 2013; Durham et al., 2011, Hitchcock et al., 2006; Nastasi et al., 2007). It allows the researcher to use inductive and deductive reasoning to understand the same thing (Wheeldon & Ahlberg, 2012). Following this logic, both qualitative and quantitative studies are used in sequential to achieve this goal. First, the qualitative research followed inductive logic, moving from data to empirical generalizations or theory (Crowther & Lancaster, 2009). The researcher used the results from qualitative components to inform subsequent quantitative research. Second, quantitative research would follow deductive logic, using the items developed from qualitative data to develope the instrument to collect quantitative data and test the proposed hypothesis (Gray, 2018). Deductive logic is " the development of a theory that is subjected to a rigorous test" (Saunders et al., 2012). In that sense, the qualitative results also add on empirical evidence of existing privacy theories.

Overall, mixed methods reconcile the strengths of both research methods, using both subjective and objective evidence to understand the same phenomenon. It is also in line with the pragmatic philosophy, where multiple pieces of the fact understand one phenomenon.

4.2 Research Methodology and Design

This study plans to conduct two research to answer the research questions; It begins with qualitative research, the qualitative data is first collected and analyzed, and the results are used to drive the development of a quantitative instrument for further exploring the research problem. The second part is quantitative research, where the validation of the developed instrument and the proposed model will be tested. These two methods are intrinsically different but otherwise thought to be compatible. Two strategies are involved in conducting this study.

4.2.1 Case study

To gain a greater insight into the perceptions of various users towards privacy concerns, the researcher focuses on an in-depth investigation of a single case (Yin, 2014). Since this issue has been related investigating, while using both types of data sources to examine the same object. (Denzin, 2010). This research design comprises three stages of analyses: after the primarily qualitative phase, after the quantitative, and the integration phases, where the two strands of data address the research questions. The research mixed the qualitative and quantitative data, which composite the multifaceted investigation of the research problem. A single case study approach potentially offers the best insight according to the exploratory nature of this study. Therefore, this study takes a mixed-method approach. Combining the two methods contributed to use the strength of both methodologies to provide clear evidence (Lincoln & Guba, 2000). This involves using qualitative and quantitative methods for data collection, analysis and interpretations.

4.2.2 Mixed Method

This study combines two different methods-qualitative interview and quantitative survey. *The qualitative interview* most widely used method for gathering data when exploring an unknown topic (Creswell, 2014). Interviews allow access to rich information. They require extensive planning concerning the development of the structure, decisions about who to interview and how, whether to conduct individual or group interviews, and how to record and analyse them. Interviewees need a wide range of skills, including good social skills, listening skills and communication skills. Interviews are also time-consuming to conduct and they are prone to problems and biases that need to be minimised during the design stage.

Quantitative survey allows access to high numbers of participants (Creswell & Plano, 2018) . The availability of the survey software enables the wide and cheap distribution of surveys and the organisation of the responses. Although the development meaningful questionnaire is difficult, it can enable quantifiable data. Questionnaires need to appeal to respondents, cannot be too long, too intrusive or too difficult to understand. They also need to measure accurately the issue under investigation. For these reasons , the current study use qualitative findings as references to refined validated items of measurement.

4.2.3 Research process

This study uses a mixed method. Figure 4.2 visualizes the research flow in its entirety. As previously mentioned, numerous studies have examined technology acceptance related to privacy concerns and trust. These studies provide insight into construct integration. The method and methodology will be present in the next chapter.

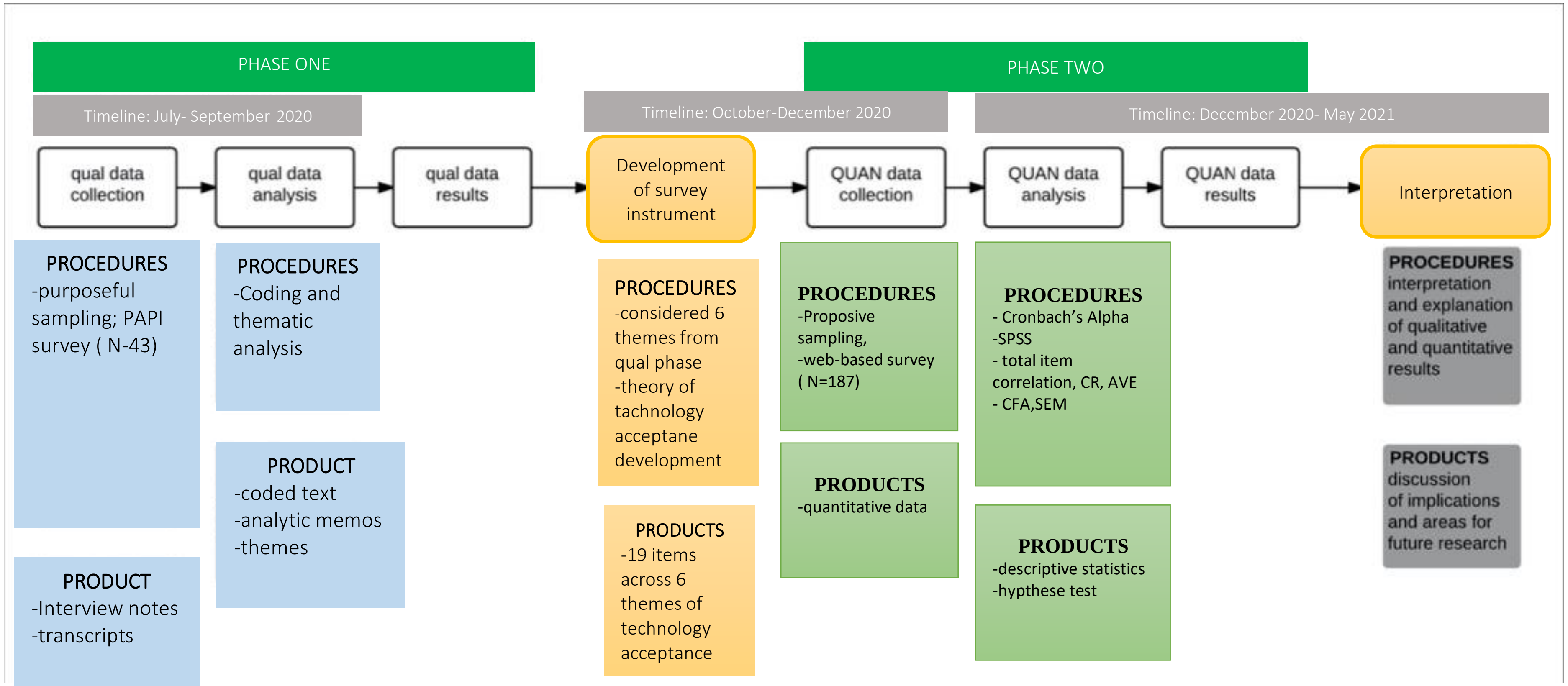


Figure 4.2. Research Flow Overview

5 Research Method

The study used mixed methods, which is unfolded in two phases. Phase One mainly aims to answer the first research question. Phase Two involved constructing and validating a questionnaire that could generate answers to the second research question. This chapter presents a description of the data collection methods and the analysis used in each phase, following by a demonstration of reliability and validity.

Introduction

The study used mixed method .The purpose of Phase One is to answer the first research; it begins with a literature review. The researcher identified spatial context of the smart mobility service and ownership of device to access the service might affect user's privacy concern, hence, a research framework to select participants of this study is made. The research identity aspects of privacy concerns associated with smart mobility and then established a researcher framework for selecting interview participants (See Fig. 1 in chapter 3). The findings of Phase One offer insight into privacy concerns and trust from smart mobility users. The deeper understanding is accomplished by relating qualitative findings to existing concepts with validated measures, which are used to develop the instrument. The developed instrument was refined and tested before major quantitative data collection. Phase Two involved constructing and validating a questionnaire with factors that are assumed to lead to technology acceptance. The details of these steps will be present in the following sub-chapters.

According to Creswell & Clark (2018), the quality of mixed-method research must as such be considered from multiple dimensions: from the planning, undertaking, interpreting, and applying the finding. Essentially, Phase One determines face and content validity, while Phase Two constructs a measure of privacy concerns and establishes its construct validity. The quality components in each of these processes will be included in each sub-chapter.

5.1 Phase One- Interview

5.1.1 Participants

According to the researcher framework (see Fig 3.2 in Chapter 3), the interview participants were selected to ensure that the result would be appropriate for assessing smart mobility users' privacy concerns. All the interviews were conducted in the Innovation Park in Stavanger. This area was chosen because Kolumbus launched a pilot project on car rental in cooperation with the commercial car sharing provider Hyre in November 2019, where all employees in this area can use this service at a price that is as affordable as the bus (Kolumbus, 2020a). In such a context, the cost has become relatively less considerable to the users. As a result, twenty-two women and twenty-five men who represent all ranges of education, ages, and industries in this area participated in the interviews. The participants' ages varied from the age category 20-29 to 50-59, civil status both single and in partnership, education level from high school to Ph.D. The participants were from diverse companies in the innovation park.

5.1.2 Data Collection

Design of Interview process. The researcher conducted a literature review and then identified the spatial context, and ownership of the device can raise privacy concerns in smart mobility

According to the findings from literature review, a research framework (Fig.1) is constructed as the foremost devised to select participants for this study. Further, the researcher consults privacy literature that using TAM in services that involved using communication technology and personal information (e.g., Zhou, 2011; Park et al., 2017; Shin et al., 2018). In the next step, the researcher develops an interview questions related to validated constructs from these prior studies to collect information for two folds purpose.

Interview guideline.The research defined the question in such a way as to help the interview think about their experience in using smart mobility service and what their perception is about the personal information collected by the service providers (See Appendix A for the interview protocol). There are three parts to these questions: Part One is demographic questions in general; Part Two are questions related to the use of smart mobility service in generals where the questions like how they start to use the specific smart mobility service, how often did they use it, how did they know that service, first impression and whether they like it; In Part Three, respondents were asked their perception of information privacy. The first two questions in Part Three asked whether they think sharing personal information contributes to ease of use or convenience. Further, they were then to think of privacy issues related to personal information (Part 3, # 3-6). For question #7, participants were asked whether they trust the service providers can handle their information well. Question #8 and #9 concerned the secondary use of personal data and risk perception of location information. These questions helped identify specific dimensions of privacy concerns that arise in smart mobility relating to the uncertainty arise from the environment of the Internet and personal data flow, which may affect their intention to use.

Interview procedures. The participants randomly took part at the cafeteria in innovation Park, where all employees have lunch and chat with colleagues in real life. Therefore, this environment is considered comfortable for interviewees, encouraging them to freely discuss their opinions, experiences, and viewpoints. Participation was voluntary, and participants understood that they could refuse to answer any questions and terminate the interview at any time. Interviewees were informed that the purpose of the research was to explore privacy concerns' dimensions of the personal data flow via smart mobility service.

Interview instrument. The researcher conducts Computer Assisted Self Interview (CASI) (Lavrakas, 2008). This interview questions are designed as an online survey, where the data entry can be easy and diverse. The QR codes and survey links were generated, which enable easy access to the survey. The interviews were conducted as paper-and-pen form, the researcher wrote notes of interviewees' words, while some participants enter their answer by text directly. Besides, the interviewer conducts these interviews by conversation, where the sequence and questions were subject to change according to the flow of the conversation. Further, each interview result was automatically numbered, allowing all participants to be anonymous. If quoted in the research results, they were coded as P1-P47 rather than their actual names.

5.1.3. Data Analysis

The analysis for Phase One served to answer the research question about privacy concerns in smart mobility. It started with the interview which helps to extend the original TAM model. The themes were added in the process of analyzing interview data, Thematic analysis (TA) was chosen in this process as this study adopted an interpretive approach. The researcher followed the six steps suggested by Braun & Clarke (2006) (see Table 5.1). This process is completed in several iterations. First, the researcher read transcriptions repeatedly to obtain an overall flavor of the interviewee's responses, followed by coding, searching, and preview themes, then provide definitions and finally name the themes. Finally, the researcher reviewed these themes to determine whether to bring them into the next phase. In this step, the researcher considered whether the information offer new insights into the understanding of smart mobility users' privacy concerns or confirm the variables from original TAM model.

This step is an iterative process where the researcher thought about the personal data in the smart mobility services and how these may arise user's perception of privacy risk in different dimensions.

Finally, two variables from the original TAM model – perceived ease of use and intention to use were confirmed. Further, the result of thematic analysis brought forwards further themes. The researcher reread the responses and categorized them into four themes. After that, the researcher considered that the resulting six themes adequately reflected the responses provided by participants. By following the six-step process and using TA, the researcher ensures valid interview data and is flexible when analyzing with NVivo 12.

Table 5.1 Brau and Clarke's (2006) six phases of thematic analysis

Phases	**Description of the process**
1.Familiarization with data	Transcribing, reading and re-reading the data, noting down initial ideas.
2.Generaing initial codes	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
3.Searching for themes	Collating codes into potential themes, gathering all data relevant to each potential theme.
4. Reviewing potential themes	Checking the theme work in relation to the coded extract (Level 1) and entire data set (Level 2), generating a thematic " map" of the analysis
5. Defining and naming themes	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme.
6. Producing the report	The final opportunity for analysis. Selecting of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.

NVivo 12 proved crucial for the discovery of themes. According to Braun & Clarke (2006), the researcher read the interview data extensively before the coding process. In this pre-coding stage, the research ran a word frequency query in NVivo to explore which terms were most commonly used. This software allows the researcher to generate a word cloud (see Figure 6.1 in Chapter 6), which helps to glance at the commonly used terms and words in interview transcribed data. For example, a glance at the word cloud reveals that "information "and "privacy" are frequently used words by the interview participants. These concepts were most frequently mentioned because of the interview topic. These terms gave research affirmatory that there was a certain degree of privacy concerns about using smart mobility. Therefore, this prompted the researcher to analyze the raw data further carefully.

The next step consists of re-reading each transcript and coding an emergent theme. This was done by selecting and adding meaningful comments to containers called "nodes" in NVivo. It is worth noting that this stage covers steps 2, 3, 4, and 5 of thematic analysis (see Table 5.1). The last step, "producing the report," is corresponding with NVivo's post-coding stage. The inductive thematic analysis results in six themes presented and summarized in Table 5.2

5.1.4 Themes and Codes

The interviews are used to capture the perspective of six main themes in the proposed research model. This study uses Braun & Clarke's (2006) ‘six steps of thematic analysis. The themes consisted of 'Perceived Privacy risks,' 'Perceived Ease of Use,' 'Perceived Risk of Use Of Personal Information,' 'Perceived Risk of Location Information,' and ' Trust.' Each theme included various relevant ranged codes. The definition of themes and coding principles are presented in Table 5.2. The themes and the interviewees' responses discovered during the analysis are outlined in Table 6.3- 6.8 (in the end of this paper, placed after appendix).

Table 5.2. *Thematic Content Analysis Coding Frame*

Theme	Definition	Coding rules
Privacy concerns	The uncertainty that related to using smart mobility in exchange with personal data. Two forms of uncertainty are naturally present in such a context: uncertainty in service providers and uncertainty in the internet environment. The former arise by service provider has the chance to behave in an opportunistic manner by taking advantage of personal information (e.g. to create commercial benefits). The latter exist mainly because of the unpredictable nature of the IoT, which is beyond the full control of the service provider or users (e.g., theft of private information, misuse).	Verbal or semantic expression of concerns in relation to personal information, types of information privacy, aggregate information and evaluation between personal interest and privacy concern of data
Secondary use of user's information	Any kind of use of personal information for other purposes than original ones.	Words or phrases that indicate sense of uncomfortableness or disagreement of any kind of use of user's information other than the initial purpose of collection
Ease of Use	The general insight into the level of effortless to use smart mobility.	Any verbal impression or explanation why and how using smart mobility is positive experience such as convenient, cheap to drive/maintain, user friendly, and comfortable
Trust	The belief that the service provider will behave in a socially responsible manner, and, by so doing, will fulfil the trusting party's expectations without taking advantageous of its vulnerabilities	Any expression that indicate a belief that can overcome the uncertainty in relation to information privacy
Location information	The concerns of information about the geographical position of an individual which can be obtained independently of the mobile network via smart mobility service.	Capture privacy concerns about their location information
Intention to use	The likeliness of one's intent to use smart mobility	Capture the strength of one's willingness to use smart mobility services

5.1.4 Quality of interview data

Reliability in this qualitative process lies in transparency and reduce bias, rather than replication. According to Saunders et al. (2016), the value in non-standardized qualitative data lies in investigating and understanding a topic. In this sense, focusing on ensuring replication would compromise the possibilities of such a research approach. To achieve transparency, the researcher made a clear description in the data collection process, strategies, methodologies used, and data required in the research design. The bias that can affect the outcomes may occur from both the interviewer and participants (Saunders et al., 2016). For this study, the interviewers aimed at understanding the perceptions of privacy concerns and personal recommendations and did not ask any particularly personal questions that would cause the respondent to feel uncomfortable. This can reduce the bias as respondents may feel uncomfortable to answer the question freely. The interviews were also short, meaning the potential bias caused by the respondent's impatient was not considered a problem.

Validity in qualitative research refers to whether the data gathered can appropriately represent and explains what the participant intended to convey in the interview (Bryman & Bell, 2011; Gray, 2018; Saunders et al., 2016). In order to ensure this, the interview questions were open questions and formulated as easy and understandable. The interview was designed as a daily conversation where the respondent could interrupt or ask any questions that came to mind, including questions for clarification. Further, the interview protocol allowed the respondents to steer the conversation's direction, the respondents could decide whether to express any specific personal opinions or perceptions. If the respondent answered vaguely or in a way that would need further explanation, they were probed or asked questions to further elaborate on their views. Also, the researcher first confirmed whether the interviewee has IT-related professionals. Those with IT background were assumed to be ultra-sensitive to information privacy, which may cause bias.

Face validity and content validity are two forms of validity that assessed qualitatively in this study. There are two parts of this study. Phase One involved asking smart mobility users to describe their privacy concerns. Phase Two involved constructing and validating a questionnaire that could be used to measure the privacy concerns in smart mobility. A survey instrument has face validity if, in the view of the respondents , the questions measure what they are intended to measure. On the other hand, content validity is, in the view of experts, the survey contains questions which cover all aspects of the construct being measured (Saunders et al., 2016). This study presents a transparent report of the developing process of the survey questionnaire to enhance these two forms of validity. In summary, six themes were identified as may have a detrimental effect on user' intention to use smart mobility: perceived ease of use, perceived privacy risk, perceived trust in service provider, perceived risk of use of personal information, perceived risk of share of personal information, perceived risk of location information. The six themes provided a foundation for the development of a measure of privacy concerns in smart mobility. The process of creating the instruments has been detailed in section 5.2.2-3.

5.2 Questionnaire

In Phase Two, the goal is to obtain quantitative data to answer the second research questions. Total nineteen items (see Appendix A) were developed to represent the six dimensions of privacy concerns in the context of smart mobility. A pilot survey was implemented before the main survey.

5.2.1 Participants

A pilot survey is implemented on twenty-three smart mobility users to test the feasibility and improve the questionnaire's quality before the primary survey. The participants were randomly selected in the Innovation Desk on the east side of Stavanger. To ensure the distinguish of participants in the pilot survey from the primary survey, the researcher asked whether the random samples were student or employee at the University of Stavanger to determine whether they could participate. Only those who do not belong to the two groups mentioned above could participate. The sample size was not set in advance since the purpose of pilot survey it to improving the quality of survey questionnaire. Hence, this process stops when participants no longer give new suggestions on how to improve the questionnaire.

After pre-testing the questionnaire, the survey was limited by individual mail and sent to smart mobility users who have an educational background in the following fields : master students enrolled in energy, society, and environment, regional and urban planning, energy engineering, environmental engineering, resource, and energy management for the survey. This approach is purposive sampling as the aim is to test the construct validity of the developed measurement. The criteria for selecting participants are based on their academic qualifications and English proficiency. Hence, the participants in this process have a relatively higher education level than the residents in Stavanger, which indicate the result should not be generalization in a statistic sense.

5.2.2 Instrument

The nineteen-item questionnaire had two to nine items to measure each of the six principal constructs included in the theoretical model (see Fig 3.2). Although all the items were adapted from previous empirical studies, they were explicitly formulated to capture the context of this research, particularly items to measure trust, which is developed to capture each scenario's context. The perceived ease of use (PEU) items was adapted from existing studies on the technology acceptance model (Park et al., 2017). Measures for trust (TU1) were adapted from Lee (2005) and Pavlou (2003)- (TU 2, 3,); Perceived privacy concerns was adapted from Hsu & Lin (2016), secondary use of information from (Stewart & Segard, 2002) and Perceived risk of location information (adapted from Pavlou & Gefen, 2004). Three items captured the dependent variable measuring on intention to use smart mobility (IU). Two were based on TAM and measured: intention to use (Lee, 2005), and one standard item captures the level of trust to exchange a specific type of smart mobility service (i.e., bus, shared-car, electric car). The design of the measurement points at the interrelation. Hence, the researcher uses three scenario-based questions that include the condition of information exchange in the statement on intention to use the service, i.e., "Considering the data collection/ use /storage by companies like Tesla, how likely are you willing to provide personal information so that you can use an electric car?"

These three different service providers are identified according to the research framework. There are four generic concept (PC, SU, LI, PEU) and one concept -trust (TU) that address the relationship between mobility user and service provider. Something that need to be taken into consideration is that the trust relation at the same time operationalizes the spatial context, so one company stand for the same model:

Model and dataset 1:
4 Generic variables + trust in Tesla / private car → intention to use (Tesla)

Model and dataset 2:
4 Generic variables + trust in Hyre / rental car → intention to use (Hyre)

Model and dataset 3:
4 Generic variables + trust in Kolumbus / public transport → intention to use (Kolumbus). Further, each item was accompanied by a seven-point scale in a Likert format ranging from 1(= not at all the case) to 7 (= very much the case).

Develop Measurement scales and items

The questionnaire items are developed from two sources: the items from prior studies and interview data. As mentioned above, given the framework's design, measurement can be divided into four generic independent constructs and one construct used for the three scenarios. The sub-heading presents this distinction in the following section, where the developing process of each questionnaire item is also presented.

Perceived ease of use

Perceived ease of use will be defined as the degree to which a user believes that using smart mobility services will be effortless (Pavlou, 2003). In the interview, many participants claimed they experience convenient, comfortable, effortless, and cheap use of smart mobility. However, half of the respondents point out the procedure to lease the car is not clear either understandable for shared car users. They explained that the registration process and ending the lease were confusing and complicated to users rather than easy or effortless. In other words, providing much personal information was emphasized as a complicated but necessary requirement to enable the shared car. In this sense, ease of use is directly related to the interaction between users and the app/interface that enable users to access the service. Therefore, the questionnaire shows the app/interface of the bus, shared-car, and electric car, and using closed-ended questions below to assess how participants experienced using the interface to access smart mobility services. The following three questions are measure by the same scale:

- Using such apps/interfaces does not takes much effort.

- These apps/interfaces are easy to use.

- The instructions to use such apps/interfaces are, in general clear.

Table 5.3 *Scale of measurement I*

1	2	3	4	5	6	7
Strongly disagree	disagree	Somewhat disagree	neutral	Somewhat agree	agree	Strongly agree

Trust

The theme of trust is the center of the third part of the questionnaire, where three scenarios are designed to measure it. The participants are asked to be electric car owner, shared-car user, and bus user in each scenario (see Figure 5.1).

Figure 5.1 Screen shot from on-line questionnaire

3.1. EV owner

The electric car companies collect consumers' mobility information from various channels. For example, online information such as users' browser history, the use history of the car, use of energy products, and even events that one attends. According to companies like Tesla, data processing is partly for business development and partly to offer customized services. Information about individuals may be stored and processed in any country where Tesla has facilities or in which they engage service providers. Those countries may not have the same data protection laws as those in which the object initially provided that information. On that account, Tesla has an internal privacy policy. They assure that its adherence to the legal framework in different countries. In Norway, all personal information is treated and stored under the General Data Protection Regulation (abbreviation: GDPR; Norwegian: personopplysningsvern).

3.2 Car-sharing service

In general, the car-sharing service requires users to download an app and make a customer profile. It requires the user's full name, birth date, driver's license photo, telephone number, debit card, e-mail address, driving history, and car number. According to companies like Hyre, processing personal information is partly for business development and partly required by the mobility provider's insurance partner and Norwegian law. They assure that all personal information is treated and stored under the General Data Protection Regulation (abbreviation: GDPR; Norwegian: personopplysningsvern). Besides, they also developed internal routines for handling personal information.

3.3. Public transport

Kolumbus offers public transport services in the region of Stavanger. To use this service you need to have a bus card or install mobile apps, which require some personal information (e.g., name, email, and billing information). All personal information is supposed to be safely treated and stored under the General Data Protection Regulation (GDPR). In addition, internal routines for handling personal information exist.

At the beginning of each scenario, the service provider is introduced, and the personal information required from the users. Then the participants are asked about their view of how service providers handle personal information. The final part asks participants about their intention to use the respective mobility service. The corresponding closed-end questions are as follows. Because the reason of trust a service provider was discussed differently on whether it was anticipatory or reflective, the following questions are formulated:

-The service provider is trustworthy in handling its consumers' information.

- I trust that the service provider takes measures to protect the information provided by the consumers.

- I trust that the service provider devotes time and effort to prevent unauthorized access to the database.

After asking the question about how the trust of service provider, the second question is to ask whether participants still want to use the service after considering these privacy concerns. The scale wording as the Table 5.4 under.

-Considering the data collect/use/storage by the service provider, how likely are you willing to provide personal information so that you can use this service?

Table 5.4 *Scale of measurement II*

1	2	3	4	5	6	7
Very unlikely	Unlikely	Somewhat unlikely	Neutral	Somewhat likely	Likely	Very likely

Perceived privacy concerns in smart mobility

The fourth part focus on participants' view of perceived risk about information privacy. As mentioned in Table 5.2, there are two forms of privacy risk in smart mobility, one is the related to the risk that the service provider may use user's personal information for other purpose. The other aspect is the risk that anything could be hacked or misused in the internet world. In order to capture these two aspects, the researcher decide to use a general concept -privacy concerns to capture these privacy risks. Further, there are more aspects about information privacy. For example, several interviewees point out specific information types that can arise respondents' privacy concerns (see Table 6.3 in Appendix H).

Hence, two questions are made to understand the variable of Perceived Privacy Concerns. The first question is multiple-choice, where the participants are asked to choose the types of information they regarded as private. Further, three closed-end questions adapted from Pavlou & Gefen (2004) are modified according to the responses from interviews to ask participant's perceived concerns in general :

-There may be privacy risks involved in using smart mobility services.

-Accessing "smart mobility service" exposes you to privacy risks.

-Smart mobility involves a loss of privacy.

The wording of the measurements is same as the Table 5.3

Perceived risk of personal information

The Secondary Use of Personal Information (see Table 5.2) is considered a construct because several respondents state that it is highly relevant to privacy concerns. These responses did not appear in a specific statement but appeared as a concept suggested by other responses' co-occurrence. For example, several respondents mentioned they think it is not acceptable to use their data for commercial purposes. Some mentioned the service providers should inform the users when their information is in used. These conceptual co-occurrences suggest how some individuals react to the uncertainty of usage of their information. As a theme, it helps to tie various accounts and responses together. In this phase, the objective is to develop items to form a scale to measure this theme. In reality, users have to consent to let smart mobility service providers use and store their data; otherwise, they cannot use the service. In this sense, the users are passive in their privacy choices, even if the service providers may use it for a not favorite purpose. Therefore, these questions are designed across the three different terms of conditions which allows respondents to select their preference. In addition, they reflect social norms to what degree users react to their information privacy about use and storage

Two sets of closed-end questions are as followed:

Social norm regarding the secondary use of information

-The service provider must not use the user's personal information for any other purposes at all.

-The service provider should not use personal information for any other purposes unless it has been authorized by the person who provided the information.

Social norm regarding storage and share of information

-The service provider must not share personal information in the database with any other company unless it has been authorized by the individual who provided the information.

-The service provider must not share personal information in the database with any other company

The wording of the measurements is same as the Table 5.3

Perceived risk of Location information

The Location Information is highly relevant to the smart mobility service. In principles, the service providers need to obtain users' location information to improve their services, e.g., record an individual's favorite route, offer real-time traffic information. Notably, issues of location-based information are directly related to the privacy concerns among smart mobility users, for example:

"….the (location information) is highly sensitive, it can be problematic for me " (EV owner, female, 40-49)

Several studies focus on services based on location information (e.g., Poikela, 2020; Zhou, 2010). Even though these studies focus on other types of services, privacy concerns on user adoption of a location-based service are expected. The following questions are modified by the items used in the questionnaire in Pavlou & Gefen (2004) to measure how users consider their privacy concerning location information.

-In general, it is risky to provide location information to a smart mobility provider.

-There is much uncertainty associated with giving location information to a service provider, as users have no control over what information is used for. (e.g., business development)

-There is a potential loss involved with providing location information (i.e., the likelihood of data leakage is high because of multiple-use).

The wording of the measurements is same as the Table 5.3

The measurement scale and items are present in Appendix B

5.2.3 Procedure

Pretest. The preliminary version of the instruments was reviewed by professors, researcher peers and doctoral students for precision and clearness. Subsequently, the questionnaire was pretested with 19 participants in order reach the appropriateness and comprehensiveness. In the pretest course, the participants were encouraged to leave feedback and message to the researcher. The research generated QR code which enabled participants to fill out the questionnaire via their smart phone. This offer participants flexible time for participant to answer. In addition, the researcher also through this process to assess the recruitment of participants and the time needed. The response rate was record and the research observed that data collection progress on the daily basis. This research process lasted for two weeks, between 20 June to 7 July.

All questions, concerns, feedback, and comments were considered and included. This was an iterative process where the researcher kept modifying the questionnaire and its structure until no further changes were considered as necessary. None of these phases reveal any major problems, but the questionnaire was progressively refined, simplified and shortened. For example, the amount of text in the introduction was shortened to ensure respondents read the text to understand the questionnaire's purpose and what they could expect to see in the questionnaire. Further, several terms of use, the sequence of questions, and the flow of statements are improved, and the font size and layout. Finally, there was reflect the open-end questions are difficult to answer. Therefore, all questions have been changed into closed-ended form to make it easy to answer. The final version of the instrument is presented in Appendix B. and their internal consistency result are shown in Chapter 5.

Data collection. After pre-testing the questionnaire, the on-line survey was conducted from period September to December in 2020, by means of the software surveyXact. The survey was sent out by the administration of faculties in the University of Stavanger and sent as a private mail to the participants. The participants are informed the purpose of the survey and knew that their participation was voluntary and anonymous. Most participant complete the questionnaire not more than 10 minutes. From 210 responses, this study retained 187 validated samples of these responses for analysis. Table 6.9 (in Chapter 6) describes the samples.

Data analysis. The quantitative data were analyzed using IBM SPSS Statistics version 26 and Amos software package. To assess normality and assumption of the general linear model, the SPSS descriptive statistical analyses would be used first, as advised by Pallant (2013). To examine the sufficiency of the measurement instrument, the reliability and validity analyses would have furthermore proceeded. First, the researcher will conduct a confirmatory factor analysis to examine the reliability and validity. The reliability is planned to test by Cronbach's Alpha coefficient. This is one of the most common indicators of the internal consistency that assesses the instrument (Churcill Jr, 1979). The validity is planned to measure by convergent validity (the extent to which multiple indicators of the construct converge), discriminant validity(the extent to which the measure is novel and distinct from the other variable), and nomological validity (a degree to which predictions in the formal theory are confirmed) (Bagozzi, 1981; Churcill Jr, 1979). The convergent and discriminant validity will be tested with Principal Component Analysis (PCA) in SPSS Statistics to explore the interrelationships among variables on this study's quick stage. After that, the researcher will run a SEM to test causality between variables in order to text the nomological validity.

5.2.4 Quantitative data

Validity and Reliability

This study examined the influence of the privacy concerns on smart mobility users and the proposed research model's appropriateness in explaining such intention. Before the analyses, the researcher screened for error and violation of the general linear model's assumption. The measurement showed adequacy for inclusion to further analyses. Descriptive statistics for variables are presented in Appendix B. The questionnaire's data are subjected to a two-step approach recommended by Anderson & Gerbing (1988). Before testing the hypothesis, the constructs of the measurement model were subjected to a two-stage validation process.

The instrument's reliability was assessed with Cronbach's alpha (C- α) values for each scale during the first stage. There are different suggestions about the minimum acceptable level of the values of C- α. A commonly accepted rule of thumb for describing internal consistency is a = 0.5 or above (George & Mallery, 2003; Nunally et al., 1967). However, DeVellis (2016) argues that a scale's coefficient alpha should be above 0.7, while Pallant's (2013) advice values above 0.8 as preferable. Meanwhile, very high reliabilities (0.95 or higher) are not necessarily desirable, as this indicates the items may be redundant (Streiner, 2003). On the other hand, item-total correlations refer to the correlations between scores on each item and the total scale scores. In several studies, total item correlation serves as a criterion for initial assessment and purification. Here again, various cut-off points are adapted, for example, 0.3 by Cristobal et al., (2007); 0.4 by Loiacono et al.,(2002). The threshold to be removed in the current study is load < 0.5 (Kim & Stoel, 2004 ; Nunnally,1978;).

Table 6.15 lists coefficient alpha and item-total correlation. As it can be concluded, all scales have resulted in surpassing the acceptable level, and none of the items indicate may be redundant (i.e., C- α > 0.95 or higher). This result indicates that the measurement items have a high degree of internal reliability. Since the last intention to use variable is caused by low value, therefore, all items were kept for further principal component analysis (PCA) before eliminating any of them.

Moreover, construct validity was established by convergent and discriminant validity. Confirmatory factor analysis (CFA) using SPSS Statistics is carried out to ascertain convergent validity. On the second stage, the proposed model has been tested with SEM confirmatory factor analysis. The predictive constructs have been validated by composite reliability and average variance extracted. Nomological validity is evaluated through hypothesis test. The SEM would be used to compare to which degree the proposed model fits the data and test the hypotheses H 1-5. The initial proposed model is tested by three data sets (as trust of three serviced providers are measured distinctively). The results presented in Table 6.17 with an acceptable data fit according to goodness-of-fit. There is little agreement on the model evaluation criteria. While many scholars argue that x^2 the fit index (e.g., Bagozzi& Yi, 2012; Iacobucci, 2010), Iacobucci (2010) points out this index cannot achieve precision in estimation. Therefore, it has been suggested to divided x^2 by its degree of freedom. Further, there are different suggestions about acceptable coefficient ranges across the studies. Although prior studies used x^2/df value up to 8 (e.g., Park et al., 2017) to be an acceptable value, the rule of thumb was the lower value indicating the better fit. Hence, this study follows the threshold suggested by Kline (2011), where x^2/df should be less than 3.0. The additional fit indices were also used to determine the fit of the models. In the present study, GFI, CFI, and TLI values of 0.90 and above were considered to reflect adequate fit, while values of 0.95 and above represented excellent fit (Knight et al., 1994; Kline, 2011). Regarding SRMR, values of 0.08 represent a good fit, and values below 0.05 represent a very good fit to the data. Lastly, regarding the RMSEA, it has been suggested that values above 0.10 represent a poor fit, values between 0.08 and 0.10 a marginal fit, values below 0.08 represent an acceptable fit, and values below 0.05 constitute a good fit (Hooper et al., 2008). This study uses 0.08 as threshold for both SRMR and RMSEA. Further , the path analysis is conducted to test hypotheses H 1-5. The test results of each data set are presented in Table 6.18a-c. The indirect effect of independent variable on dependent variable are shown in Table 6.18a_1,b_1,c_1.

The Moderating Effect of Spatial Contexts and Demographic characteristics

The potential effect of spatial context of the smart mobility has been pointed out in Chapter 2 and 3. The research model will be examined from two perspective, the measurement and structural. In the measurement model, the research model will be examined for the differences between spatial context in term of the users' choice of transport tool. As mentioned early, car represent private space in contrast to collective transport. In the structural model, the research model will be examined for the differences between these two groups of users in term of the hypotheses- the negative effect of spatial context on intention to use is stronger for car user than collective transport user. The multi group analysis in AMOS categorize the data based on the grouping value (i.e., car-1, collective transport-2) and the group analysis will be performed simultaneously between these two groups. The result will be present in Table 6.20-21.

Finally, the research conducted an additional statistical analysis using the linear regression in the parametric testing tool, SPSS to further investigate relationships between demographic independent variables of Gender, Age, Civil State, and Education Attainment. The result present in Table 6.22.

5.3 Ethics

The type of data collected in this study are not belong to sensitive data, therefore the NSD approval was not necessarily to be sought (the researcher checked the types of information needs to be collected on the NSD website before the data collection process). The ethics issues in this research are evaluated in line with four perspectives suggested by Bryman & Bell (2011), namely the issue of harmfulness, lack of informed consent, invasion of privacy, and deception.

The first area of harmfulness refers to violating confidentiality assurances (Neuman, 2013; Saunders et al., 2016). Confidentiality refers to proper safeguards are in place to protect participants' privacy and information from unauthorized access, disclosure, modification, loss, or theft (NESH, 2016). The technical measure to ensure confidentiality includes password-protected electronic data, where the researcher is the only one who has access to these data. The other safeguard measure involves the data collection process. All interviewees are pseudonyms in numbers, and the researcher avoids asking or including information related to a specific individual.

The second area, lack of informed consent, refers to the idea that participants must be given enough information before the data collection to let the individual decide their willingness to participate (Neuman, 2013). Since this study is overt research, all participants in both the interviews and the conjoint analysis were given information and instructions to clarify the research. Contact information was also presented, and the participants were encouraged to make contact if there were any questions or suggestions about the research objective. Further, there were no sensitive personal questions asked in these two processes because the researcher consider overstepping privacy at the individual level is unethical. As such, the researcher reached a balance between retrieving helpful information and the ethical considerations for the subject's integrity.

Finally, the issue of deception occurs when the research is presented in a misleading way (Bryman & Bell, 2011). To address this, the researcher demonstrates the logic of the research design and reports how the data was gathered and analyzed clearly. The idea is to make the whole process transparent to avoid the researcher's presupposition hamper the participant's descriptions of reality.

6 Result and Data Analysis

This chapter aims to present the findings from each of the data collection methods. The first sub-chapter (6.1) is presenting the results from the qualitative interview, where an qualitative data analysis is provided based on the themes and codes identified in the interview data. The second subchapter (6.2) is the results of the quantitative data and analysis. The initial data processing for each type (i.e., qualitative and quantitative) will be discussed in detail, along with study results. This chapter increases transparency, allowing readers to examine the thought process behind research decisions and minimize the chance of researcher bias in the research method.

6.1 Findings and Analysis of Interviews

The function of the qualitative data helps the researcher to get an understanding of what understanding of "privacy" interviewees have, to then define variables accordingly for the survey. This sub-chapter outlines the result following the completion of a thematic analysis of 46 interviews. This stage's main objective was to identify the factors influencing users' intention to use smart mobility services. Quotations from the interviewees have been added to provide narrative accounts and illustrate the themes emerging from this study. The NVivo 12, a qualitative data analysis software, which was used to explore data, organize the themes, and develop the data findings' visualizations. The following paragraphs will present the analysis of qualitative data.

6.1.1 Pre-coding Stage: Data Familiarisation

According to Braun & Clarke (2006), the researcher read the interview data extensively before the coding process. In this pre-coding stage, the research ran a word frequency query in NVivo to explore the most commonly used words. The NVivo allows the researcher to generate a word cloud, as shown in Figure 6.1. The word cloud helps to give a glance at the commonly used words in interview data. For example, a glance at the word cloud reveals that "information "and "privacy" are frequently used words by the interview participants. These words gave research affirmatory about the existence of a certain degree of privacy concerns among smart mobility users. Therefore, this prompted the researcher to analyze the interview data further.

6.1.2 Descriptive A

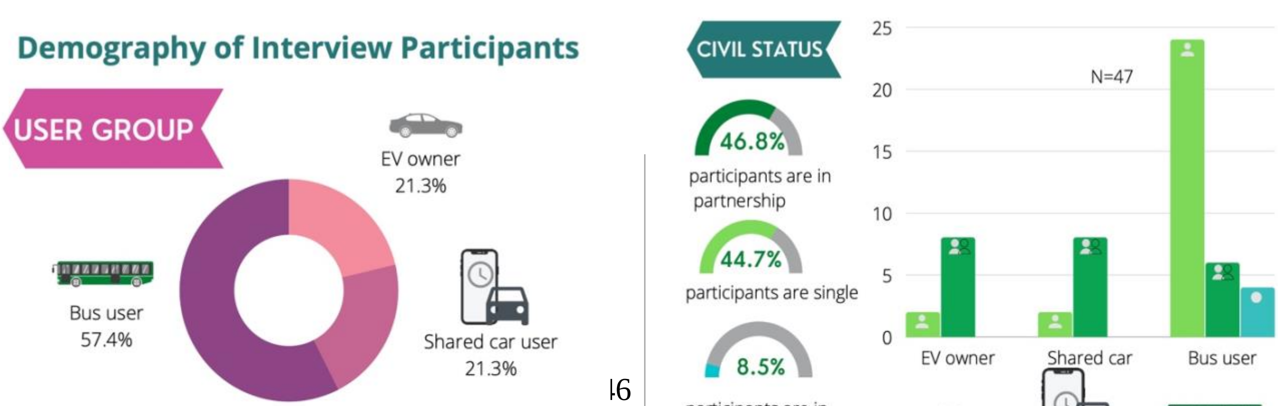
Interviews v ... rvices. The name of all particip ... . Thus, they are named as P1-P4

More bus u ... d car users. The electric car owners are relatively older than the other two groups. Two of them are between 30-39; four are in the 40-49 age group, four respondents belonged to the 50-59 age group, one respondent belonged to the 50-59 age group, while no one is between 20-29. Two of them are single, while the rest are in partnership. Two respondents have a Ph. D, six have a master's degree, and two have high school degrees. Three of the respondents have expertise in IT.

There were eight males and two females in shared car users, two respondents who belonged to the 20-29 age group; four respondents belong to the 30-39 age groups and 40-49 groups. There are only two respondents in this category that are singles; the rest are in partnership. When it comes to educational level, two of the respondents have a Ph.D.; fours have a master's degree, three have a bachelor while one has a high school degree. There is half part of the respondents in this group has IT expertise.

The biggest group is bus users. There are only nine male participants and eighteen female participants. Eighteen respondents belong to the 20-29 age group; eight belong to the 30-39 age groups, while only one belongs to the 40-49 age group, no respondents belong to the 50-59 age group. Seventeen respondents are singles, while there are six in partnership and four in other kinds of relationships. There is one has Ph.D., eight and eleven have master's and bachelor's degree respectively. At the same time, there are seven with high school. There are only two respondents in this group that has IT expertise. The participants collectively fulfilled all of the target population's criteria, except those who have IT expertise. A summary of the respondents who participated in interview for this study is outlined in Table 6.1 and Appendix C.

Table 6.1. *Interviews Demographics*



6.1.3 Interview data analysis

The researcher conducted the interviews to obtain information in order to develop the items in the questionnaire. By looking at responses related to each construct in the proposed research model, the researcher identified the similarities, differences amongst responses related to the same construct and then conducted comparisons, which further gave insight more concise.

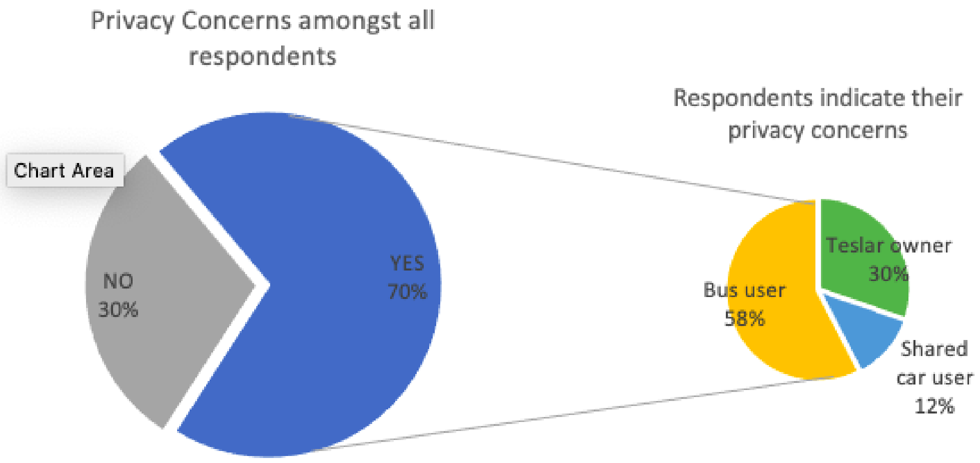
Observed Similarities

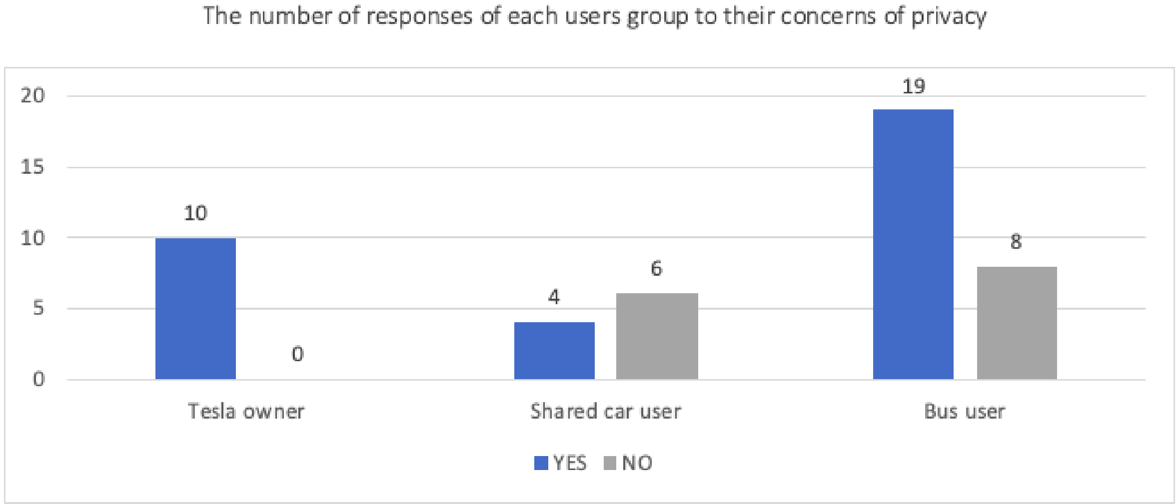
In this section, the research will describe interviewee responses from each mode of transport who talked about one theme. First, the majority of the findings related to the theme of

Privacy concerns, as shown in Figure 6.2, the majority of participants expressed privacy concerns related to smart mobility services in one way or another (Figure. 6.2) . In general, there is privacy concerns exist among all smart mobility users. While the Tesla owner represents appear more sensitive to privacy concerns, bus users are less sensitive to privacy concerns among all. Although different user groups have slightly different privacy considerations, there are similarities to their concerns for sharing sensitive information with smart mobility service providers. More specifically, many respondents perceive privacy risk about bank information, browser history, and location information. Around half of the respondents entail they do not want others to know their personal information. A bus user says, "I am fine with sharing (my) personal details except for bank card de browser history.[P23]"; the other shared-car user expresses, "I don't want people (to) know where I am [P16]."

While many respondents express their concerns about sharing traceable information (i.e., driving history or address). One of these respondents further expressed that he was otherwise not concerned with the privacy of his address[P3]. Besides, there were similarities in the perceived privacy risk with the personal information collected by the smart mobility providers, such as data breaching, hacking, and uncertainty of the purpose of data use. One of the Tesla owners says, "Well, it (refers to personal information) can be exposed to many things. (For example) Data breaching [P8]" Although less than half of the respondents entail their privacy concerns override their interest in using smart mobility service, it is clear that privacy concerns exist to a different extent among smart mobility users.

Figure 6.2



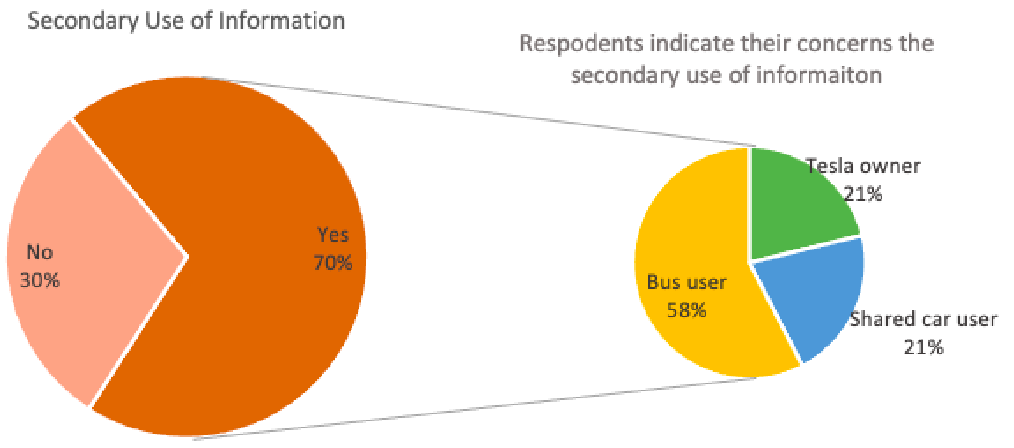


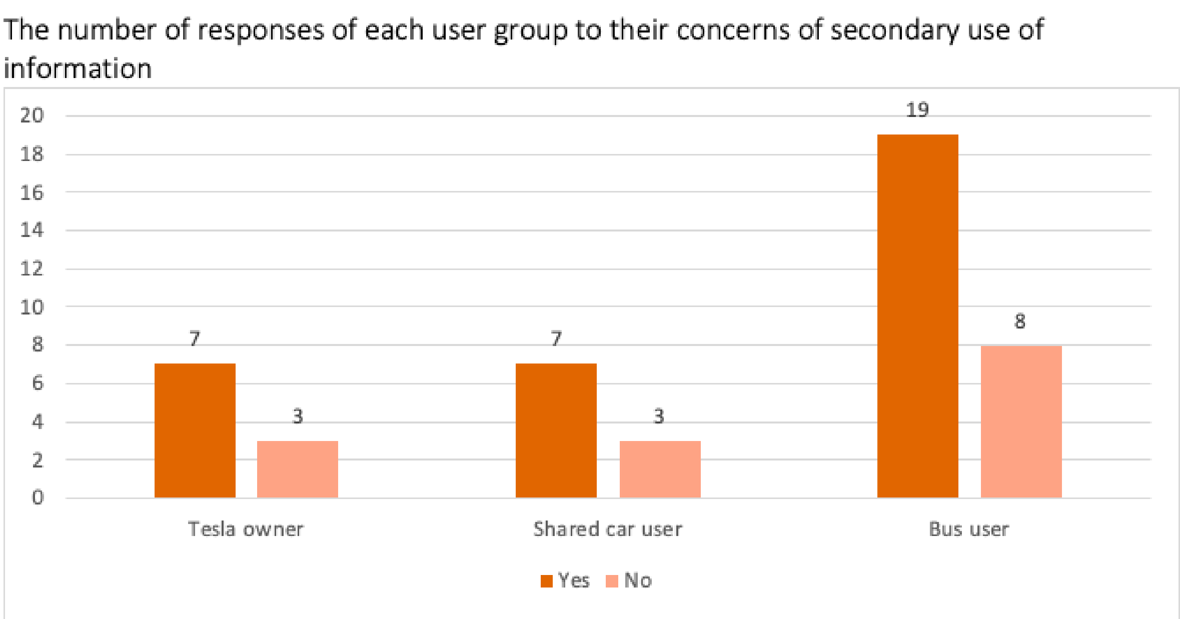
Note: The percentages present on the left pie are based-on all respondents as a whole, while the percentage on the right pie are based on all respondents that have privacy concerns ; the table shows the percentage amongst each group user's responses to privacy concerns.

After that, the second theme of Secondary Use of Personal Information for other purposes than the original ones, as shown in Figure 6.3, presents a similar results. It appears the majority of the respondents were concerned about data privacy concerns if one's information was used elsewhere, such as a third-party. A third-party refers to parties that were different from the service provider they initially provided the information. More specifically, more than half of the responses consider personal data for other purposes can raise privacy concerns. Though this is a theme that raises considerable negative response, several respondents point out it is the purpose of using their data to determine whether it is acceptable. There are also a couple of respondents entails this is a helpless situation because companies collect user's data for other purposes while users can not do anything about it[P6, 8]. Besides, respondents emphasize that personal data should be used based on consent[P25], and one points out users should be informed of the purpose of using their data[P34].

However, it is essential to consider that many respondents reflected further on their privacy concerns and paradoxical behavior. That says they have privacy concerns but still using these services that require their personal information. It is worth noting that there is relatively low competition among the smart mobility service providers in Stavanger; therefore, respondents lack data privacy options due to the number of service providers in place.

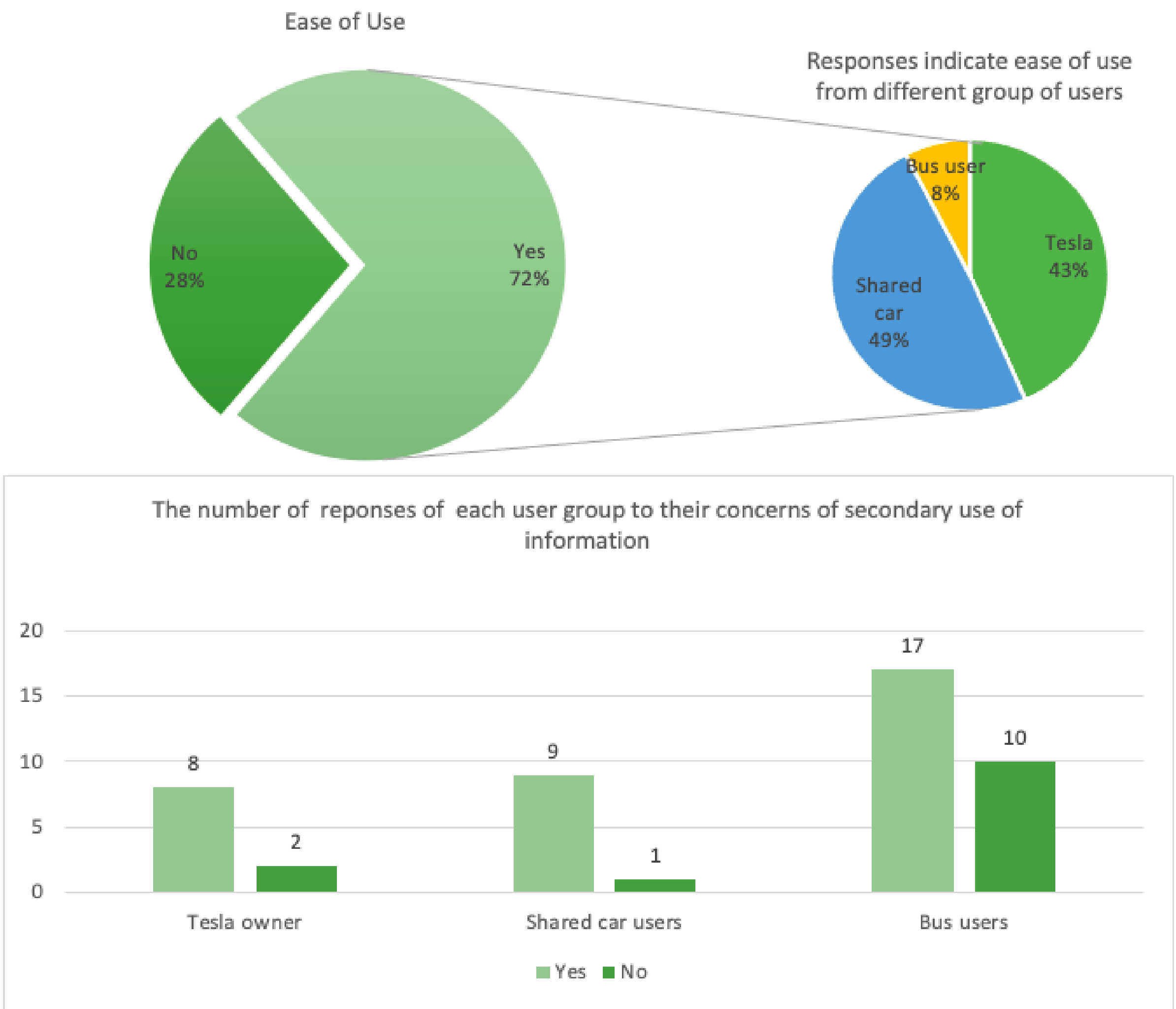
Figure 6.3





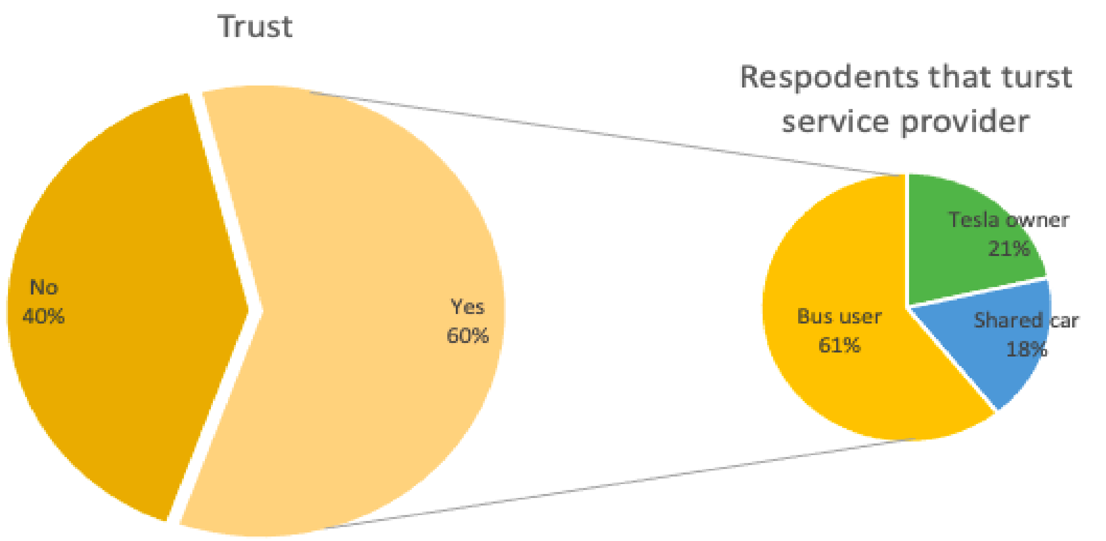
The third theme of Ease of Use, as seen in Figure 6.4, exhibited a majority of similar responses that mainly focused on what smart mobility users think about these services based on their experiences. More specifically, half of the responses were similar since many respondents think it is convenient and affordable/cheap. A couple of respondents point the electric car is cheap and easy to maintain [P3, 6], and more than half of the respondents express bus is cheap and convenient. Meanwhile, the groups of shared-car users present different opinions. A couple of respondents used examples to recall their experience with the inconvenient part of using shared-car service. For example, one respondent elaborates: "The service is simple, easy to use, but when finishing the car hire, it was not quite clear how to complete/stop the hiring fully I had to call the Hyre call center (shared-car company) to kelp me fully stop the hiring [P14]." The other respondent also points out the difficulty of registration for lease[P16]. He elaborated further about the registration takes time, and the travel distance is somehow limited. Although the shared-car service registration process gave some respondents a not user-friendly impression, one explains it is effortless to use the service once registered [P12]. Overall, more than half of the respondents think that sharing their information makes smart mobility easy to use. Although there is some complains about registration of personal information, once one complete this process, using the service is convenient. Hence, smart mobility leaves the majority of respondents impression of ease of use.

Figure 6.4

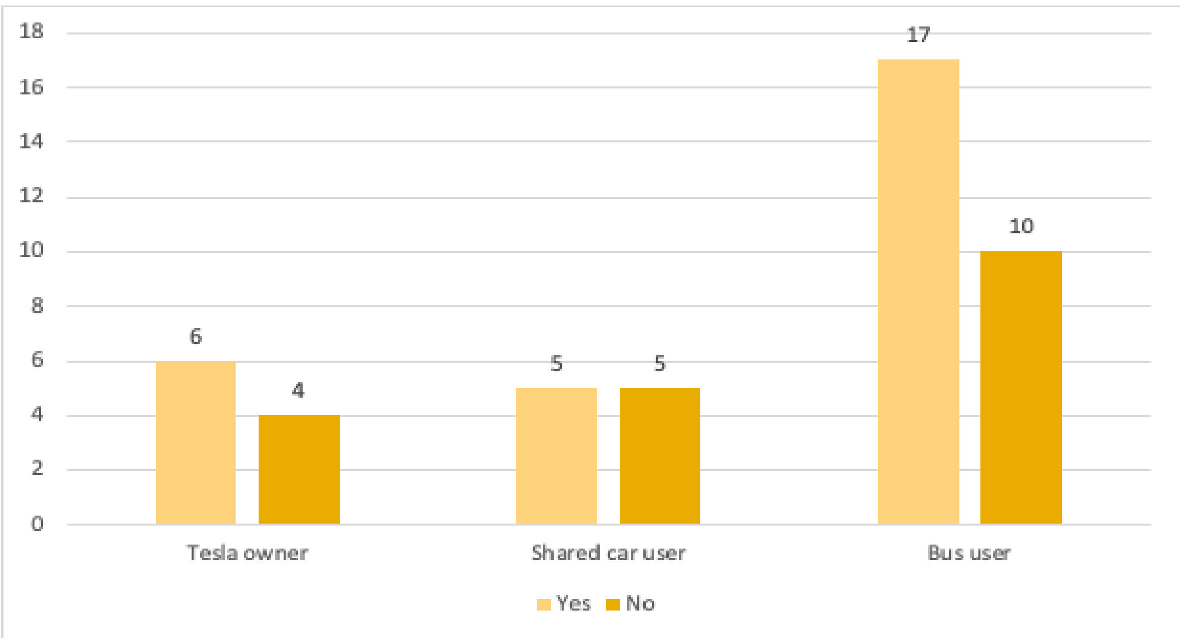


The fourth theme of Trust of Service Provider's capability to handle personal information, as shown in Figure 6.5, revealed a significant amount of responses related to respondent's uncertainty of service provider's capability and behaviors in relation to manage data base. As such, the responses were similar as the majority of the responses started with a disclaimer such as "not sure… [P6,16]," "I think [P24]," "I hope [P22]," or "I am not sure [P31]," which acknowledges that respondents were ultimately unclear of how companies handle personal data. Although there are considerable responses that express low trust of shared car company and car company), the responses among the bus users are opposite. A considerable number of bus users express that they trust Columbus can handle their information well. One respondent even elaborates where the trust comes from, "... I think all companies operate in Norway are trustworthy because they have to follow the law [P24]."

Figure 6.5

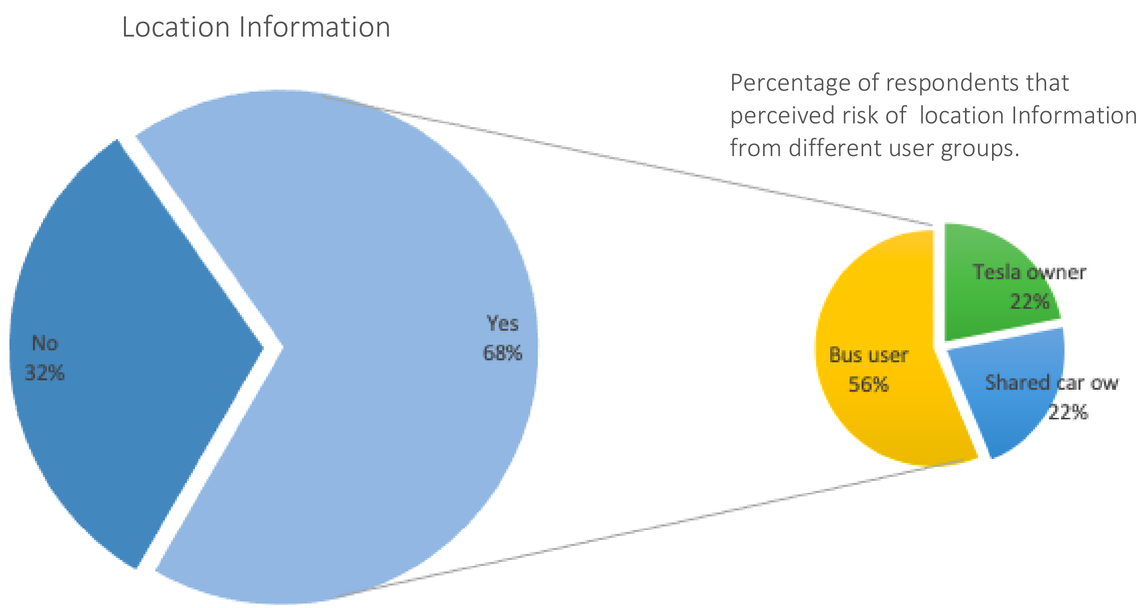


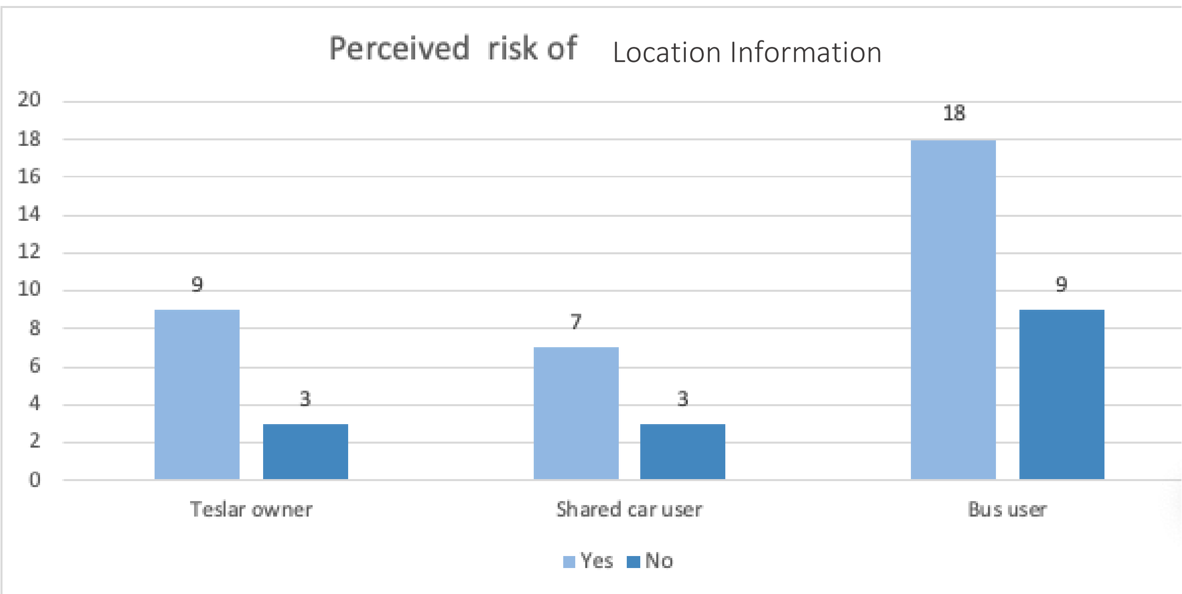
The number of responses of each user groups to trust of service provider



The fifth theme of location information, as shown in Figure 6.6, presented a majority of similar responses that mainly expressed the concerns of this type of information. Many of the responses stated with negative tones, for example, "I don't like that [P33]", "never, that is bad [P46]", or "It can be a problem for me [P24]," which acknowledges that respondents do have privacy concerns about sharing information about where they were/are. Although there is a notable privacy concerns related to location information, there is a minor difference between users' groups. Tesla and shared car users expressed more concerns than bus users. This is interesting because the shared car users and Tesla users differ in that the Tesla users own the car and in principle have more options to determine data processing through consent. Such insights should be further discussed.

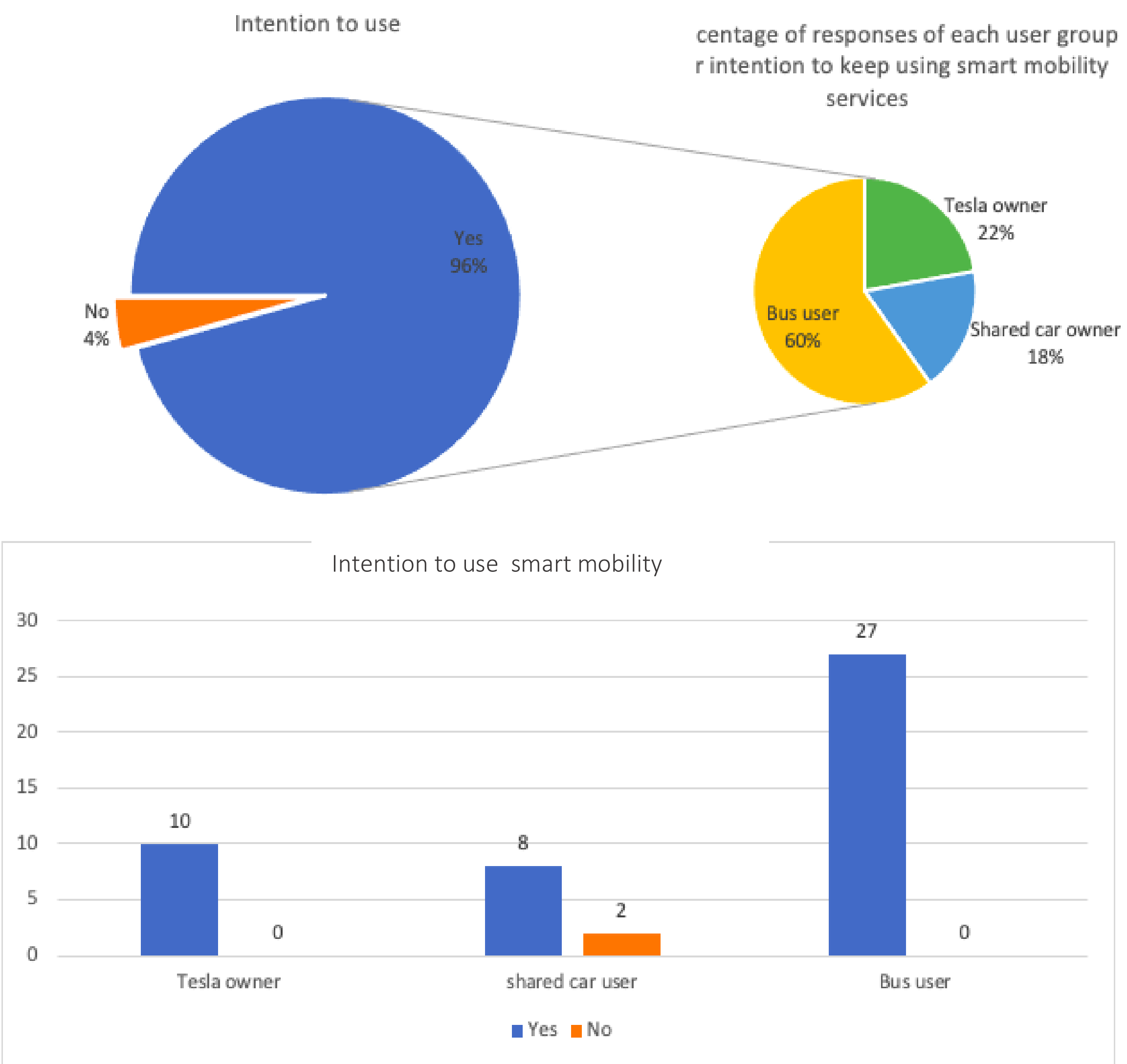
Figure 6.6





Lastly, the sixth theme of Intention to Use, as shown in Figure 6.7, revealed a significant amount of responses related to the respondent's behavior intention to keep using smart mobility service. Except for the shared-car users, all Tesla owners and bus users point out they will continue to use these means of transport. The intention to keep using shared car service is considerably high since only two respondent expressed that negative [P17, 18]. The questions aim to assess users' intention to use the smart mobility service are conducted in two phases. In the first phase, the research asked the respondents about their commute in general. After that, the researcher asked a set of questions related to data collection through smart mobility service, then asked respondents about their intention to use these mobility services again. In this phase, more than half of the respondents express their interest in using smart mobility to override their privacy concerns regarding the information collected through service providers. However, there is a notable difference from the first phase. The difference in these two phases responses may indicate when including privacy concerns into consideration, it may affect users' intention to use smart mobility. Although privacy concerns affect some respondents' intention to use smart mobility, most of the responses provide an attempt from the users that their interest to use these services override their privacy concerns.

Figure. 6.7



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focused on the risk of driving history and behavior, which can be sold and used in a big-data setting to profile a user [P3]. The respondent entails the privacy concerns related to the consumer's commercial potential for market mapping. There is one respondent indicated no privacy concerns about the information gathered by Tesla. However, upon further reflection during the interview, the respondent concluded that he was ultimately not worried about sharing his information with Tesla because his interest in new technology overrides his privacy concerns [P8]. Lastly, another respondent uncovered a differing viewpoint of privacy concern that he did not like being too controlled [P22]".

Furthermore, while a significant amount of respondents expresses a negative attitude within the Secondary Use (see Table 6.4), one responded differently toward his perception of using personal information for other purposes than original ones. This respondent believed that companies like Google gather more information than Tesla [P8]. Further, he elaborates that gathering consumer information is positive as it can make the electric car more comfortable and convenient. Another respondent expressed a positive perspective of using information for other purposes, except for bank information and browser history [P23]. One respondent expresses it is ok to share information; however, he expresses in a helpless tone as " they (refers to the shared-car company) do that anyway! [P6]"

Moreover, the third theme- Ease of Use, as shown in Table 6.5, mainly contained responses with a similar opinion about smart mobility services. While most of the responses reflect the positive experiences, several shared-car users presented different opinions. These negative responses specified the reason related to that. One shared-car user pointed out the confusing registration process [P12], while the other pointed out it is unclear how to complete the hiring process [P14]. It is worth keeping in mind that these responses emphasized that the inconvenience is caused by the registration procedure, not the service per se.

Further, the Trust of Service Provider's theme, as shown in Table 6.6, provided several distinct responses. For example, there is a moderate difference between groups of users. Most bus users showed slightly more trust in the service provider's capability to handle the user's information, while more than half of the responses from Tesla owners and shared car users expressed a lower level of trust. A shared car user points out that the service provider should protect the user's information and further clarified that there is still a risk of hacking. Meanwhile, one respondent points out that big companies like Tesla are supposed to protect their database because they have enough resources and strategies [P 6]. Additionally, several responses reveal a helpless tone where the respondent explains that he "hopes" that companies can handle user's information well [P22]. This tone is similar to respondents as they express "I do not know, I am not sure [P27]," kind of [P28]," and "maybe [P35]".

The fifth theme of Location Information, as shown in Table 6.7, mainly contains responses with similar responses about privacy concerns. The majority of the responses reflect that most people do not like revealing their location information, while few do not mind. One respondent specifies whom to share the location information with is essential, and he explains further that he shares location information with family and friends [P12].

The last theme of the Behavior Intention, as shown in Table 6.8, almost all respondents represent positive to continue using smart mobility. However, after adding privacy concerns into consideration, the responses related to intention to use are observably reduced. Overall, this entails privacy concerns that can affect people's intention to use.

Overall, there is no apparent difference of responses about six themes. In general, the respondents have a certain level of privacy concerns. More specifically, most of them entail a negative attitude toward secondary use of information and sharing location information. However, several responses express a helpless tone and point out they cannot do anything about privacy concerns. The most notable differences amongst responses are related to the third theme- ease of use, where several shared car users reflect the complicity of the registration process. Interestingly, there is a considerable level of trust in service providers and intention to continue using smart mobility services. It may indicate a direct correlation between trust and behavior intention, where more data should be collected to test it.

Comparison

This section is a comparision of similarity and differences across participants in different groups and demographic background.

Privacy concerns. As the participants are divided regarding the types of smart mobility services they engaged with, they were also segmented accordingly to identify any similarities or differences in demographic factors. The result of interviews shows that most respondents had at the very least a few privacy concerns. Further, it was also apparent that the respondents who were less concerned with sharing personal data belonged to bus users' group segments. The bus user group is divided into two segments according to the tool one uses to buy the tickets, namely bus cards or apps. Bus users who use bus cards have less privacy concern than these who use mobile app. However, there were only a few respondents use bus cards, while the majority use mobile apps. The other two segments- shared car users and Tesla owners have relatively more significant privacy concerns than bus users. In contrast, the latter has the most significant privacy concerns among all. Regarding the research framework, the empirical findings show that the less ownership, the more privacy concern. This result seems not compatible with the assumption where the spatial context and ownership of the tool to access service positively impact privacy concerns. However, the interview data does not show whether there are different privacy concerns between Tesla owners and shared car users. These two groups of users differ in that shared car users, in principle, have less option to determine data processing through consent; such insight will be further discussed in quantitative analysis.

However, it was also apparent that the respondents who were less concerned with sharing their data belonged to a younger age group segmentation. For example, a respondent who belonged to the 20-29 age group explained that she could not be bothered with evaluating data gatherings because the service providers already have a lot of her information, so it is too late to worry about it. Another respondent who belonged to the 20-29 age group said she had privacy concerns about the personal information collected by smart mobility service providers, but it was not too much.

Regarding gender, almost half of the female respondents entail concerning of their privacy higher than personal interest to use smart mobility. In contrast, the other half of female respondents argued that sharing their personal information makes it easy to use. Additionally, a few female respondents described the perceived risk of personal information as "I do not know" or "not so much as a concern" due to their lack of knowledge and experience about information privacy. In contrast, many male users could name some data security problems such as "data breaching" and "aggregate information." However, there is a need for a large data set to test the relationship with demographic division with the means of transport.

Secondary use of information. Further, the theme of Secondary Use of Personal Information, most respondents reflect a high level of privacy concerns. Expressly, the group of Tesla owners represents the highest level of privacy concerns. For instance, one respondent who belongs to this group elaborated that privacy concerns are determined using the user's data. The commercial uses are mentioned among several respondents as " nor acceptable," while using these data to improve the services is otherwise acceptable. While almost all respondents from the shared car segment revealed deep concerns about the secondary use of personal data, one of them mentions that these data should be used based on the contract [P14]. However, several respondents who belonged to the bus users group mentioned they do not mind[e.g., P29, 36, 40].Interestingly, they belong to 20-29 and 30-39; most are female with a lower grade high education. However, more than half of the female respondents also observed negative issues concerning the secondary use of their personal information. Besides, all respondents with a higher-grade high education show a unanimous negative attitude toward secondary information. These observations could call for verification based on a larger sample. The same could be applied to all other concepts.

Ease of use. Moreover, for the theme of Perceived Ease of Use, most respondents express their impression that all smart mobility services are excellent and convenient. More specifically, the Tesla owners segment expresses the highest positive impression level and a positive attitude about sharing their information to contribute to an easing of use. Meanwhile, several opposite opinions appear from the segment of shared car users. The issues that have been specified are complicated registration and lease processes. While almost all respondents of all segments recognizing that sharing information can contribute to ease of use, few female respondents of the segment of bus users do not think so. They belong to the age group of 20-29 and 30-39. However, they cannot describe the perceived risk of personal information, which indicates that they may lack relevant knowledge and experience of information privacy.
Trust. Moreover, the results from the theme of Trust of Service Provider to handle personal information suggested that the segments of Tesla owners and shared car users have relatively low levels of trust. In contrast, more than half of bus users express they believe the bus operator can manage users' personal information well. The reason for the trust is diverse. For example, one mentioned company in Norway is trustworthy since they have to follow the laws (GDPR). In contrast, the other mentioned big companies like Tesla supposed have the resource to manage that well.

While the level of trust seemed to be the general high of most respondents in the bus user segment, is observable a gradual reduction of trust and the increase of respondents' age. More specifically, the level of trust is highest among the age groups 20-29, then moderately reduced among 30-39. In the age group 40-49 and above, the level of trust appears almost none. Besides, the male respondents of the age groups 50-59 emphasize that they do not trust that they can handle users' information well. These respondents discussed examples of risks such as data breaching, unclear purpose of data usage, aggregate information.

Location Information. It was apparent from the results for the theme of Location information that the majority of respondents had a very high level of privacy concerns. However, there are two opposite opinions of the shared car user segment; it was also apparent that these two respondents have less concern about information privacy. In general, the location information raises the highest level of privacy concerns among all themes. For example, one respondent who belonged to the age group 30-39 mention it could be dangerous to reveal an individual's location information. However, he points out that a public authority can mitigate privacy concerns by securing this information. For example, a respondent who belonged to the 20-29 age group explained that she could not be bothered with evaluating data gatherings because of the time and effort involved. However, some consumers expressed that they relied on the law to protect their data. Another respondent who belonged to this age group did not mind sharing personal data through a company website, but only if it did not leave the website. Additionally, a respondent who belonged to the 20-29 age group was also unclear about his privacy concerns, and as such, he remained neutral on privacy concerns. The participants who belonged to the age groups 20-29 and 30-39 reflect higher personal interests than privacy concerns.

Intention to Use. Finally, for the theme Intention to Use, most respondents who belonged to the group segment of Tesla and bus users express their intention to keep using the service they currently engaged in. Only one respondent belonged to a shared car's group segment, meaning he will not use it again. However, he explained that he usually cycles to work. He only uses a shared car when he needed to go home quickly when there was a special occasion.

Further, when the researchers asked respondents about a set of privacy concerns, the respondent's intention to continue using smart mobility services was notably reduced. The decrease of the intention to use appears explicitly among the higher age groups 40-49, 50.59, 60-69, lower at age group 20-29 and 30-39. However, several respondents belong to the age groups 20-29, acknowledging that they had no other choice because they did not have a car.6.2 Findings from Questionnaire

The primary data collection in this study took place by the quantitative method, namely an online survey. The interview findings have developed a questionnaire to collect quantitative data, which can increase the understanding of the qualitative findings statistically. All measurements are in 7 likers-scale in order to maintain consistency with prior studies. It begins with the achieved sample.

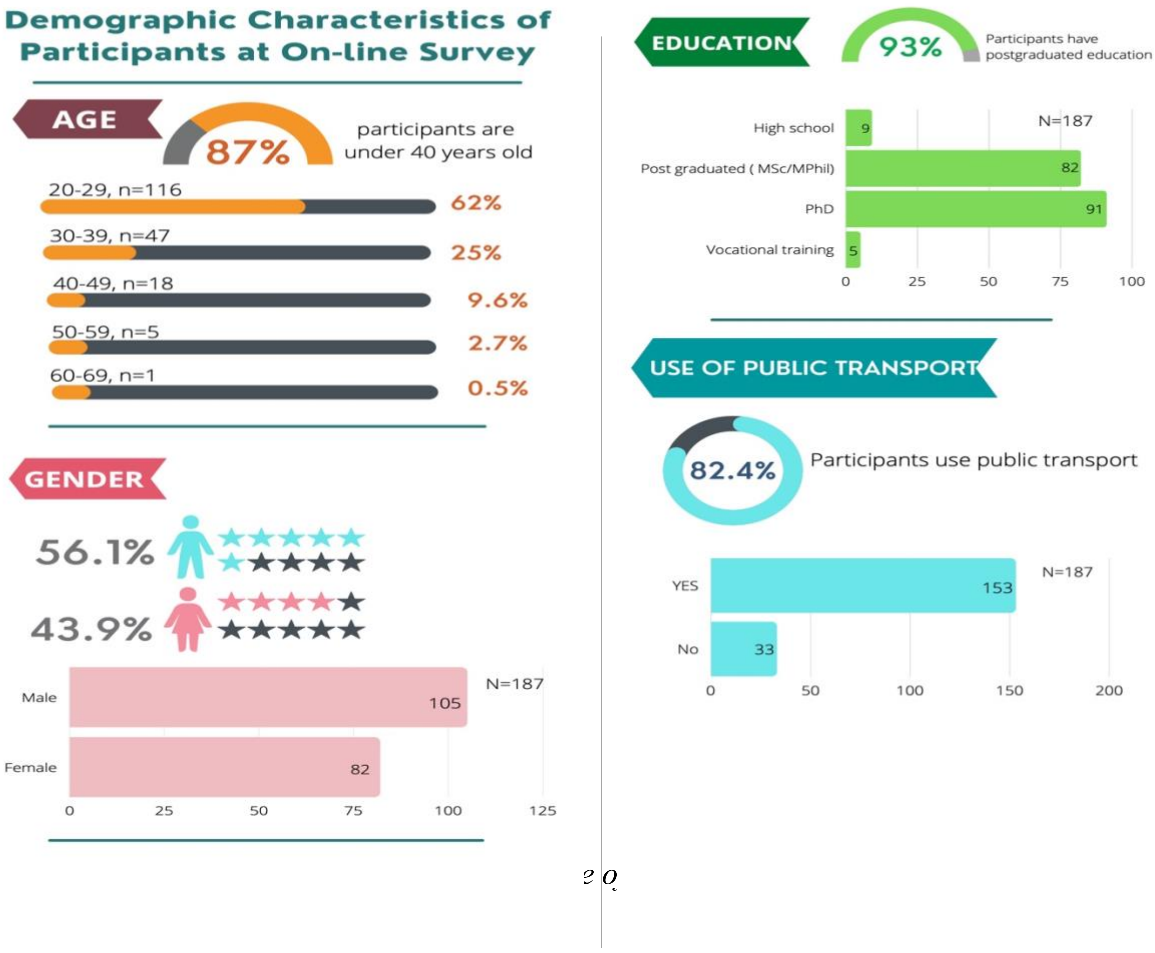
6.2.1. Achieved Sample

The online survey was conducted from September to December 2020. The administration of the master program regional and city planning, energy, environment and society and the energy resource management sent out email to academics (i.e., master and Ph.D.) who are involved in these programs in the University of Stavanger. The achieved sample consisted of 220 responses; 33 were manually excluded based on the great extent of uncompleted questionnaires. A total of 187 usable responses were included in the analyses. The gender distribution reveals that 43.9 % of respondents were female, 56.1% were male. Respondents ranged in age from 20 to 69 years, and most participants are between the ages of 20-39. The educational level of the participants ranged from holding a high school diploma (4.8%), master-degree (43.9), Ph.D. degree (48.7%), and vocational training (2.7%). Table 6.9 lists demographic information regarding the 187 responses used in the analysis. Among these responses, 153 participants indicate that they use public transport for the daily commute. According to the demographic characteristics of participants, the result may shed a light to young city dwellers.

Table 6.10 present their percentage use of public transport in light of their total transport. Further, this question was followed by a multiple question of whether they were also use other forms of transport and the percentage related to chosen forms of transport mode (Table 6.11). Table 12 present the difference of participants' intention to use smart mobility before and after considered privacy concerns. Table 6.9- 6.13 presents information on their use of transport in general.

The rest of the questionnaire are mainly focus on measure the variables in the proposed measure model, they are independent variables-perceived ease of use (PEU), trust in service provider (TU), Perceived privacy concerns (PC), secondary use of information (SU), location information (LI) and dependent variable-intention to use (IU). Table 6.16a-c present the descriptive result of these variables, and Appendix D present the descriptive results of items to measure them.

Table 6.9. *Demography of Online Survey Participants*



Note. [a] Reflects the number of participants answering “yes” to the questions of “ Use of Public transport “ in Table 6.9.

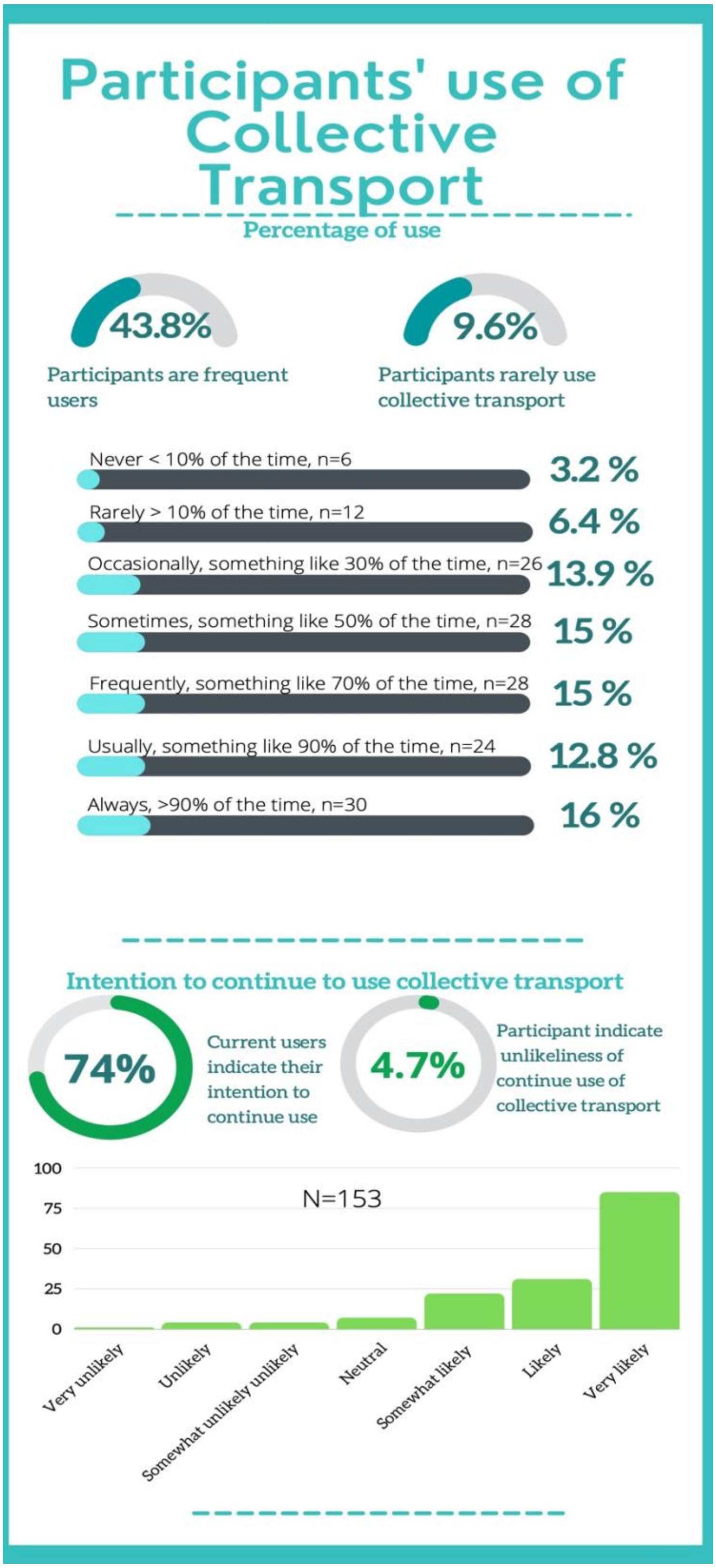


Table 6.11. *Percentage of Using Other Means of Transport*

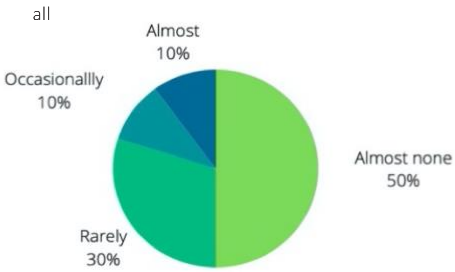
Participants' use of other means of transport

94%

Participants also use other alternatives means of transport besides public transport. In this graph, their frequency of use of these means will be present.

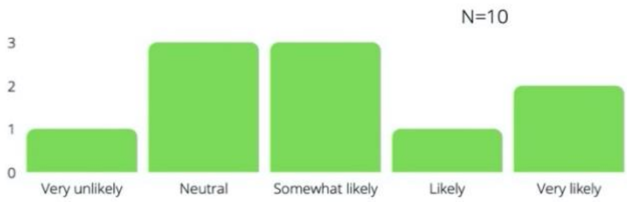
Car from car sharing company

Frequency of using shared car among participants who use car from car sharing provider



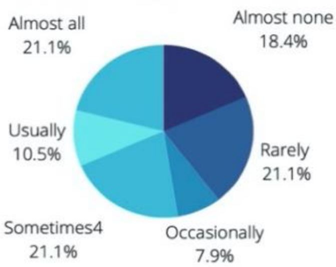
Frequency	n (%)
Almost none (< 10% of the times)	5 (50%)
Rarely (something like 10% of the times)	3 (30%)
Occasionally (something like 30% of the time)	1 (10%)
Almost all (> 90% of the times)	1 (10%)

Likeliness of continuous using shared car in the abovementioned percentage



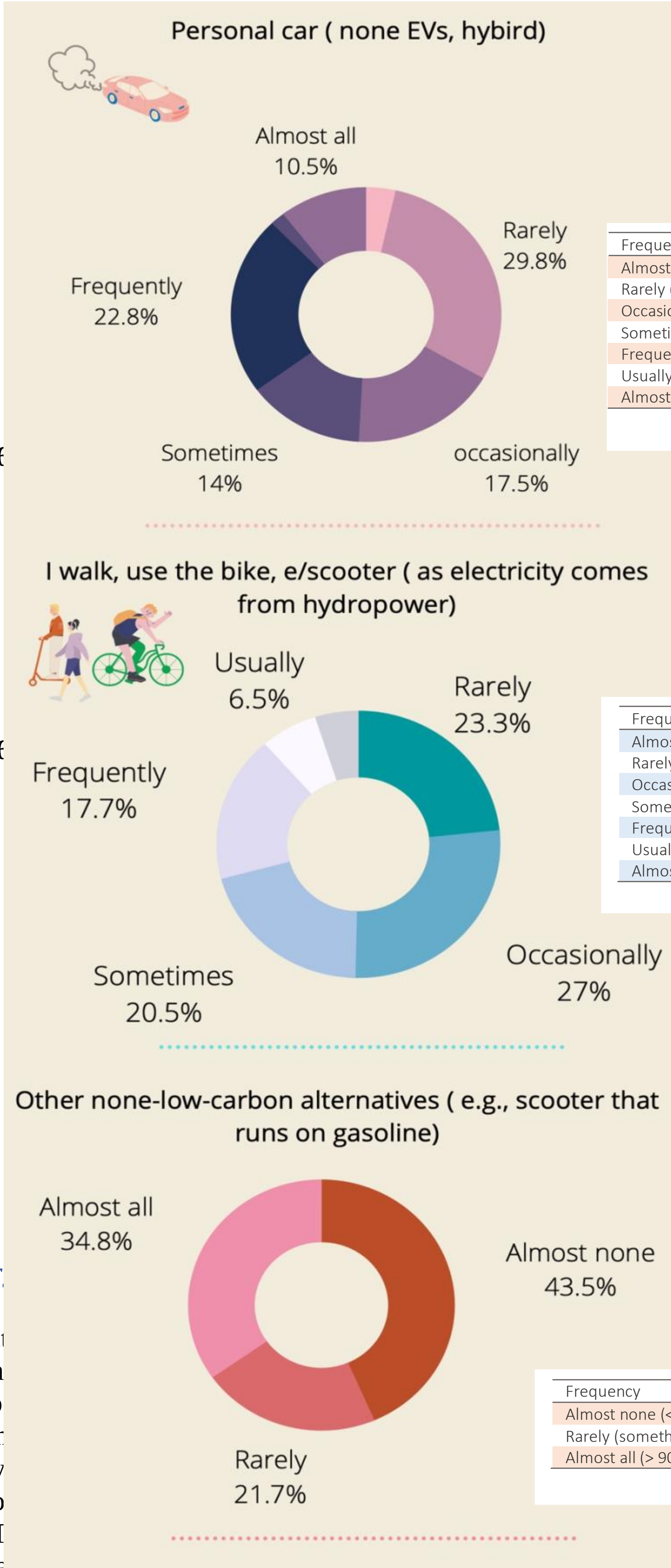
Personal car (EVs, hybird)

Frequency of using personal cars (EVs, hybird)



Frequency	n (%)
Almost none (< 10% of the times)	7 (18.4%)
Rarely (something like 10% of the times)	8 (21.1%)
Occasionally (something like 30% of the time)	3 (7.9%)
Sometimes (something like 50% of the time	7 (21.1%)
Usually something like 70% of the time)	4 (10.5%)
Almost all (> 90% of the times)	8 (21.1%)

Likeliness of using personal car (EVs, hybird) in abovementioned percentage



Frequency	n (%)
Almost none (< 10% of the times)	2 (1.1%)
Rarely (something like 10% of the times)	17 (29.8%)
Occasionally (something like 30% of the times)	10 (17.5%)
Sometimes (something like 50% of the times)	8 (14%)
Frequently	13 (22.8%)
Usually	4 (2.1%)
Almost all (> 90% of the times)	6 (10.5%)

Table 6 ... considered

Table 6

Frequency	n (%)
Almost none (< 10% of the times)	0 (0%)
Rarely (something like 10% of the times)	25 (23.4%)
Occasionally (something like 30% of the times)	29 (27%)
Sometimes (something like 50% of the times	22 (20.5%)
Frequently	19 (17.7%)
Usually	7 (6.5.%)
Almost all (> 90% of the times)	10 (9 %)

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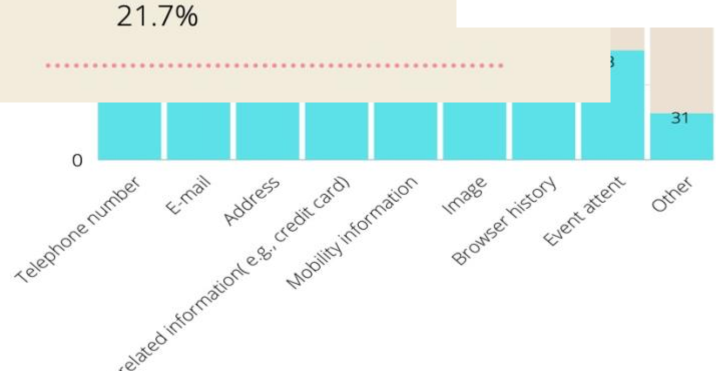
Frequency	n (%)
Almost none (< 10% of the times)	2 (34,8%)
Rarely (something like 10% of the times)	1 (21.7%)
Almost all (> 90% of the times)	3 (43.5 %)



Further, Barlett’s test of sphericity value was found significant ($p < 0.001$). Thereby, ensuring the appropriateness of factor analysis for this research work. Eventually, the number of factor analysis to be retained were decided on the basis of latent root criterion, i.e., variables having eigenvalues greater than 1. Additionally, items had to have a primary factor loading of 0.4 (Hunter & Gerbing, 1982; Tabachnick & Fiedell, 2013) which yields all factors. The most commonly used method, Varimax rotation procedure is used and results for all analysis are presents in Appendix E-G.

Principal Component Analysis under rotation method (Varimax with Kaiser Normalization) , rotation converged in 5 iterations. The five factors extracted together account for around 80% of total variance with all three data sets. The result of rotated component matrix is in Table 6.14, which shows 5 factors may be extracted:

Table 6.14. *Rotated Component Matrix*

	Component				
	1	2	3	4	5
Q. 22. The service provider must not use personal information for any other purposes unless it has been authorised by the person who provided the information.	0.921				
	0.921				
	0.901				
Q. 23. The service provider must not use the user's personal information for any other purposes at all.	0.709				
	0.924				
	0.907				
Q. 24. The service provider should not share personal information with other companies unless it has been authorised by the individual who provided the information.	0.923				
	0.727				
	0.764				
Q. 25. The service provider must not share personal information in the database with any other company.	0.704				
	0.742				
	0.757				
Q. 26. In general, it is risky to provide location information to a smart mobility provider.		0.997			
		0.980			
		0.977			
Q. 27. There is much uncertainty associated with giving location information to a service provider, as a user has no control over what the information is used for (e.g., business development, service mapping).		0.629			
		0.719			
		0.734			
Q. 28. There is a potential loss involved with providing location information (i.e., the likelihood of data leakage is high because of multiple use).		0.799			
		0.806			
		0.834			
Q. 19. There may be privacy risks involved in using smart mobility services.			0.888		
			0.879		
			0.881		
Q. 20. Accessing “smart mobility service” exposes you to privacy risks.			0.923		
			0.917		
			0.917		
Q. 21. Smart mobility involves a loss of privacy.			0.721		

	0.702		
	0.705		
Q. 1. Using such apps/interface does not takes a lot of effort.		0.912	
		0.903	
		0.903	
Q. 2. These apps/interfaces are easy to use.		0.955	
		0.963	
		0.952	
Q. 3. The instructions to use such apps/interfaces are, in general clear.		0.817	
		0.819	
		0.827	
Q. 4. Tesla is trust-worthy in handling its consumers information.			0.924
Q. 5. I trust that Tesla takes measures to protect the information provided by consumers.			0.963
Q. 6. I trust that Tesla devotes time and effort to prevent unauthorised access to personal information.			0.746
Q. 9. Hyre is trustworthy in handling its consumers' information.			0.807
Q. 10. I trust that Hyre take measures to protect the information provided by users.			0.906
Q. 11. I trust that Hyre devotes time and effort to prevent unauthorised access to personal information.			0.922
Q. 14. Kolumbus is trustworthy in handling its customers' information.			0.850
Q. 15. I trust that Kolumbus takes measures to protect the information provided by users.			0.895
Q.16. I trust that Kolumbus devotes time and effort to prevent unauthorised access to personal information.			0.851

Note. The value from Dataset1is highlighted in red, dataset 2 in blue , dataset 3 in green.

Factor 1 Secondary Use of Personal Information measure user's privacy concern related to use and sharing user's personal information. This is converged by two factor- perceived risk of use of personal information and share of personal information. Looking at Table 6.14, we can observe that a strong negative attitude against use or share personal information without authorised by the person who provided the information. Most respondent don't like this idea at first place. The items used to measure have loading of 0.921. 0.709, 0.923, 0.704 (data set 1) , 0.921, 0.924, 0.727, 0.742 (data set 2) , 0.921, 0.924, 0.727, 0.742 (data set 3). This suggest that factor one is a combination of these 4 items explained 33.249 %, 33.483% and 34.165% of variance in the 3 data sets with the Eigenvalue of 5.320, 5.357, 5. 466 respectively.

Factor 2 Location Information measure user's perceived risk related to their location information. Looking at Table 6.14, we can observe that high risk perception of location information amongst smart mobility users. The items used to measure have loading of 0.997, 0.629, 0.799 (data set 1) , 0.980, 0.719, 0.806 (data set 2) , 0.977, 0.734, 0.834 (data set 3). This suggest that factor one is a combination of these 3 items explained 21.285 %, 21.266% and 19.850% of variance in the 3 data sets with the Eigenvalue of 3.406, 3.387, 3.176 respectively.

Factor 3 Privacy Concern measure the privacy concerns in smart mobility in general. Looking at Table 6.14, we can observe there is certain level of privacy concerns amongst smart mobility users. The items used to measure have loading of 0.888, 0.923, 0.721 (data set 1) , 0.879, 0.917, 0.702 (data set 2) , 0.881, 0.917, 0.705 (data set 3). This suggest that factor one is a combination of these 3 items explained 10.791 %, 10.596% and 11% of variance in the 3 data sets with the Eigenvalue of 1.727, 1.695, 1.336 respectively.

Factor 4 Perceived Ease of Use measure the level of effortless in using smart mobility. Looking at Table 6.14, the items used to measure have loading of 0.912, 0.955, 0.817 (data set 1) , 0.903, 0.963, 0.819 (data set 2) , 0.903, 0.952, 0.827 (data set 3). This suggest that factor one is a combination of these 3 items explained 8.116 %, 8.359% and 8.349 % of variance in the 3 data sets with the Eigenvalue of 1.299, 1.337, 1.337 respectively.

Factor 5 Trust measure the level of confidenc in different smart mobility service providers. Looking at Table 6.14, the items used to measure the trust in electric car company like Tesla have loading of 0.924, 0.963, 0.746 (data set 1) , Shared car company like Hyre have loading 0.807, 0.906, 0.922 (data set 2) , while collective operator like kolumbus have loading 0.850, 0.895, 0.851 (data set 3). This suggest that factor one is a combination of these 3 items explained 6.686%, 6.645% and 6.494 % of variance in the 3 data sets with the Eigenvalue of 1.070, 1.063, 1.039 respectively.

Although the Pattern matrix indicated that some items had cross-loading with other components (see Appendix D and E). These loadings are notably smaller than the load on the items and its factors, which can be ignored. Therefore, all items are kept for further analysis. For "Use of information" and "Share of information," the Component matrix results showed that all items are positively related to each other. The decision is then made to combine these two scales and names the variable as " Secondary Use of Information" for further analysis.

In order to demonstrate converge and discriminant validity of the measurement instrument in a more rigorous way, Fornell & Lacker (1981) propose to calculate Composite Reliability (CR) and Average Variance Extracted (AVE). The former measures the internal consistency in scale items, while the latter assesses constructs' convergent validity about the distinction between them according to the formula. Though there is a statement about the quality of instruments that can be solely made relying on CR evaluation (Fornell & Larcker, 1981), this study presents both values in Table 6.15a-c.

CR has been calculated according to the formula:

$$CR = \frac{\left(\sum_{i=1}^{p} \lambda_i\right)^2}{\left(\sum_{i=1}^{p} \lambda_i\right)^2 + \sum_{i=1}^{p} \sigma_{ei}^2}$$

Where p is the number of items, λ_i is the factor loading on item *i*th indicator, and σ_{ei}^2 the variance of the error term for the *i*th indicator (Fornell & Larcker, 1981).

Composite reliability for study construct has ranged from exceeding recommended value above 0.60 suggest by Bagozzi & Yi (2012), indicating a good internal consistency of multiple indicators for each scale.

Further, the AVE has been calculated according to the formula below. Which is proposed by Fornell & Larcker (1981):

$$AVE = \frac{\sum_{i=1}^{p} \lambda_i^2}{\sum_{i=1}^{p} \lambda_i^2 + \sum_{i=1}^{p} VAR(ei)}$$

Here, *Var (ei)* the variance of the error for the *i*th indicator. As shown in Table 6.15, all constructs reached the minimum criteria of 0.5 suggested by Fornell & Larcker (1981). The values of CR and AVE are presents in Table 6.15. where lists the total item correlations, AVEs, CRs, and alpha values. All loadings are larger than 0.7, and t-values show that all loadings are significant at 0.001. All AVEs, CRs, and Alpha values exceed 0.5, 0.6, and 0.7, respectively. Thus, it could be stated that reliability and convergent validity on item level for all scales was reached (Nunnally, 1978; Bagozzi & Yi, 2012).

The discriminant validity can be satisfied if the correlation between two particular constructs should be lower than the AVE's square root degree (Reisinger & Mavondo, 2007). Table 6.16a-c demonstrates the discriminant validity. Though there is argument about AVE and CR are old standards that are not fully applicable to the SEM model, the model fit indices should also be evaluators (Bagozzi & Yi, 2012). As shown in Table 6.15-17, The current study reaches the recommended validity tests standards.

Table 6.15

Convergent Validity and Internal Reliability

Construct	Items	Internal reliability		Converge Validity		
		Cronbach's α (C- α)	Total-item correlation	Factor loading	Composite reliability (CR)	Average variance extracted (AVE for convergent)
Perceived ease of use	PEU1	0.886	0.768	0.839	0.804	0.727
	PEU2		0.831	0.922		
	PEU3		0.736	0.791		
Trust	TSEV1	0.902	0.733	0.899	0.828	0.697
	TSEV2		0.775	0.931		
	TSEV3		0.695	0.646		
	TSSC1	0.985	0.747	0.569	0.840	0.712
	TSSC2		0.825	0.940		
	TSSC3		0.806	0.964		
	TSB1	0.992	0.581	0.666	0.785	0.651
	TSB2		0.622	0.867		
	TSB3		0.692	0.872		
Perceived privacy concerns	PC1	0.885	0.761	0.834	0.852	0.702
	PC2		0.850	0.941		
	PC3		0.736	0.779		
Secondary use of info	SU1	0.873	0.698	0.737	0.814	0.634
	SU2		0.714	0.810		
	SU3		0.747	0.780		
	SU4		0.760	0.854		
Location information	LB1	0.888	0.735	0.884	0.837	0.708
	LB2		0.796	0.886		
	LB3		0.827	0.747		
Intention to use	IU1	0.946	0.860	0.892	0.948	0.926
	IU2		0.939	0.992		
	IU3		0.861	0.894		

Table 6.16a. *Descriptive Statistics and Discriminant Validity for Data Set 1 (EV)*

		MEAN	SD	1	2	3	4	5	6
1	Secondary Use	6.1	1.19	*0.796*					
2	Ease of use	5.49	1.12	0.614	*0.841*				
3	Location info	5.07	1.34	0.432	0.594	*0.853*			
4	Privacy concern	5.29	1.12	0.087	-0.131	-0.203	*0.835*		
5	Trust (EV)	4.14	0.02	0.105	-0.091	-0.046	0.27	*0.852*	
6	Intention to use	5.05	0.46	-0.045	-0.31	-0.13	0.041	0.305	*0.962*

Note. The square root of AVE (shown as italic at diagonal) and factor correlation coefficients.
*Correlation is significant at the 0.01 level (2-tailed).
*Correlation Matrix, and Square Root of Average Variance Extracted (AVE) of Principal Constructs demonstrated discriminant validity

Table 6.16b. *Descriptive Statistics, Correlation Matrix, and Square Root of Average Variance Extracted (AVE) of Principal Constructs for Data Set 2 (shared car)*

		MEAN	SD	1	2	3	4	5	6
1	Secondary Use	6.1	1.19	*0.796*					
2	Ease of use	5.49	1.12	0.615	*0.85*				
3	Location info	5.07	1.34	0.432	0.596	*0.857*			
4	Privacy concern	5.29	1.12	0.073	-0.147	-0.232	*0.843*		
5	Trust (share-car)	4.17	0.3	0.106	-0.088	-0.044	0.302	*0.852*	
6	Intention to use	5.05	0.46	-0.039	-0.302	-0.129	0.633	0.296	*0.93*

Note. The square root of AVE (shown as italic at diagonal) and factor correlation coefficients.
*Correlation is significant at the 0.01 level (2-tailed).
*Correlation Matrix, and Square Root of Average Variance Extracted (AVE) of Principal Constructs demonstrated discriminant validity

Table 6.16c. *Descriptive Statistics, Correlation Matrix, and Square Root of Average Variance Extracted (AVE) of Principal Constructs for Data Set 3 (Bus)*

		MEAN	SD	1	2	3	4	5	6
1	Secondary Use	6.1	1.19	*0.796*					
2	Ease of Use	5.49	1.12	0.615	*0.841*				
3	Location Info	5.07	1.34	0.433	0.596	*0.853*			
4	Privacy Concern	5.29	1.12	-0.036	-0.267	-0.232	*0.807*		
5	Trust (bus)	5.29	1.12	0.104	-0.09	-0.044	0.247	*0.852*	
6	Intention to Use	5.05	0.46	-0.046	-0.308	-0.129	0.546	0.306	*0.927*

Note. The square root of AVE (shown as italic at diagonal) and factor correlation coefficients.
*Correlation is significant at the 0.01 level (2-tailed).
*Correlation Matrix, and Square Root of Average Variance Extracted (AVE) of Principal Constructs demonstrated discriminant validity

Structural Equations Modelling(SEM)

The researcher used structural equation modeling to examine the proposed model and research hypotheses in Chapter 3. The SEM was performed using IBM Analysis of Moment Structures (AMOS) to complete this analysis, which allow examining the proposed model fit, explained variance and the research hypotheses. Figure 6.8 showed the developed model presentation in IBM AMOS.

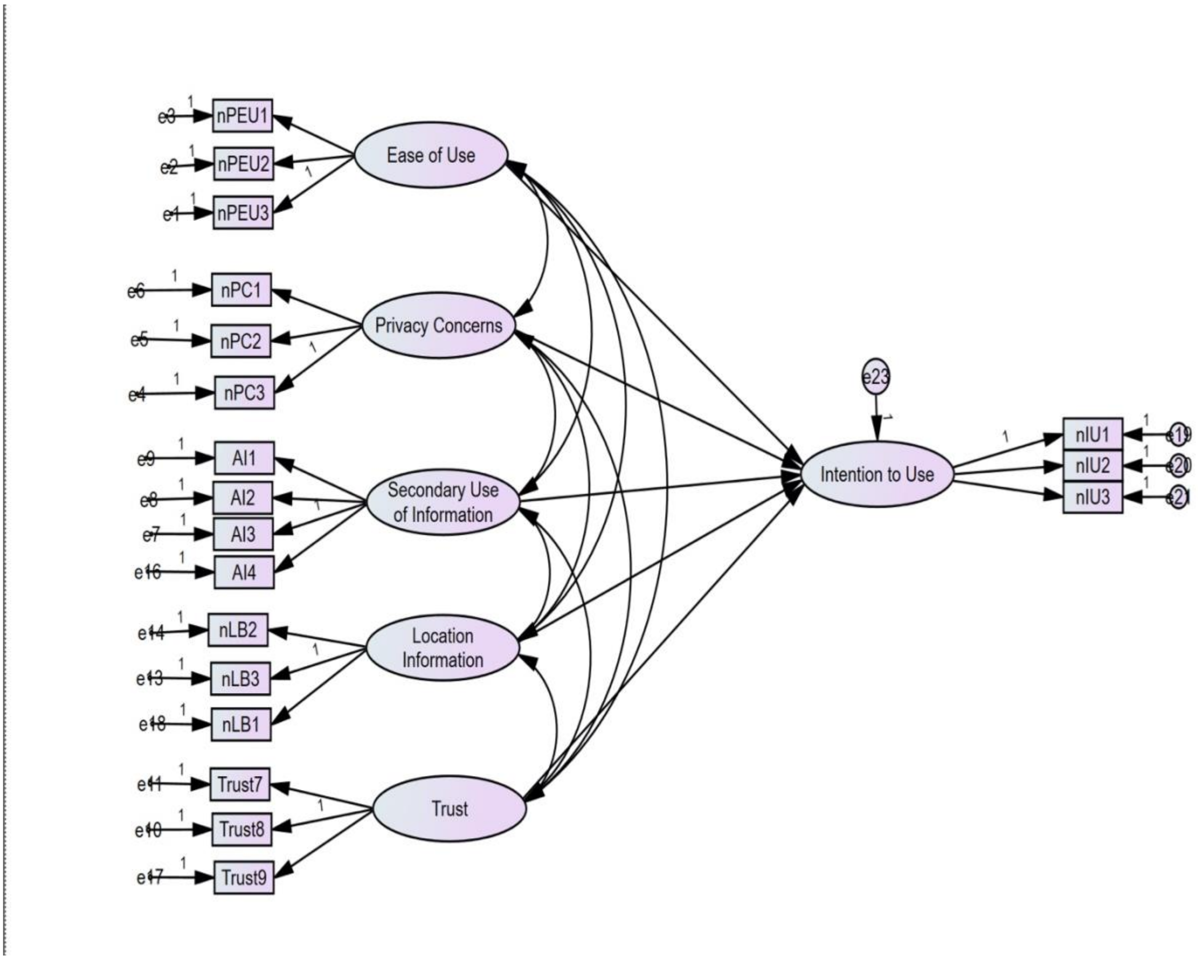


Figure 6.8 The research model representation in IBM AMOS.

Fit Indices

The quality of the model takes into consideration the different fit indices : Good of Fit Index (GFI), Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Residual (RMR/SRMR), the ratio between x^2 and degree of freedom (x^2/df); Comparative Fit Index (CFI) ; (Non) Normal Fit Index (NFI); Tucker Lewis index (TLI). The fit indices that generated by AMOS thresholds are : x^2/df <3.0, RMR, RMSEA < 0.08, GFI, AGFI, CFI, NFI, TLI > 0.9. Moreover, the results of proposed model goodness of fit over these measures are present in Table 6.17. While x^2/df , CFI, and TLI satisfied the suggested standard, other values are tolerable but not good fit.

Table 6.17.

Fit Indices of the Measurement Models (AMOS)

Fit index	x^2/df	CFI	NFI	RMR	AGFI	GFI	TLI	RMSEA
Recommended value	< 3	>0.9	>0.9	<0.08	>0.8	>0.9	>0.9	<0.08
Measurement model (EV)	2.576	0.924	0.892	0.092	0.785	0.852	0.911	0.077
Structure model (EV)	2.721	0.971	0.958	0.051	0.901	0.986	0.855	0.096
Measurement model (Shared car user)	2.697	0.922	0.883	0.097	0.776	0.845	0.9	0.096
Structure model (Shared car user)	2.603	0.978	0.966	0.049	0.905	0.986	0.832	0.093
Measurement model (bus user)	2.545	0.923	0.881	0.095	0.785	0.851	0.902	0.091
Structure model (bus user)	2.647	0.975	0.963	0.049	0.904	0.986	0.877	0.094

Result of the hypothesis analysis

In search of answering for research questions 2, SEM analysis is used to revealed significant linkages between variables. The structure model is tested by three set of data. As the three data set ai to test trust in different service provider (a- electric car , b-shared-car company, c-collective transport), the hypothesis test result from each set of data is marked with a, b, c.

The statistical analyses showed amongst the five proposed hypotheses, two hypotheses (H4a-c and H5a-c) were constantly accepted while the other three were rejected (H1-3) (See Table 6.18a-c). The most surprising finding is that the perceived privacy concerns doesn't present direct effect on intention to use smart mobility. Two variables, trust (H5a, β= 0.393, CR = 6.093, $p < 0.001$; H5b, β=0.566, $p < 0.001$; H5c, β=0.475, $p < 0.001$), and perceived risk of location information (H4a, β= - 0.276, CR = -4.748, $p < 0.001$; H4b, β= –0.221, CR= -4.217, $p < 0.001$; H4c, β=0.475, CR= -3.804, $p < 0.001$) , were shown direct effect on the intention to use smart mobility services. While the trust has shown as the most influential factor in determining the user's intention to use smart mobility, perceived risk of location information present a moderate negative implication user's intention. Although independent variable privacy concerns do not show direct effect on dependent variable intention to use, it appears indirect effect on intention to use (Table 6.8a_1, 6.8b_1, 6.8c_1).

The p-values of H1-3 are greater than the significance level; hence these hypotheses are constantly rejected by three data sets in the current study. However, it is worth considering that one cannot prove these correlations do not exist by these statistic results. A lack of statistic evidence only means that the researcher has not proven these correlations exist with current data. It does not say something about these relationships do not exist. Many prior studies have provided empirical evidence of the existence of these correlations (e.g., Culnan, 1993; Dabholkar & Bagozzi , 2002; Dabholkar, 2002; Dinev & Hart, 2006; Venkatesh, 1999) The other alternative to entails their existence is the correlation from path analysis. A correlation table with means and standard deviations is shown in Table 6.19. Although these correlations do not say anything about causality, it can at least offer a glance of how these variables may interact with each other. The interpretation of each variable is described below:

Perceived Ease of Use (PEU): Maybe not too surprising, given the sample of highly educated respondents. Using smart mobility is likely to fall into a certain routine of using mobility ervices, therefore they do not feel too much difference. However, this variable is often included into TAM model as to study service that involve using ICT and personal data (e.g., smart home, smart tourism, smart health). The idea is that the purpose of services including these technologies is aiming to make the use of these service easier. Regarding smart mobility, these technologies are used aiming to provide personalize service, which aim to make user feel ease to use the service. Hence, even the statistic result does not show its relevance in this study, it is still relevant to smart mobility.
Privacy Concerns (PC) : It is interesting that the privacy concerns can be observed in qualitative data but does not show its correlation on intention to use in statistic test. It may relate to its a rather broad concept, which is not related to smart mobility as clear as the following two concepts (i.e., secondary use and location information). Therefore, it might also be a question of how respondents referred to this concept and its realization in the questionnaire.
Secondary use (SU): However, what I mention above about “privacy concerns” not being specific enough, obviously does not mean that “secondary use of information” is significant. This concept contains two groups of variables, i.e., about social norms “the service provider should not use user’s personal data for the purpose other than the original one” and about knowledge “service provider cannot use information“. With regard to the knowledge dimension, qualitative data provide clues refer to respondents being knowledgeable of the GDPR and trusting that it is implemented, so their response to these statements (mean of 6.1) makes little difference for their behavioral intention. Apparently, environmental and behavioral uncertainty do not as much exist.
Location Information (LI) : This research hence shows the significance of location information and its proper processing in the context of mobility use. However, location information is important for smart mobility use independent of mobility spatial context, because the linear relationship is about the same (-0.220, -0.221, -0.276).
Trust (TU): data are aligned in a linear relationship to different degrees, so the linear relationship is the strongest for shared cars.

Table 6. 18 a

Path Coefficients and Their Significance with Data Set2 (EV)

Hypothesis	Path	SE	CR	Coefficient	Support
H1a	PEU →IU	0.068	2.888	0.179	NO

H2a	PR →IU	0.072	2.468	0.153	NO
H3a	SU →IU	0.068	0.126	-0.009	NO
H4a	LI→ IU	0.058	-4.748	-0.276***	YES
H5a	TU→ IU	0.065	6.093	0.393***	YES

Note. Significant of Correlations *** $p<0.001$

Table 6. 18 a1

Indirect Effect

	Privacy Concerns	Trust bus	Location Information
Trust (bus)	0	0	0
Intention to Use	0.084	0	0

Table 6.18b

Path Coefficients and Their Significance with Data Set2 (trust shared car)

Hypothesis	Path	SE	CR	Coefficient	Support

H1b	PEU →IU	0.061	2.475	0.152	NO
H2b	PR →IU	0.065	3.105	0.201	NO
H3b	SU →IU	0.062	-0.461	-0.028	NO
H4b	LI→ IU	0.052	-4.217	-0.221***	YES
H5b	TU→ IU	0.058	9.842	0.566***	YES

Note. Significant of Correlations *** p<0.001

Table 6. 18 b1

Indirect Effect

	Privacy Concerns	Trust bus	Location Information
Trust (bus)	0	0	0
Intention to Use	0.136	0	0

Table 6.18c

Path Coefficients and Their Significance with Data Set3 (trust bus)

Hypothesis	Path	SE	CR	Coefficient	Support
H1c	PEU →IU	0.065	3.116	0.202	NO
H2c	PR →IU	0.068	3.122	0.212	NO
H3c	SU →IU	0.065	-0.275	-0.018	NO

H4c	LI→ IU	0.055	-3.804	-0.220***	YES
H5c	TU→ IU	0.058	8.189	0.475***	YES

Note. Significant of Correlations *** p<0.001

Table 6. 18c1
Indirect Effect

	Privacy Concerns	Trust bus	Location Information
Trust (bus)	0	0	0
Intention to Use	0.084	0	0

Table 6.19

Correlations for CFA and SEM Analyses

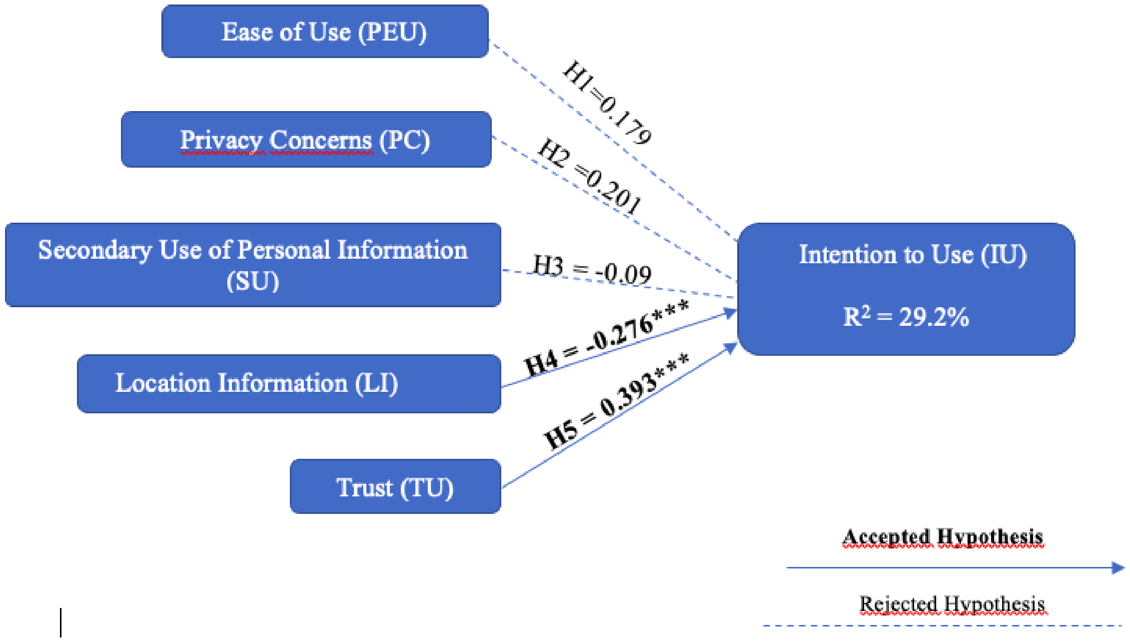
Observed variables		1	2	3	4	5
1	Privacy concerns (PC)	1	-	-	-	-
2	Secondary use of information (SU)	0.383	1	-	-	-
3	Location information (LI)	0.477	0.358	1	-	-
4	Ease of Use (PEU)	-0.010	0.167	-0.045	1	-
5	Trust (TU)	-0.190	0.129	-0.192	0.3	1

Note. This table is essentially the same for the structural equation modeling (SEM). Also, the variables were standardized to have a mean of 0 and a standard deviation of 1. CFA = 203; *M* = 0; *SD* = 1.

Explanation of Variance and Significance

The coefficient of determination (R^2), which represent s the amount of explained variance in each endogenous latent variable. The R^2 values takes into account the fit of each regression equation in the inner model. Since the structure model are tested with three data sets, with each data set, there is different percent of the variance in Intention to Use explained by the dependent variables shown below in Figure 6.9 a-c.

The figure 6.9a-c present the result of the hypothesis test with the data set a-c.



The numbers represent the standardized coefficient

Hypotheses in Bold were supported

Figure 6.9a Summary of important measure on structural model of data set 1(***p<0.001)

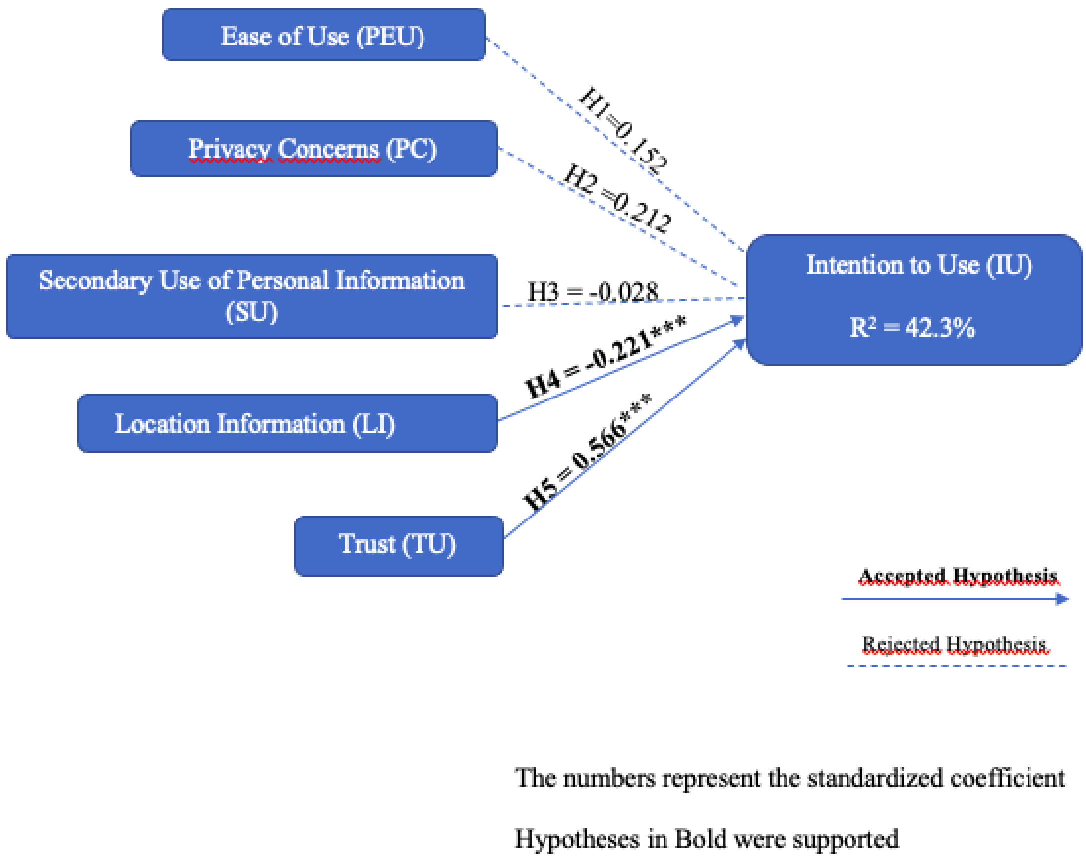


Figure 6.9b Summary of important measure on structural model of data set 2 (***$p<0.001$)

Hypotheses in Bold were supported

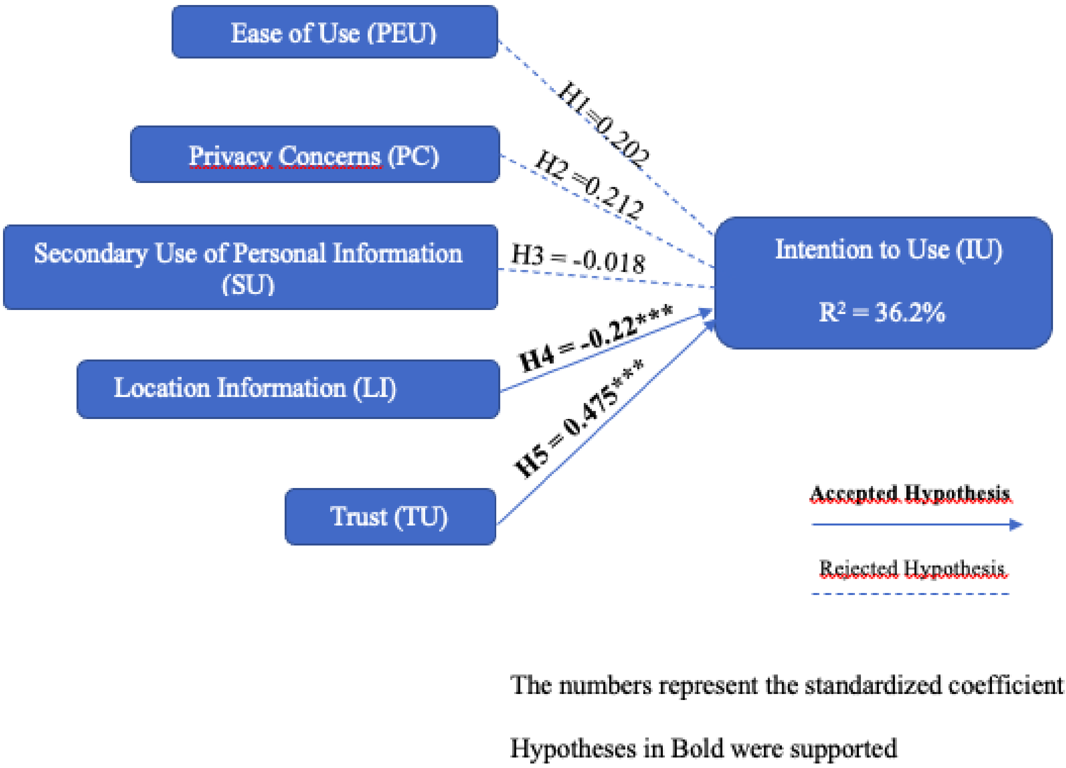


Figure 6.9c Summary of important measure on structural model of data set 3(***p<0.001)

The SEM provided the statistical evidence at the .001 level to indicate significant positive correlation between (a) trust and intention to use, and negative correlation between (b) perceive risk of location information and intention to use. The beta value for TU→IU is positive indicating that for every 1-unit increase in the independent variable, the dependent variable will increase by the beta coefficient value. In contrary, the beta value for LI →IU is negative indicating that for every 1 unit decrease in the dependent variable, the dependent variable will increase by the beta coefficient value. The proportion of the variance explained in Intention to Use was R^2 = 29.2%, 42.3%, 36.2% in each data set respectively.

At first glance, the R^2 value may seem low, however, given this is the first experiment of this specific type, it is not known whether this value possesses better explanatory models that other similar ones.

The Moderating Effect of spatial context

As mentioned early, the researcher assumed the spatial context of the smart mobility service might relate to privacy concerns. Two groups can be identified: car users (travel in a private space) and collective transport users (travel without distinct themselves from the public). The difference in chi-square $\Delta\, x2$ will be used to examine if there a significant difference between these two groups of users on the measurement and structural model level; Chi-square is a "statistical measure of difference used to compare and estimated covariance matrices (Hair et al., 2010)." The chi-square x2 will be calculated for the measurement model via the confirmatory factor analysis and the structural model via structural equation modeling. The chi-square difference can be computed by calculating the chi-square x2 twice, first without weight constraints and second with weight constraints (Byrne, 2010). If the difference in chi-square $\Delta\, x2$ is significant, then the model is not equivalent over spatial contexts.

The measurement model test: The chi-square for the measurement model was calculated before and after applied the weight constrains to the measure variables, the results showed that there is no significant different (chi-square $\Delta\, x^2 =$ 14.4 and $\Delta\, df$ = 16), which means perception of car user and bus users towards the measured variables is the same (see Table. 6.20). The difference in chi-square $\Delta\, x^2$ result significance can be decided using Chi-Square Distribution Table which is commonly used in statistics.

Table 6.20 *The chi-square Δ x^2 for the measurement model*

Measurement Model	x^2	df
Unconstrained Model	227.1	73
Constrained Model	241.5	89
The difference in $\Delta\, x^2$	14.4	16

The structural model test: in order to conduct multiple group test in AMOS, the hypothesis must be made: the negative effect of spatial context on intention to use is stronger for car users than that for bus users. The chi-square for the structural model was calculated before and after applied the weight constrains to this hypothesis (See Table 6.21), the results showed that there is no significant different (chi-square $\Delta\, x^2$ = 21,5 and $\Delta\, df$ = 52) between car user and bus users towards Intention to use. To conclude, the statistical result cannot prove evidence to indicate the relationship between the spatial context of the service and intention to use smart mobility.

Table 6.21 *The chi-square Δ x^2 for the structural model*

Measurement Model	x^2	df
Unconstrained Model	521.4	89
Constrained Model	542.9	141
The difference in $\Delta\, x^2$	21.5	52

Linear Regression

In addition, the researcher conducted additional statistical analysis using the linear regression in the parametric testing tool, SPSS to further investigate relationships between demographic independent variables of Gender, Age, Civil Status and Education Attainment. The researcher did not discover any significant relationships between these variables and Intention to Use (Table 6.22).

Table 6.22
Regression results excluding cases list-wise for missing values (SPSS)

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
1. (Constant)	-286	.399		-717	.475
Gender	.162	.112	.145	1.441	.152
Age	.008	.004	.184	1.925	.057
Civil State	.001	.001	.070	.717	.475
Education	-.003	.018	-0.19	-.190	.850

Summary

The data collected supported only two of the proposed hypotheses, one of which (LB→ IU) had not been tested in this way before this research. The researcher was unable to conclude why more of the hypotheses were not supported by the data but has made suggestion in Chapter 8 regarding this.

7 Discussion

This chapter combines the findings from the interviews, the quantitative analysis, and the theories from the literature review. The discussion aims to analyze the findings further and answer the research questions. In addition, a conceptual model suggested for the smart mobility service interface design will be present in this chapter. This model is aimed to strengthen the user's sense of trust in the smart mobility service provider, which will be explained in detail. Finally, policy suggestion regarding location information is presented in the end of this chapter.

7.1 Over all discussion

The present study explores the influence of information privacy concerns on user's intention to use smart mobility. A modified TAM model is used in explaining such purpose and the role of trust, secondary use of information, and perceived risk of location information while removed perceived usefulness and attitude from the original TAM model.

Before testing the hypotheses, the constructs of the measurement model were subjected to a two-stage validation process. During the first stage, the reliability of the instrument was accessed with Cronbach's alpha values for each scale, which were on a sufficient level. Moreover, component factor analysis closely examined construct validity. It results in the evidence of convergent and discriminant validity, which presents the validity of the developed instrument.

Both CFA and SEM were employed to test the structural connection in determining which factors has direct implication on user's intention to use the smart mobility. The structural results indicate that users' trust in service providers is the most significant predictor of their intention to use. Surprisingly, the perceived privacy concern does not show significant statistic correlation to intention to use in the current studies. This result highlights that trust is one of the core issues in determining smart mobility's successful diffusion. Moreover, because smart mobility is associated with exchanging service with user's information, the means and strategy to enhance trust are considered necessary in market and policy success. For example, building trust through the interface of the website or mobile app.

The current study did not prove privacy concerns directly affect users' intention to use smart mobility statistically. It is worth noting that the hypothesis assesses the evidence in a specific sample. If the test fails to detect an effect, it is not proof that the effect does not exist. It just means the sample contained an insufficient amount of evidence to conclude that it exists. Further, the statistical result has shown privacy concerns influence user's intention to use indirectly. This together with the interview results, which provide qualitative evidence of the existence of privacy concerns among smart mobility users. In this sense, the qualitative results from this study add empirical evidence of the existence of privacy theories from smart mobility users. Perhaps one can say the effect of privacy concerns might exist in the overall population but not in the particular sample in this study, or privacy concerns has indirect implication on user's intention to use smart mobility in Norway. Since this study does not aim to produce a generalizable result, we can stop here.

Regarding to the different result from quantitative and qualitative analysis of this study, the mixed-method approach illustrates its power to offer rich evidence from different perspectives. A lack of statistic evidence only means that the researcher has not proven enough evidence quantitatively, but not qualitatively. This is particular useful for this type of research where a valid instrument for collection quantitative data is expected, not a generalizable statistic result. In the following sections, the qualitative and quantitative findings from this study will be used to answer the research questions.

7.2 Purpose and Research Questions

The findings from this study aim to address and answer the following two research questions appropriately.

The first research question asked about what are the privacy issues in smart mobility. In order to answer this question, the researcher will first answer what the privacy issue are related to smart mobility, and then discuss what the privacy concerns amongst smart mobility users are.

After reading a considerable number of literatures the initial assumption was that the privacy concerns in smart mobility could be related to the service per se and information required by the smart mobility service providers. The privacy issues related to the service per se can arise by the spatial context (i.e., individual who travel by collective transport cannot which cut-off themselves from the members of the public, individuals use a car can cur-off them while moves among members of public) , and ownership of the device to access the service (i.e., whether individual owns the device they use to access mobility service,). The ownership of the device is further related to how much control an individual has of his personal data in exchange with mobility service. In this regard, the ownership entails more control over one's personal information (i.e., individual who own's a car has more control over the how much information he gives to car company than these who use shared car service). In order to understand how privacy concerns related to these two aspects, interview is used to capture the insight from smart mobility users.

On the other hand, Smart mobility refers to using information technology and personal data, therefore, the privacy concerns among users can be captured by the uncertainty from the online environment (ICT, IoT) and information privacy concerns (IPC). Further, the IPC can be captured by types of information, use/ process/storage of information. Moreover, many literatures also point out demographic characteristics are in some cases influential to IPC. The existing literatures offer a rich theoretical lens to understand IPC in smart mobility. Five concepts from privacy theories are identified may has implication to user's intention to use smart mobility : trust in service providers, perceived privacy concerns, perceived risk of location information, perceived risk of secondary use of personal information, ease of use. All and all, these concepts capture the privacy concerns amongst smart mobility users.

Further, these aspects and concepts can be used to answer the question about what privacy concerns are in smart mobility. The interview questions are mainly developed along above- mentioned concepts to capture user's insight from empirical experience.

The findings from interviews shows that privacy concerns exist among smart mobility users at the very least level. The majority of respondents express privacy concerns and many of them refers to information privacy concerns. Particularly, the shared car users and Tesla owners appear to have higher privacy concerns than bus users. However, this does not say anything about privacy concerns is related to the spatial context of the service. First, there is not statistic evidence. Second, the higher privacy concerns of car users are caused by more personal information required to access the service. In this regard, it suggests that users' privacy concerns in smart mobility are more related to users' information privacy concerns than the service's spatial context.

Further, as mentioned in semi-subchapter 6.1.3 - comparison- privacy concern, the difference between owning a car and using shared car lies in that shared car user in principle have less option to determine data processing through consent, therefore, the initial assumption was that shared car users supposed to have the highest privacy concerns than car owners and bus user. However, responses from these two groups of users doesn't reflect much insight to this assumption. In contrary, they appear concerns on similar issues- information privacy. More specifically, it is the perceived risk of secondary use of personal information and location information that appears sensitive for them. These two reflect the purpose of collecting/use/process information, and the types of information, which arise considerable privacy concerns amongst smart mobility users, no matter what service they use. Ironically, when ask about the ease of use, most participants show positive answers. More than half part of the users entails their willingness to use personal information in exchange to access these services. This in some extent confirms the quantitative results: secondary use of personal information does not have any impact on user's intention to use. This result entails refers to the discrepancy between individuals' intentions to protect their privacy and how they actually behave in disclose personal information, which is very different. Regarding to this, it may relate to "where" the case study applies. In Stavanger, there is only one collective transport operator -Kolumbus, few shared car companies. That is to say, people who live in Stavanger has not many choices between smart mobility service providers, therefore they rarely have chance to choose among mobility services in line with the different privacy policies offer by various providers. The other factor that may have something to do with this is trust.

While many claimed they felt unpleasant to provide personal data due to the company's objective to earn money, others claimed that they trusted companies to offer some sort of reciprocity for the use of their personal data (e.g., the better quality of service). In general , most respondents entail a high level of trust to the service provider. According to the interview data, it may relate to their trust in legislations (GDPR) , or service provider's capacity to handle privacy-related issues. Therefore, while privacy awareness is widely established across different users' groups, privacy concerns do not seem to be bothering. In this sense, privacy concerns exist amongst smart mobility users, but they mainly seem to situate around sensitive information such as location information or banking information, or the purpose of using personal data. Obviously, respondents are expressing their hesitancy towards mobility tracking as well, but there were not any active actions these users tended to take/could take to actually avoid being tracked. It is worth to note that, this study uses two concepts to address particular privacy concerns i.e., if the privacy data is passed on for secondary use, and the kind of data i.e., location information. The result from both qualitative part and quantitative part may point at the necessity to be specific with regard to what privacy related data particular a smart service uses. In this study, it is the location data , and it correlates with intention to use. Further, there is no notable differences between respondent's answer regarding to demographic characters. This need to be discuss further with the quantitative results. Overall, privacy concerns amongst smart mobility users are related to information privacy , such as location information, secondary use of information. The discussion draws on the qualitative data can answer the first sub-question so far.

Further, the second sub-question asked about do privacy concerns affect user's intention to use smart mobility? While many articulated considerable privacy concerns, there was no opposition to using smart mobility. Further, many respondents would instead focus on the ease of mobility services rather than decrease data gathering. It goes for the respondents who trust their privacy is protected, relying on privacy law (GDPR) or the service providers. None of the respondents mentioned nor seemed interested in actively performing any actions that withdrew any data gathering consent. However, many indicate they should be well informed of the objective of data gathering and use of data. It is worth noting that while there seem to be many interplays between these factors, the qualitative data can only offer insights about what may affect user's intention to use smart mobility. It is, therefore, unclear to say what affects users' intention to use smart mobility. Perhaps the qualitative data cannot offer enough information to answer this question. To offer richer insights, we need inspiration from the statistical evidence.

The second research question asked how privacy-relevant factors affect users' intention to use smart mobility. In order to answer this question, the researcher built a theoretical model from the variables mentioned above and developed items from interview data to measure the correlation between these variables. Further, two sub-questions are made to answer this question; the first goal is to find out which of these factors directly implies the user's intention to use smart mobility. Second, if any, does the relationship between privacy concerns and trust influence user's intention to use Smart mobility ?

For the first sub-question, the descriptive statistic results present privacy concerns do exist certain level of influence on user's intention to use smart mobility (see Table 6.12). Surprisingly, a direct correlation between privacy concerns and intention to use in a hypothesis test. Instead, the hypothesis analysis reveals that trust and perceived risk of location information directly affect users' intention to use smart mobility.

Significantly, trust matters a great deal. The statistic results show that Trust has a higher significance which is positively correlated to the user's intention to use smart mobility. It indicates an increase in service providers' overall confidence associated with a rise in user intention to use smart mobility. On the contrary, user's perceived risk of location information negatively impacts his intention to use smart mobility. It indicates that the more one concerned about location information, the less likely he may use smart mobility. Meanwhile, this effect can be counterbalanced by the trust. The latter is considerably weaker than the former regarding the strength of implication of trust and location information. That says, if one has higher confidence in a service provider, even though he has high-level concerns about his location information, it does not affect his intention to use smart mobility. It answers the first sub-question, which also leads to further discussion.

This outcome perhaps not surprising considering the context of this study- Norwegian society, which acknowledged as a high trust society in many studies Previous studies point out that there are various trust sources in Norwegian society, for example, a strong sense of shared group membership and a high level of trust in government. It may explain why privacy concerns appear much less influential than trust in this study. Further, this finding is also supported by the interview data. Several interview participants indicate they have little or no direct privacy concerns about using smart mobility. They most likely form an opinion based on other more diffuse and indirect cures, for example, whether the government seems trustworthy and competent or whether phenomena such as data misuse seem to be under control. Although the researcher found a weak correlation between Privacy Concerns with Trust, it does not appear to affect user's acceptance of smart mobility strongly. Based on this study's result, high trust seems to make the digitalized mobility transition in Norway or similar societies smoother from the current stage to the near future (since most participants are under 40). It may be much more difficult for urban dwellers to accept smart mobility, particularly in low trust societies (e.g., Poland, Czech Republic, Hungry). Although the mobility transition is promising in Norway, there are still many uncertainties related to trust. For instance, it may be unequally distributed between smart mobility service providers – state vs. private, foreign vs. domestic. The suggestion for further research is to look into whether different organizations in the Norwegian society received equal trust. The other suggestion is to expand the scope to the rural area. The sample of this study can only shed light on the elders in city dwellers in Scandinavian societies, but not other groups, for example, rural area elders. Many different social groups are not included in this study; it is suggested to generate a larger-scale investigation.

The second sub-question concerning the interplay between trust and privacy regarding their influence on user's intention to use smart mobility. As mentioned earlier, the statistical result cannot show privacy concerns have direct implication on user's intention to use smart mobility. However, it cannot deny its existence. For the first, the interview responses offer enough evidence to the existence of privacy concerns amongst smart mobility users. Further, there are notable existing literatures offer empirical evidence (see chapter 2) to prove the effect of privacy concerns on users' behavior intention. In fact, according to the statistical analysis of direct and indirect effect, the privacy concerns (PC) may mediate its implication on intention to use (IU) via other variables, for example trust. As the correlations present in Table 6.19, privacy concerns (PC) is negatively correlated to trust (TU). According to existing empirical evidence, the interplay between trust and privacy concerns is likely that the latter have negative implication on the former, which may reduce one's intention to use smart mobility service.

Further, other factors also appear interaction with trust via the correlations. According to the qualitative findings, the privacy concerns in smart mobility is mainly related to information privacy, which are captured by secondary use of information (as it related to collect/process/store personal data) and location information (types of information) in this study. These two shows correlation with privacy concerns respectively, as well as to each other. This entails a good capture of the IPC in smart mobility. Further, the perceived risk of location information, which has a correlation to trust. That is to say, except it has direct effect on intention to use, it can also mediate its negative effect via trust. These interweaved correlations indicate that the perceived privacy concerns in smart mobility have its implication on user's intention to use smart mobility. In this sense, reducing the perceived risk of one's location information can substantially increase behavior intention of using smart mobility both directly and indirectly. Interestingly, the statistics show that secondary use of information does not correlate to trust in any way. It may entail the privacy terms and use by service providers do not enhance Trust. It perhaps has something to do with the high trust in Norwegian society again, the influence of trust may override user's perceived risk of secondary use of personal data .

Moreover, perceived ease of use presents negative correlation with privacy concerns while it correlated to trust and intention to use smart mobility positively. This can be interpreted as Ease of Use mediated its positive influence on Intention to Use via Trust while it reduce privacy concerns. The second interpretation is that it may have something to do with the types of information required by service providers. As shown in Table 5.13 in Chapter 5, the payment-related information raises the highest privacy concerns, followed by one's browser history, location information, address, image. Whereas e-mail, telephone number, and event one attends are perceived as less private than the information above. In this sense, the service that requires more sensitive information leads to complicate the registration process, higher privacy concerns and make use less easy. Both interpretations are perhaps not surprising sound as they are also supported by interview responses.

In addition, the statistic test does not say anything about the demographic factors, neither the spatial context/ ownership of the device to access the smart mobility service has implication to privacy concern. Again, the statistical results in this study do not deny their influence. As mentioned early, In the qualitative data, there seems a trend that the younger users have less privacy concerns. Meanwhile, it is worth to note that the participants in qualitative and quantitative study are slightly different demographically- these participate in interview have relatively lower education level than these who participate on-line survey. However, the demographic factors are interweaved with many other factors, e.g., most young interviewees are bus users, which is a service that gather much less sensitive information than shared car or electric car. Therefore, we have no idea whether it is education , the type of service, or the information that affect user's perception of privacy concerns. It worth for further investigation, both qualitatively and quantitatively.

In the discussion, the qualitative and quantitative data play complementary roles in this study. While the statistic result can only show trust and location information directly affect users' intention to use smart mobility, the interview data help explain the correlation between factors and how they may affect intention to use indirectly. It enhances the validity of findings and assesses whether data agree on complement one another. Dissonance, in this respect, does not indicate a failure but constructive as it leads to a richer understanding. Suppose this study only relied on a qualitative study. In that case, the interview results would suggest that both privacy concerns and trust imply users' intention to use smart mobility and no further comparison between them either other factors. Had it only relied on the quantitative result, the trust would become determinant to intention to use. If that were the case, the conclusion would become "users' intention is only affected by trust, and location information, not privacy concerns." It is not necessarily the case that one is right and the other one is wrong. Instead, they may each be capturing different aspects of what one is trying to figure out. However, using a single type of method/data does not reflect the underlying philosophy of science that the researcher is promoting.

The philosophical assumption underlying this study is pragmatism, reflecting the researcher's assumption that reality is composed of multiple faces. Therefore, mixed method appropriately brings out multiple pieces of evidence of reality. Further, the researcher has demonstrated how to use, interpret, reflect and make sense of qualitative and quantitative evidence to answer the research questions, which is in line with the philosophical perspective the researcher is promoting. Further, mixed methods add flare to this current study and prompt further research in this area. In the following sub-chapter, the researcher will demonstrate how to use the result of this study , together with the result of the study by Elkins & Jevinger (2019) to generate a practical suggestion for smart mobility service providers.

7.3 Conceptual Model

This sub-chapter presents a conceptual model based on the main findings from this study. First, the development of the model is discussed, then the actual model is presented, which is followed by a discussion explaining the model in detail.

Development of the Conceptual Model to enhance trust

The finding from this study indicates trust is the crucial factor that affects user's intention to use smart mobility, which is directly affected by their perceived risk of location information negatively. Although privacy concerns do not directly affect user intention, it mediates negative influence through other factors to indirectly reduce intention to use smart mobility indirectly. Thus, the researcher suggests applying some attributes to the interface (i.e., app or website), benefitting the communication strategy for service providers through an enhanced trust design.

At the center of this conceptual model are trust and privacy concerns. A prior study conducted in Scandinavia has tested various websites aiming to moderate consumer's privacy concerns (Elkins & Jevinger, 2019). Among various attributes, four attributes catch the privacy concerns and trust, namely Online Chat Channel, Customer Reviews, Photograph of a Customer Care Person, Feedback, Encryption, and Option to Share Location Information. The central idea of these attributes is that they can positively increase user's sense of trust while mitigating privacy concerns.

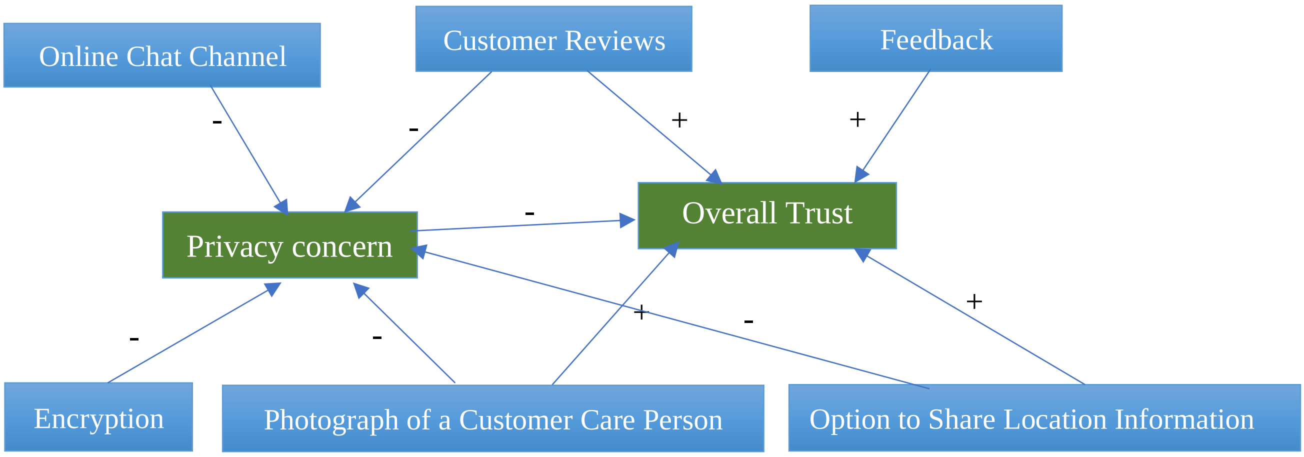


Fig. 7.3 conceptual model

Explanation of the Conceptual Model

The two main attributes that were proven from the work of Elkins & Jevinger (2019) to have the most impact in reduce privacy concerns were Customer Reviews, Online Chat Channel (Fig 7.3). All these app attributes have at least one arrow point towards either privacy concerns or overall trust, or both. First, the Online Chat Channel includes an arrow pointing towards Privacy Concerns with a negative symbol, meaning it reduces privacy concerns.

Further, Customer Reviews has two arrows, one pointing from Customer Reviews towards Privacy Concerns, and another pointing from Customer Reviews and Overall Trust. The arrow pointing from Customer Reviews toward Privacy Concerns contains a negative symbol, reducing privacy concerns. It is similar to the relationship between Encryption and Privacy Concerns. The arrow pointing from Customer Reviews toward Overall Trust contains a positive symbol, meaning, as identified from the interviews, it also positively impacts Overall Trust, which also reduces privacy concerns. The relationships between Option to Share Location Information to trust and privacy concerns are also similar to this.

Lastly, the Photograph of a Customer Care Person is represented in the conceptual model with just an arrow pointing from the attribute level towards Privacy Concerns with no symbol. Since the literature review showed a Photograph of a Customer Care Person would decrease privacy concerns, the findings for this attribute level were inconclusive. That means that while the Photograph of a Customer Care Person seemed to have some connection to privacy concerns, no identifiable direction of impact could be found, which is why the Photograph of a Customer Care Person only has an arrow pointing towards Privacy Concerns, without any symbol indicating its impact on it. However, this model is merely a suggestion which is not the focus on this study. It needs further work for test it.

7.4 Policy Recommendations

The other important finding in this study is the direct implication of location information on user's intention to use smart mobility. Location information is the key to smart mobility. The practitioners need location information in order to offer better service. Meanwhile, sharing location information is sensitive to many. Hence, it is quite a task for policymakers to ensure the smart mobility service providers can obtain the data they need. In that sense, policymakers must recognize and align the different needs of service providers with data policy developments. Therefore, it is suggested that the policy development process should be flexible and collaborative. The policymakers need to be better informed in order to make a better decision. Therefore, the suggestion is that citizens and smart mobility stakeholders should be involved in order to develop a broader data policy altogether.

Concerning this, the policy-making process becomes transparent. Further, a connected strategic approach may help align implementation actions for mutual benefit. Policymakers should understand the purpose and process of using these data and use effective data policies to ensure the latest requirements or service providers are met. Overall, policymaker needs to work more on collaboration to ensure that data policy, location information, and the goal of smart mobility market strategy, are reflected in national policy. Take steps so that location information can make a practical contribution to improve mobility service.

8. Conclusions, Implications, Recommendations and Summary

This chapter provides the conclusion of this research. It started with summarizing the purpose and key findings of this study, followed by the theoretical and practical¨ implications. Further, this study's limitation will be discussed, which ended with the recommendation for further research.

8.1 Conclusion

This study examined whether smart mobility users had privacy concerns when using smart mobility or when dealing with technology that involved ICT and personal data. The primary goal of this study is to examine the effect of privacy concerns and trust in the context of smart mobility. To accomplish this, the researcher developed a framework that considered the privacy concerns related to the spatial context of mobility service and ownership of the device to access smart mobility. Further, a theoretical model considered the relationship between the independent variables of ease of use, privacy concerns, secondary use of personal information, location information, and trust on the dependent variable of intention to use.

A mixed-method approach employs both qualitative and quantitative methods to collect data. There are two phases of this study; the first phase is collecting qualitative data through the interview, where participants were selected according to the mentioned framework. They were asked about perceptions of privacy concerns regarding the variables in the theoretical model. Further, the interview data are analyzed and used to develop a multi-item questionnaire in Phase Two. The questionnaire is electronically distributed via surveyXact, a web-based survey provider. The survey was distributed to academia in city planning, energy, environment and society, and energy and resource management in the University in Stavanger, and there were 187 valid responses out of 210 total respondents, yielding a response rate of 89%. Finally, the researcher conducted CFA and SEM test on three data sets based on its mixed-method approach. The data retrieved from these methodological procedures supported the researcher to fulfill the purpose and acknowledge the two research questions. The findings add empirical evidence to existing theories and also prompt further research in the fields.

The findings regarding the importance of certain variables in smart mobility:

1. Trust and perceived risk of location information directly affect users' intention to use smart mobility. This result suggests that enhance trust and reduce the perceived risk of personal information are the key components in users' acceptance of smart mobility. Interestingly, the effect of privacy concerns is proxy through trust on the user's intention to use. This finding is different from recent work using the TAM model (e.g., Zhou, 2010; Pavlou, 2003; Park et al., 2017), where the privacy concerns found directly affect users' intention to use negatively.

2. Trust is found more significant than privacy concerns in this study may strongly related to the societal context- this case study is done in Norway, where trust is high in this society. It is unique compare to other studies that found privacy concern is the determinant of intention to use a service. This finding highlights Norwegian society's unique feature where the high trust can reduce cost on mitigating privacy concerns.

3. Other factors such as privacy concerns, perceived ease of use, perceived risk of location information and secondary use of information mediate its effect through trust on intention to use.

4. Both Secondary Use of Information and location Information are correlated with perceived privacy concerns, suggesting that the technology acceptance model could also extend into types of information to explain technology acceptance.

In sum, the present study presents several new findings that enrich our understanding of privacy concerns in the unique nature of smart mobility. Hereafter, the researcher presents the practical implications for smart mobility service providers and other practitioners in the following subchapters.

8.2 Implications for Theory and Research

This study identified the significant effect of trust on user's acceptance of intelligent mobility from a theoretical perspective, as a result by grounding new variables in a well-accepted general model (TAM) and applying them to a new context. The new variables are placed within the original model's nomological structure and are compatible with TAM variables. This approach is likely to extend TAM's explanatory power, where the proposed model makes an essential contribution to the ever-evolving literature of privacy concerns.

The present study has implications for information management research on technology acceptance, particularly in the system acceptance of smart cities. Much research on technology acceptance indicates that privacy concerns do not comprehend the notion of uncertainty. However, the advent of communication technology has introduced uncertainty in system acceptance because it involves collecting and using personal data from various sources, sensors, and devices. In this sense, uncertainty is one of the critical elements of system use. This study integrates variables to capture the uncertainty into the existing technology acceptance model, which opens new avenues for future research. For example, Zhou (2010) argues that trust and perceived risk are essential elements in accepting and using location-based services (LBS) (i.e., service providers can provide the optimal information and services to users based on their location preferences). Given this study's finding, it seems necessary for information management researchers to examine where uncertainty may be present, such as smart mobility, smart healthcare systems, when trust and perceived privacy concerns are likely to affect system usage. Moreover, a similar study done in high trust societies can focus more on trust than privacy concerns.

The present study has significant implications for the research of behavior change. Without addressing the demand side of urban challenges (i.e., human behavior), it is unlikely to solve the critical challenges such as traffic, pollutions that cities everywhere face today. The data created by smart city systems can be operationalized to promote individual behavior change. However, there have been limited studies on how various factors are related to adopting new technology in a smart city. Although few works contribute to examining the role of trust and privacy concerns in behavior intention, there is not too much focus on smart mobility. Besides, the relative impact of technology acceptance across cultures will also be critical for the multinational study of behavior change and mobility transition. This study presents empirical support which worth further testing. Consequently, the proposed model can serve as an initial instrument for understanding smart mobility's effects on citizen's behavior change within and across cultures.

The most exciting implication of this empirical study is the relationship between trust and perceived information risk. While they are interrelated, it does not appear a causal relationship. For trust can only be measurable under the premise that a certain degree of risk exists. The higher the initial perception of risk, the higher the trust needed to facilitate the user's intention to use. Nevertheless, the results show perceived risk of secondary use of information and location information correlated to perceived privacy concerns but not statistically significant. This result suggests that these two may be the causal predictors of perceived privacy concern, prompting further research in this area.

On the other hand, perceived privacy concern is correlated to trust. Therefore, the researcher suggests that there may be a causality flows from privacy risks to perceived privacy concern and trust. According to the empirical findings for trust and perceived risk of location information, it may be inferred that privacy concern ask acts indirectly on the intention to use smart mobility through the mediating effect of trust, on which it has a direct impact. However, this directionality is different from other prior works. This finding enriches extant research on services delivered by ICT and data flow (e.g., smart mobility) and advanced understanding of user acceptance of these services. It is suggested to further examine the complex interrelationship among trust, perceived risk, and behavior intention to reach more robust conclusions.

8.3 Implication for Practice

The study has important implications for influencing the acceptance of smart mobility. The service providers, particularly in high trust societies, should recognize that user's trust is the key in mobility transition, particularly in Norway. As mentioned earlier, the researcher has given practical suggestions to add specific attributes to the service website or app to enhance trust and moderate user's perception of privacy concerns (see subchapter 7.3). The service providers could also employ other trust-building mechanisms to manipulate favorable user attitudes and ultimate intention to use. Further, ease of use may contribute to user's intention to use a service; the service provider could also orient packages towards various user groups to easily select the most appropriate model for them.

The high trust in Norwegian society seems to promise the success of smart mobility rather than arising out of the deliberate effort. Indeed, it is not limited to "mobility," many ideas and projects involved using ICT and personal data flow to offer services related to information privacy concerns (e.g., energy transition, smart meter, smart tourism, smart contract, smart health). Although the privacy issues do not seem to bother Norwegian society, this is not the case in other regions. This issue is by no means confined to few countries. The current mainstream literature tends to seek technology solutions to address the challenges related to privacy. Therefore, technology solutions appear the best way to lead to a successful transition. It is worth noting that many of these research efforts are oriented by funding to highlight these technologies for various reasons. However, the technology solutions do not guarantee a long tern technology acceptance of these smart services. Without user's long-term acceptance of smart technologies, they cannot ensure profits. The technology acceptance will surely not enhance by emphasizing using technology solutions to address privacy concerns. Regarding this, the finding of this study can be a start point, which calls for the idea of building up a trust mechanism. Rather than heavily skewed research efforts to overemphasize "technology solutions(e.g., display privacy seals, encryption, or verification)," should the research force be oriented to find elements to strengthen "trust" in a society. As prior studys has pointed out economic benefits in higher-trust societies, where trust can improve the efficiency and cost of public administration (Knack, 2001; Putnam 1993). In light of this, Norway can be a prototype to develop a trust mechanism underpinning a successful digitalized transition. Rather than spending more money to find technology solutions, developing a trust mechanism is a more cost-efficient solution. For example, periodic test rides in diverse urban areas allow citizens to experience the smart mobility service. The researcher can then assess how impressions such as convenience, safety, and comfort affect trust when the individual experiences them.

On the other hand, the policymaker in Norway should acknowledge that trust appears as a vital diffuse technology factor. However, it is worth keeping in mind that the high trust level in society may not be equally distributed. The level of trust these smart mobility service providers received in this study is not representative of other service providers (e.g., these operate in other cities in Norway or electric cars of different brands). Many other factors, such as the service provider's reputation, which country this brand originates from, can also affect trust. Therefore, there is a need for further studies to ensure a more comprehensive understanding of the key factors to make mobility transition smoother.

8.4 Limitation

The researcher recognizes certain limitations to this study and suggests that some limitations may provide future research opportunities.

The first limitation relates to the mixed-method approach. This approach requires considerable time and resource for separate data collection and analysis. Considering the factor influencing users' intention regarding technology acceptance, the researcher suggests changing Phase One to an expert interview for further research. The expert interview can save much more time and effort to identified variables to the research model. Together with this study, they can also serve as a comparable point of view between expert-centric and user-centric approaches.

A second limitation is that while privacy concerns are a dynamic process, this study only consulted current smart mobility users. However, privacy concerns may exist before access a service, and some effects may linger after having experienced the services. Longitudinal testing of the research model on individuals who had not yet gained experienced and those who had gained some experience would provide researchers with a better understanding of the dynamic change in privacy concerns and the factors that affect behavioral intention. For example, inexperienced users may rely more on the service providers' reputation, whereas experienced users may rely more on other factors.

Third, given the importance of trust, it is suggested to examine trust's nature and role in more detail for future research. This study's definition of trust is abstract, which refers to low uncertainty to use smart mobility services. It is suggested to examine more detailed facets of perceived trust, which would likely be a promising future research area. According to this study results, trust can be perceived as a second-order factor, comprising multiple first-order dimensions, such as privacy concerns. In this sense, the future researcher can examine a multifaced Trust model and theorize the relationship between trust and other variables.

Forth, the researcher used the variable intention to use to indicate the user's actual behavior. It is worth noting that this variable does not necessarily reflect actual behavior. In this sense, if the study's focus is about behavior change, what should be measured is actual behavior, and any indications regarding behavior change were inferred from the research context. Perhaps one can test this model after a data leakage incident, and this alone could change outcomes to results regarding the theoretical model. In that case, statistical methods can be used to measure actual behavior change.

Fifth, the research sample is limited to city dwellers, and the result does not representative of any population. Therefore, there is a need for further investigation. For example, how people in rural area perceive smart mobility in terms of trust remain unclear. Given the different demographic contexts, further study should assess the city, rural or district (NOU 2020: 15) context, and aim to select sample for generalize purpose in order to gain better understanding. In this sense, the useful data can contribute to design a well-accepted smart mobility service over all of Norway.

Sixth, the future design of smart mobility systems should consider whether the high level of trust found in this study extends equally to all service providers. It concerns the size, ownership, and origin of the service providers involved.

Finally, the model used in this study only included five variables. Other factors that have not been included can also affect user's intention to use smart mobility. Despite the high variance explained by the current model, the statistical results indicate there may be other latent variables. It is suggested that future research should explore these variables with a large population of respondents that may provide better statistical power and increase the likelihood of validation.

Summary

This study focused on the implication of privacy concerns and trust on behavior intentions of city dwellers to use smart mobility in Norway. To conduct this investigation, the researcher developed a framework and a theoretical model based on TAM (Davis, 1989), TPB (Ajzen, 1991). Unlike other studies, the researcher did not focus on validating a new model. Instead, the focus was placed on which variable has a direct implication on dependent variables. The final results were based on five independent variables and one dependent variable.

After conducting a review of the literature concerning privacy issues related to Smart Mobility service and acceptance, as well as TAM (Davis, 1989), TPB (Ajzen, 1991), and the theoretical model presented by Zhou (2010), the researcher developed a theoretical model to calculate the effects of the independent variables ease of use, trust, perceived risk of secondary use of information, perceived risk of location information, privacy concerns on the dependent variable intention to use. The researcher developed a model, as shown in Figure 3.2, based on the analysis of the effect of these variables on intention to use smart mobility. The main research question considered the effects of these variables on young city dwellers' intention to smart mobility. The investigation addressed these questions :
RQ1: What are the privacy issues related to smart mobility? What is the privacy concern among smart mobility users? What may affect their intention to use smart mobility?
RQ 2: From a user-centric perspective, how do privacy concerns and trust affect users' intention to use smart mobility?
The specific research sub-questions for Phase II are:
-Which factors have a direct impact on user's intention to use Smart mobility?
- How do other privacy-relevant factors influence user's intention to use Smart mobility?

The researcher uses a mixed-method approach. The qualitative method is in the first phase, while the quantitative method is used in the second phase. First, the researcher chooses respondents along the framework mentioned in Chapter 3, where the interview took place in Innovation Park in Stavanger. The interview questions are designed along the concepts mentioned in the theoretical model (see Figure 3.2). Further, the interview data were used as an auxiliary to develop items to measure these concepts. These items were explicitly formulated to capture the context of this research, particularly items to measure trust, which was developed to capture each scenario's context. Finally, the research developed 19 items based on the interview data and existing validated scales that used Likert-scaled items. The perceived ease of use (PEU) items were adapted from existing studies on the technology acceptance model (Park et al., 2017; Lee, 2005). Measures for trust (TRU1) were adapted from Lee (2005) and Pavlou (2013)- (TRU 2, 3,); Perceived risk was adapted from Hsu & Lin (2018), secondary use of information from (Stewart & Segard, 2002) and Perceived risk of location information (adapted from Pavlou & Gefen, 2004). Three items captured the dependent variable measuring on intention to use smart mobility (IU). Two were based on TAM and measured: intention to use (Lee, 2001), and one standard item captures the level of trust to exchange a specific type of smart mobility service (i.e., bus, shared-car, electric car). The data collection for this phase was a Web-based Survey. The researcher chose academics who have relevant knowledge in digital transition in the mobility sector as participants in this process due to this research's focus. The research model presented in this investigation predicted that there would be positive relationship between trust and the dependent variable intention to use. In contrary, perceived risk of location information present negative relationship to the dependent variable intention to use. The model also entails the positive correlation between the independent variable privacy concerns, perceived risk of secondary use of information, perceived risk of location information. On the other hand, it entails negative correlation between privacy concern and trust , ease of use and privacy concern. The researcher used IBM SPSS and AMOS to provide statistical analysis of the survey items and the proposed hypothesis. The survey was distributed to academia in the University in Stavanger and received 220 responses, and 187 of these responses are usable. The survey distribution was supported by SurveyXact.

The SEM model provided the statistical evidence at the .001 level to indicate a significant correlation between independent variables and a dependent variable. Three sets of data test these relationships: each set of data are four generic concepts (i.e., ease of use, privacy concerns, perceived risk of location information, perceived risk of secondary use of personal information), and one concept (i.e., trust) that addresses the relation between smart mobility user and a service provider as follow:

Model and dataset 1:

4 Generic variables + trust in Tesla / private car → intention to use (Tesla)

Model and dataset 2:

4 Generic variables + trust in Hyre / rental car → intention to use (Hyre)

Model and dataset 3:

4 Generic variables + trust in Kolumbus / public transport → intention to use (Kolumbus).

The statistical analysis shows a positive predictor of intention to Use, Trust (β= 0.393 (dataset 1), 0.556 (dataset2), 0.47 (dataset3)) was more important than Perceived Risk of Location In-formation (β= -0.276 (dataset 1), -0.221(dataset2), -0.475 (dataset3)). The beta value for TU → IU is positive, indicating that for every 1-unit increase in the independent variable, the dependent variable will increase by the beta coefficient value. On the contrary, the beta value for IF → IU is positive, indicating that for every 1-unit increase in the independent variable, the dependent variable will decrease by the beta coefficient value. The proportion of the variance explained in Intention to Use was 29.2%, ($R2 = 29.2\%$), 42.3% ($R2 = 42.3\%$) , 36.2% ($R2 = 36.2\%$) in each data set respectively. In academic fiends that attempt to predict human behavior, R-squared values are typically lower than 50%.

The results finding are consistent with the prediction presented in H4: perceived risk related to location information (LI) is negatively associated with intention to use (IU) in smart mobility. The opposite relationship exists between trust (TU) and intention to use (IU), as presented in H5. The prediction shows that there should have been a positive relationship, in practical terms: If there is a higher perception of trust, then a person will be more likely to use smart mobility. This research showed that both of these relationships, TU, IF→ IU, were significant. The theoretical model predictions and the actual results are present in Table 6.18a-c.

In chapter 6.19, the researcher concluded the study by presenting the correlation between other variables. Although there is a lack of statistical evidence to say something about the causal relationships between these variables (i.e., PC→ TU; SU→ TU; PEU→ TU; PEU→ PC), these relationships would need further investigation.

The researcher presented the implications of this study, indicating that the theoretical model provided can be tested in future research. The investigation's limits were the number of respondents and sampling bias where respondents are young and have a relatively high education background. It indicates that this study aims not to produce a generalizable result but a preliminary understanding of the study's topic. Finally, the researcher provided suggestions for future research, practitioners, and policymakers to broaden the acceptance of smart mobility.

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Appendix A. -Interview Guideline

Questionnaire for EV owner

It is a survey for a master thesis(UiS). THREE parts of this survey: the first part is general information about you; The second part is about your experience of using electric car. The last part is about your privacy concerns about your personal information collected by the car company. All in all, these questions won't take you more than 10 minutes!

Part 1. Demography

Age

• Under 19 • 20-29 • 30-39 • 40-49 • 50-59 • 60-69 • Above 69

Gender

• male • female

Sivil status

• Single (you live alone) • Partner (you live with someone) • Other

Education level (the highest level that you are completed)

• High school • University (bachelor) • Postgraduate (master) • PhD • Others

Do you have expertise in IT industry?

• YES • NO

Part 2. Your experiences of using EV

In this part, I would like to know your using experience of EV.

1. Why do you purchase an electric car?
2. How often do you use it?
3. How did you get to know electric car?
4. What is your first impression of your EV?
5. Do you like it?
6. Will you recommend it to your friends?

Part3. The information you gave to the car company

When you have EV, you establish a personal profile which contains certain personal information.

1. Do you think your sharing of these data make using your electric car ease of use?
2. Do you think by sharing your information, using your electric car become more convenient?
3. What is your perceived risk in relation to your personal information? (e.g., your telephone, address, driving history, browser history, etc.)
4. Do you have privacy concerns about this information?
5. What is your personal interest/need in using an electric car?
6. Does your personal interest override your privacy concerns?
7. Do you trust your electric car company can handle consumer's information well?
8. Do you mind if the car company using your personal information for other purposes than the original one?
9. Do you mind if there are others know about your location information?
10. Last but not least, do you have any suggestion about this survey?

Thanks for your participation!

Questionnaire for shared car user

It is a survey for a master thesis (UiS). THREE parts of this survey: the first part is general information about you; The second part is about your experience of using shared-car. The last part is about your privacy concerns about your personal information collected by the shared-car service provider. All in all, these questions won't take you more than 10 minutes!

Part 1. Demography

Age

• Under 19 • 20-29 • 30-39 • 40-49 • 50-59 • 60-69 • Above 69

Gender

• male • female

Sivil status

• Single (you live alone) • Partner (you live with someone) • Other

Education level (the highest level that you are completed)

• High school • University (bachelor) • Postgraduate (master) • PhD • Others

Do you have expertise in IT industry?

• YES • NO

Part 2. Your experiences of using shared-car service

In this part, I would like to know your using experience of shared-car service.

1. How often do you use shared-car service?
2. What do you use shared-car service for?
3. How did you get started in using this service?
4. What is your first impression of using this service?
5. Do you like this idea of shared-car service?
6. Will you continue to use it?

Part3. The information you gave to the shared-car service provider

When you use the shared-car service, you give "Hyre" (the shared-car company) some persona information. I would like to know whether you have privacy concerns over personal information.

1. Do you think your sharing of these data make this service ease of use?
2. Do you think by sharing your information, this service can become more convenient/ effective?
3. What is your perceived risk in relation to your personal information? (e.g., your telephone, address, driving history, browser history, etc.)
4. Do you have privacy concerns about personal information?
5. What is your personal interest/need in using shared-car service?
6. Does your personal interest override your privacy?
7. Do you trust “Hyre” can handle consumer's information well?
8. Do you mind if Hyre using your personal information for other purposes than the original one?
9. Do you mind if there are others know about your location information?
10. Last but not least, do you have any suggestion about this survey?

Thanks for your participation!

Questionnaire for bus user

It is a survey for a master thesis (UiS). THREE parts of this survey: the first part is general information about you; The second part is about your experience of using collective transport. The last part is about your privacy concerns about your personal information collected by the shared-car service provider. All in all, these questions won't take you more than 10 minutes!

Part 1. Demography

Age

- Under 19 • 20-29 • 30-39 • 40-49 • 50-59 • 60-69 • Above 69

Gender

- male • female

Sivil status

- Single (you live alone) • Partner (you live with someone) • Other

Education level (the highest level that you are completed)

- High school • University (bachelor) • Postgraduate (master) • PhD • Others

Do you have expertise in IT industry?

- YES • NO

Part 2. Your experiences of using collective transport

In this part, I would like to know your using experience of collective transport.

1. What do you use to access collective service?

• APP • Bus card • Both • I used to use bus card, but I am using an app now • Others

2. How often do you use collective transport (i.e., bus, ferry, train)?
3. What do you use collective transport service for?
4. How did you get started in using this service?
5. What is your first impression of using this service?
6. Do you like this idea of collective transport?
7. Will you continue to use it?

Part3. The information you gave to the Kolumbus (service provider)

When you use the collective transport, you give "Kolumbus" (the collective transport operator) some persona information. I would like to know whether you have privacy concerns over personal information.

1. Do you think your sharing of these data make this service ease of use?
2. Do you think by sharing your information, this service can become more convenient/ effective?
3. What is your perceived risk in relation to your personal information? (e.g., your telephone, address, driving history, browser history, etc.)
4. Do you have privacy concerns about personal information?
5. What is your personal interest/need in using collective transport?
6. Does your personal interest override your privacy?
7. Do you trust the Kolumbus can handle consumer's information well?
8. Do you mind if Kolumbus using your personal information for other purposes than the original one?
9. Do you mind if there are others know about your location information?
10. Last but not least, do you have any suggestion about this survey

Thanks for your participation!

Appendix B- Questionnaire Items Used in the Survey

Constructs	Descriptions
Perceived ease of use (Park et al., 2017)	PEU1: When use smart mobility does not require significant mental effort. PEU2: Smart mobility service is easy to use PEU3: Using smart mobility is understandable and clear.
Perceived privacy concerns (Hsu & Lin 2016)	PC1. There is a considerable privacy risk involved in using smart mobility service PC2: My decision to access " smart mobility service" expose me to privacy risk. PC3: Using smart mobility would lead to a loss of privacy.
Secondary use of personal information (Stewart & Segard, 2002)	SU1:Service provider cannot use personal information for other purpose unless it has been authorized by the users providing personal information SU2: When user provide personal information to service provider for some reason, service provider cannot use the information for any other purposes. SU3: Service provider should not sell personal information in the data base to other companies SU4: Service provider should not share personal information with other companies unless it has been authorized by the users providing personal information
Trust (Lee, 2005) and (Pavlou 2003)	TU1: This service provider is trustworthy in handling the information. TU2: This is service provider keeps its promises related to protect the information provided by me. TU3: This service provider keeps users' interest in mind when dealing with information.
Perceived risk of location information (adapted from Pavlou & Gefen, 2004)	LI1: In general, it is risky to provide location information to smart mobility provider. LI2: There will be much uncertainly associate giving location information to service provider. LI3: There will be much potential loss associated with providing personal information to service provider.
Interntion to use (adapted form Lee, 2005)	IU1 :I am willing to use this smart mobility service IU2: I am willing to provide my personal information to the service provider IU3 : I will recommend this service provider to others

Appendix C- Demographics of Interviewees

	Participant	Age	Gender	Sivil	Education	IT compentance
EV owner	P1	50-59	Male	Partner	Master	No
	P2	50-59	Male	Single	High school	No
	P3	40-49	Male	Partner	Master	Yes
	P4	60-69	Male	Partner	Master	No
	P5	50-59	Male	Partner	Master	No
	P6	50-59	Female	Partner	Ph. D	No
	P7	40-49	Female	Partner	Master	No
	P8	40-49	Male	Partner	Ph. D	No
	P9	30-39	Male	Single	Master	Yes
	P10	40-49	Male	Partner	High school	Yes
Shared car	P11	20-29	Male	Partner	Bachelor	Yes
	P12	20-29	Female	Partner	Bachelor	No
	P13	30-39	Male	Single	Master	No
	P14	30-39	Male	Single	Ph. D	No
	P15	40-49	Male	Partner	Ph. D	No
	P16	40-49	Female	Partner	Master	No
	P17	30-39	Male	Partner	Master	Yes
	P18	30-39	Male	Single	Master	Yes
	P19	40-49	Male	Partner	Bachelor	Yes
	P20	40-49	Male	Partner	High school	Yes
Bus	P21	20-29	Male	Single	Master	No
	P22	20-29	Male	Partner	Bachelor	No
	P23	20-29	Male	Single	Master	Yes
	P24	40-49	Male	Single	Master	No
	P25	30-39	Female	Single	Bachelor	No
	P26	20-29	Female	Single	Bachelor	No

P27	20-29	Male	Other	Bachelor	No
P28	30-39	Female	Single	Master	No
P29	20-29	Female	Other	High school	No
P30	20-29	Female	Single	High school	No
P31	30-39	Female	Single	Master	No
P32	20-29	Female	Single	Bachelor	No
P33	20-29	Female	Single	High school	No
P34	20-29	Female	Other	Bachelor	No
P35	30-39	Female	Other	Master	No
P36	20-29	Female	Single	High school	No
P37	20-29	Female	Single	High school	No
P38	20-29	Female	Partner	Bachelor	No
P39	20-29	Male	Partner	High school	No
P40	30-39	Female	Single	Bachelor	No
P41	20-29	Female	Partner	Bachelor	No
P42	20-29	Female	Partner	Bachelor	No
P43	20-29	Female	Single	High school	No
P44	20-29	Female	Single	Master	No
P45	30-39	Male	Partner	Ph. D	No
P46	30-39	Male	Single	Master	Yes
P47	30-39	Male	Single	Bachelor	No

Appendix D- Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistics	Statistics	Statistics	Statistics	Statistics	Statistics	Std. Error	Statistics	Std. Error
IU1	187	1	7	4.93	1.169	-0.844	0.178	1.553	0.354
IU2	187	1	7	4.95	1.202	-1.072	0.178	2.020	0.354
IU2	187	1	7	5.04	1.177	-0.984	0.178	2.176	0.354
PEU1	187	1	7	5.63	1.164	-1.468	0.178	2.482	0.354
PEU2	187	1	7	5.58	1.125	-1.228	0.178	1.8	0.354
PEU3	187	1	7	5.35	1.202	-0.973	0.178	1.226	0.354
Trustev1	187	1	7	4.07	1.246	-0.21	0.178	0.85	0.354
Trustev2	187	1	7	4.11	1.288	-0.135	0.178	0.362	0.354
Trustev3	187	1	7	4.24	1.205	0.029	0.178	1.113	0.354
Trustsharecar1	187	2	7	4.93	1.501	-0.122	0.178	-0.528	0.354
Trustsharecar2	187	1	7	4.14	1.143	-0.265	0.178	1.575	0.354
Trustsharecar3	187	1	7	4.19	1.207	-0.043	0.178	1.187	0.354
Trustbus1	187	2	7	5.07	1.446	-0.423	0.178	-0.058	0.354
Trustbus2	187	2	7	5.37	1.365	-0.766	0.178	0.161	0.354
Trustbus3	187	2	7	5.25	1.238	-0.592	0.178	0.438	0.354
Privacy1	187	1	7	5.44	1.016	-0.593	0.178	1.994	0.354
Privacy2	187	1	7	5.29	1.079	-0.831	0.178	2.35	0.354
Privacy3	187	1	7	4.98	1.184	-0.479	0.178	0.706	0.354
Useinfo1	187	1	7	6.18	1.145	-2.34	0.178	6.76	0.354
Useinfo2	187	1	7	5.97	1.200	-1.84	0.178	4.3	0.354
Shareinfo1	187	1	7	6.3	1.082	-2.75	0.178	9.62	0.354
Shareinfo1	187	1	7	6.13	1.124	-2.19	0.178	6.488	0.354
Location1	187	1	7	4.8	1.384	-0.467	0.178	0.285	0.354
Location2	187	1	7	5.28	1.191	-0.623	0.178	1.577	0.354
Location3	187	1	7	5.09	1.259	-0.555	0.178	0.971	0.354
Valid N (listwise)	187								

Appendix E- Pattern Matrixa (EV)

	Factor				
	1	2	3	4	5
UI1	0.921				
UI2	0.709				
SI1	0.923				
SI2	0.704	0.330			
PEU1				0.912	
PEU2				0.955	
PEU3				0.817	
LI1		0.997			
LI2		0.629			
LI3		0.799			
PC1			0.888		
PC2			0.923		
PC3			0.721		
TRUST1					0.924
TRUST2					0.963
TRUST3					0.746

Extraction Method: Principal component Analysis.

Rotation Method : Varimax with Kaiser Normalization.

Note. The result is generated by explorative factor analysis (EFA) via SPSS.

[a] The numbers represent the loadings above .4, which indicates that the respective dimension is sufficiently assessed by an item.

[b] There is a cross loading of item SI2, however, the researcher tested its reliability and decide to keep it for further analysis since the C-a value will reduce if delete any of the items.

[c] The scale of the items response scale: 1 = “very low”, 7 = “very high”.

KMO and Bartlett’s Test

Kaiser- Meyer-Olkin Measure of Sampling Adequacy		.802
Bartlett’s test of Sphericity	Approx. Chi-Square	2002.617
	df	120
	Sig.	.000

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loading		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.320	33.249	33.249	5.320	33.249	33.249
2	3.406	21.285	54.534	3.406	21.285	54.534
3	1.727	10.791	65.325	1.727	10.791	65.325
4	1.299	8.116	73.442	1.299	8.116	73.442
5	1.070	6.686	80.127	1.070	6.686	80.127

Extraction Method: Principal component Analysis.

Appendix F- Pattern Matrixa (Shared-car)

	Factor				
	1	2	3	4	5
UI1	0.921				
UI2	0.924				
SI1	0.727				
SI2	0.742	0.315			
PEU1				0.903	
PEU2				0.963	
PEU3				0.819	
LI1		0.980			
LI2		0.719			
LI3		0.806			
PC1			0.879		
PC2			0.917		
PC3			0.702		
TRUSTSC1					0.807
TRUSTSC2					0.906
TRUSTSC3					0.922

Extraction Method: Principal component Analysis.

Rotation Method : Varimax with Kaiser Normalization.

Note. The result is generated by explorative factor analysis (EFA) via SPSS.

[a] The numbers represent the loadings above .4, which indicates that the respective dimension is sufficiently assessed by an item.

[b] There is a cross loading of item SI2, however, the researcher tested its reliability and decide to keep it for further analysis since the C-a value will reduce if delete any of the items.

[c] The scale of the items response scale: 1 = “very low”, 7 = “very high”.

KMO and Bartlett’s Test

Kaiser- Meyer-Olkin Measure of Sampling Adequacy		.788
Bartlett’s test of Sphericity	Approx. Chi-Square	2090.713
	df	120
	Sig.	.000

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loading		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.357	33.483	33.483	5.357	33.483	33.483
2	3.387	21.266	54.649	3.387	21.266	54.649
3	1.695	10.596	65.245	1.695	10.596	65.245
4	1.337	8.359	73.604	1.337	8.359	73.604
5	1.063	6.645	80.249	1.063	6.645	80.249

Extraction Method: Principal compxonent Analysis.

Appendix G- Pattern Matrixa (Collective Transport)

	Factor				
	1	2	3	4	5
UI1	0.901				
UI2	0.907				
SI1	0.764				
SI2	0.757				
PEU1				0.903	
PEU2				0.952	
PEU3				0.827	
LI1		0.977			
LI2		0.734			
LI3		0.834			
PC1			0.881		
PC2			0.917		
PC3			0.705		
TRUSTSC1					0.850
TRUSTSC2					0.895
TRUSTSC3					0.851

Extraction Method: Principal component Analysis.

Rotation Method : Varimax with Kaiser Normalization.

Note. The result is generated by explorative factor analysis (EFA) via SPSS.

[a] The numbers represent the loadings above .4, which indicates that the respective dimension is sufficiently assessed by an item.

[b] The scale of the items response scale: 1 = “very low”, 7 = “very high”.

KMO and Bartlett’s Test

Kaiser- Meyer-Olkin Measure of Sampling Adequacy		.802
Bartlett’s test of Sphericity	Approx. Chi-Square	1944.256
	df	120
	Sig.	.000

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loading		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.466	34.165	34.165	5.466	34.165	34.165
2	3.176	19.850	54.015	3.176	19.850	54.015
3	1.336	11.000	65.015	1.336	11.000	65.015
4	1.337	8.349	73.365	1.337	8.349	73.365
5	1.039	6.494	79.859	1.039	6.494	79.859

Extraction Method: Principal component Analysis.

Appendix H- Tables

Table 6.1. *Demographics of Interviewees (text description of infographic present in Table 6.1 in Chapter 6)*

		EV owner	Shared car	Bus
Age (no.)	60 – 69	1	0	0
	50 – 59	4	0	0
	40 – 49	4	4	1
	30 – 39	1	4	8
	20 – 29	0	2	18
Gender	Male	8	8	9
	Female	2	2	18
Civil Status	Single	2	2	17
	Partner	8	8	6
	Other	0	0	4
Education	PhD	2	2	1
	Master	6	4	8
	Bachelor	0	3	11
	High School	1	1	7
IT competence	Yes	3	5	2
	No	7	5	25

Table 6.2. *Privacy Concerns*

Theme	**Responses**
Perceived privacy risk	Data breaching. It can be problematic because you have no idea what are (is) people going to use this information for [P1].
	Telephone, address, etc (.) is public knowledge in Norway. So, no big risk. But there is a risk, when it comes to driving history, driving behaviour (behavior) , etc… This data can be sold and used in a big-data setting to profile me as a user [P3].
	Aggregate information, unclear of the purpose of us these data, data storage is also unclear [P5].
	Data misuse. You have on full control over what the data will be used for[P6].
	Well.it can be exposed to many things. Data breaching [P8].
	I have nothing to hide, Google gathers more data[P9]!
	Don’t like it, no one can guarantee the privacy and how secure my

	info [P9].
	Some things (something) is (are) not possible to avoid, but I don't like sharing anything unneccesary (unnecessary) [P10].
	Five out of ten respondents (Tesla owner) express their privacy concerns about personal information collected by Tesla [P1, 3,5, 6, 7, 10]. One respondent mean he has " a bit" privacy concern [P4]. Two Tesla owners mean they don't have privacy concern [P2, 8].
	One says "It's fine to share general info like mil(mail), age, per day running costs but not my location and browsing history [P9]."
	One says " This profile can (and will) be sold. (like Google and Facebook does). In norway (Norway) it will probably not affect me personally that much, but in general this knowledge can be used to make my life more difficult in the long run [P3]. "
	Five out of ten respondents (Tesla owner) mean their privacy concerns of personal information override their personal interest to use the service [P1, 2, 5, 7, 9]. Four respondents indicate[P6] " sometimes" while one indicates "maybe[4]".
	The responses that point out perceived privacy risk in relation to personal data, all respondents indicate certain levels of privacy concerns. One point out "Hacking and loss of personal information[P13] "; "Data abuse, traceability (refers to personal information e.g., telephone, address, driving history, browser history, etc.) [P14]" ; "Data breaching and uncertainty about the purpose of using the data. [P16]" ; "It varies by the type of information. Couldn't care less about my address, but I try not to share driving history, browser data, etc.[P18] " ; "Risk of id (identity) theft [P19] " ; and "(There is) Medium to high risk in relation to my personal information [P20]."
	Four out of ten respondents (shared car users) express privacy concerns in relation to personal data collected by shared-car company- "(There is) Medium to high risk in relation to my personal information[P20]"; "Well, Yes, I do have (refers to personal information e.g., telephone, address, driving history, browser history, etc.) because it is stored in the system and God knows who will misuse it [P14] "; "Yes (privacy concern) refers to personal information e.g., telephone, address, driving history, browser history, etc.). For example, I don't want people know where I am [P16]".
	Four out of ten respondents (shared users) mean their privacy concerns of personal information override their personal interest to use the service[P11, 15, 16, 19], while two means it may sometimes like that[P17, 18]. Four respondents indicate their personal interest overrides privacy concerns, one of them states that "Yes, it still does (refers to personal interest override privacy concerns). But it would be important not to provides so many privacy information[P14]."
	There are bus users indicate perceived privacy concerns in relation to their personal information, for example " The sum of information [P21]", " Don't like being too much controlled [P22]", "I am fine with sharing my personal details except bank card details and browser history [P23]", "data breaching [P24]", "aggregate information, data leakage [P25]", "they already have a lot of my info

	so its too late to worry now [P27]", " Hiker (hacker) [P28]", "Personal data (refers to the type of information participants has privacy concerns about) [P31]", "Adress (address), driving history, browser history (refers to the type of information participants has privacy concerns about)[P33]", "Telephone and address (refer to the type of information participants has privacy concerns about))[P35]."
	eleven out of twenty-seven respondents (bus users) indicate that they do have privacy concern over personal information collected by Kolumbus. While there are twelve respondent means they do not have privacy concerns over this information. One indicates "Some (refers to having privacy concerns in regarding to personal information such as telephone, address, driving history, browser history, etc.)[P22]", "Yes. I have privacy concern regarding my bank details and browser history [P23]", "yes, I don't want others know these information (refers to personal information such as telephone, address, driving history, browser history, etc.) [P24]", "yes, I don't want them to be misused ("them" refers to personal information such as telephone, address, driving history, browser history, etc.) [P25]", "There is nothing you can do about this in the future, cloud connected world .)[P46]",
	Nine out of twenty-five respondents (bus users) mean their privacy concerns of personal information override their personal interest to use the service [P23-25, P31,P35-37,p43,44], while one indicates maybe [P45].

Note. Responses from Tesla owners are high-lighted in orange, shared car owner in blue while bus users in green (same as table 6.3-7)
[P number] refers to participant's response in Appendix B

Table 6.3 *Use Personal Information for Other Purposes than Original ones*

Theme	**Responses**
Secondary use of information	Eight out of ten Tesla owners mean that they do mind that Tesla use consumer's information for other purposes than original ones. [P1, 2, 3, 4, 5, 7, 9, 10]. Two says it depends on the purpose to use gathered information [P1,7]. One of them says "Yes, it depends. If they use it to improve service, it's ok (O.K.). However, the commercial purpose is considered as not acceptable [P1] ". The other one says " Yes, I Do. However, they will do that for business purposes [P7]."
	There is one respondent (Tesla owner) express " Depends how, Again- Google gather much more (!)[P8]"
	One respondent indicates he doesn't mind "Not really. They do that anyway" [P6]
	Seven out of seven shared car users indicate they do mind if Hyre (the shared car company) using personal information for other purposes than the original one[P11-20].
	Yes, I do (refers to using personal information for other purposes than the original one) . It is important that they use it based on the contract [P14].
	Nineteen out of twenty-seven bus users indicate that they do mind if Kolumbus using personal information for other purpose than the original one[P21-28, 31-35, 41, 42, 46, 47].

	It depends. I should be informed [P34],
	Fine (refers to use personal information for other purposes) with the exception my bank information and browser history [P23]
	Well, Hopeful not. But it depends, if it is used for create (creating) good things, it's ok. But it they use to make money, I won't like it [P24].
	They'd better to ask for consent in advance [P25].
	I don't like that idea (refers to use personal information for other purposes) [P33]
	that will be not fine [P46]

Table. 6.4 *Ease of Use*

Theme	Responses
Ease of Use	I think it is a car with many benefits. For example, it doesn't use a combustion engine. In this sense, it's easier to repair and maintain.[P5]
	It's cheap to drive, easy to maintain. Price is accetable (acceptable).[P6]
	Very useful car. It's more than just car. It enables the driving to reach the other level. [P1]
	VERY comfortable to drive! And cheap to drive! [P3]
	Eight out of ten Tesla owners think by sharing their information, using their Tesla becomes more convenient [P 1, 2, 3, 5, 6, 7, 8, 9] . One of them has less certainty about it [P9]. Two point out by sharing their information, using their Tesla maybe become more convenient [P1, 5].
	(It is) Less work to maintain the car. [P1]
	Convenient, like to drive(it is convenient to drive), low cost. [P2]
	All responses from shared car users indicate good impression of this service. For example, Good [P11] .
	Not very user friendly (user-friendly) registration through invitation link, but very easy once registered [P12]!
	All good. Once I didn't manage to start the lease. But then I received a refund[P13].
	The service is simple, easy to use, but when finishing the car hiring, it was not quite clear how to complete /stop the hiring fully. I had to call the Hyre call center to help me fully stop the hiring[P14].
	Easy and convenient [P15].
	It's good, but not convenient. The registration takes time. The travel distance is somehow (somehow) limited [P16].
	Easy to use, cheap [P17].
	Quick setup, clean car, easy to use [P18]!
	It is good and affordable [P19].
	Very good[P20].
	Eight out of ten shared car user think sharing if their information makes this service ease of use [P 11, 12, 13, 15, 16, 17,18, 20], while two of them are not sure[P19], one doesn't think so[P14]. One indicates "I understand why there is a requirement of uploading the drivers' licence (license) [P12]."

	Eight out of nine shared car users think by sharing personal information, this service can become more convenient/effective [P11, 12, 13, 14, 16, 17, 18, 20]. One of them states "Once provided these personal data, next you don't have to because you are registered. It can be time saving [P14]." One respondent indicates no, while one indicates "not sure[P19]."
	I have no own car. It is good that we can use them for various purposes (e.g., travelling) without having to be bound to public transport [P14].
	Convenience [P15]
	It's cheaper to drive, relatively convenient since I don't have to maintain the cars [P16].
	Just like that it is an option and cheaper than taxi [P19]
	Convenient and good [P25].
	Twenty-one out of twenty-six bus users think share of information contribute make this service ease of use [P21-25,27,28,31-34, 40-47], one bus users indicate "Probably(refers to sharing personal data make this service ease of use), since the service provider can use it to improve the services[P24]." Two bus users mean they are not sure[P29, 30]. One says " maybe[P29] " while there are four don't think so[P26, 35, 38,39].

Table 6.5 *Trust of Service Provider*

Theme	**Responses**
Trust of service provider	Three out of ten Tesla owners mean they trust their electric car company can handle consumer's information well [P3, 8, 9].
	Yes. For sure they have capacity to do that quite well since the stock value and business is what they care. That is capitalism! [P3]
	Six out of ten Tesla owners indicate they do not trust the service provider. However, one of them has ambiguous attitude : "Not sure. But big company like Tesla supposed has good enough resource and strategy to protect their data base. " [P 6]
	Five out of ten shared-car users mean they trust the Hyre can handle consumer's information well. However, one of them says " I think they can…but everyone can be hacked[P19].
	17 out of 26 bus users mean they trust Kolumbus can handle consumer's information well, and one of them says " I think so, since it's operated in Norway, I think all companies in Norway are trustworthy because they have to follow the law[P 24]."
	The remaining nine respondents express their trust in Kolumbus in more subtle manner. One of them says " I hope so[P22]", " litt (Englsh: lilltle)[P26] " ," IDK(I don't know)[P27]"," Kind of [P28]", "I am not sure)[P31]" , and "Maybe [P35]".

Table 6.6 *Location Information*

Theme	**Responses**
Location Information	Seven out of ten Tesla owners mean they do mind if there are others know about their location information [P1, 3- 7, 9, 10].

	Seven out of ten shared car users mean they do mind if there are others know about their location information[P13, 14, 16-20], while one respondent means " (It) Depends (depends) on who- I share my location with friends and family all the time [P12]." There are two respondents mean they don't mind [P11, 15].
	One of the shared car users says " Yes. For example, I don't want people know where I am[P16]" while he described his privacy concern in relation to personal information collected by Hyre (the shared car company)
	Eighteen out of twenty-seven bus users mean they do mind if there are others know about their location information. One says " yes. It can be a problem [P24]" , " Yes, I don't like that [P33]" , " It could be dangerous but if it is with a public authority and secured, I do not have such concerns [P45] ", " Never, that's bad! [P46]" . In contrast, there are three bus users clearly indicate they don't mind [P23, P30, P43]

Table 6.7 *Intention to Use*

Theme	**Responses**
Intention to use	All respondents (Tesla owners) express their intention to use electric car by recommending it to their friends. [P1-10]
	After asked a set of questions about privacy concerns, five out of eleven Tesla owners mean their personal interests of using electric car override their privacy concerns in regarding to the personal information privacy. [P3, 4, 6, 8,10]
	Eight out of ten respondents (shared car users) express that they have intention to continue using this service [P 11-16, 19, 20]
	After asked a set of questions about privacy concerns, six out of nine respondents mean their personal interests to use shared car service override their privacy concerns in regarding to the personal information privacy [P12-14, 17,18, 20].
	All respondents in this group express their intention to continue using this service.
	After asked a set of questions about privacy concerns, sixteen out of twenty-five respondent (bus users) mean their personal interests override of using bus override their privacy concerns in regarding to the personal information privacy[P21, 22, 26-30, 33, 34, 38-42, 46, 47].

Table 6.9

Sociodemographic Characteristics of Participants at On-line Survey (N=187) (text description of infographic Table 6.9)

Age	n (%)	Education	n (%)
20-29	116 (62%)	High school	9 (4.8%)
30-39	47 (25.1%)	Post graduated (MSc /MPhil)	82 (43.9%)
40-49	18 (9.6%)	PhD	91(48.7%)
50-59	5 (2.7%)	Vocational training	5 (2.7%)
60-69	1 (0.5%)		
Gender	n (%)	Use of Public transport	n (%)
Male	105 (56.1%)	Yes	153 (82.4%)

Female	82 (43.9 %)	No	33 (17.6%)

Note. N=187 (n (%) = the number and percentage of participants that choose each alternative to this question)

Table 6.10. *Participants' use of Public Transport (text description of infographic- Table 6.1 in Chapter 6)*

Percentage of use [a]	n (%)
Never (< 10 %)	6 (3.2%)
Rarely (something like 10% of the times)	12 (6.4%)
Occasionally (something like 30% of the times)	26 (13.9%)
Sometimes (something like 50% of the times)	28 (15%)
Frequently (something like 70% of the times)	28 (15%)
Usually (something like 90% of the times)	24 (12.8%)
Always (> 90 %)	30 (16%)
Intention to continue using public transport [a]	
Very Unlikely	1 (0.5%)
Unlikely	4 (2.1%)
Somewhat unlikely	4 (2.1%)
Neutral	7 (3.7%)
Somewhat likely	22 (11.8%)
Likely	31 (16.6%)
Very likely	85 (45.5%)

The tool use purchase bus ticket [a]	
Mobile app	114 (61%)
Bus card	12 (6.4%)
Both	12 (6.4%)
I used to use bus card, but I use app now	11 (5.9%)
other	4 (2.1%)
Other means of transport [a] (multiple choice)	
Car from car sharing provider	11 (5.9%)
Personal car (EVs, hybrid)	39 (20.9%)
Personal car (none EVs, hybrid)	60 (32.1%)
I walk, use the bike, e-scooter (as electricity comes from hydropower)	117 (62.6%)
Other non-low-carbon alternative (e.g., scooter that runs on gasoline)	6 (3.2%)
None of these	12 (6.4%)
I don't use any further means of transport	11 (5.9%)

Note. [a] Reflects the number of participants answering "yes" to the questions of " Use of Public transport " in Table 6.9.

Table 6.11a. *Percentage of Using Other Means of Transport (text description of infographic Table 6.11 in Chapter 6)*

Car from car sharing provider [b]	n (%)
Almost none (< 10 %)	5 (50%)
Rarely (something like 10% of the times)	3 (30%)
Occasionally (something like 30% of the times)	1 (10%)
Almost all (> 90 %)	1 (10%)
Personal car (EVs, hybrid)[c]	
Almost none (< 10 %)	7 (18.4%)
Rarely (something like 10% of the times)	8 (21.1%)
Occasionally (something like 30% of the times)	3 (7.9%)
Sometimes (something like 50% of the times)	7 (21.1%)
Usually (something like 90% of the times)	4 (10.5%)
Almost all (> 90%)	8 (21.1%)
Personal car (none EVs, hybrid)[d]	
Almost none (< 10 %)	2 (1.1%)
Rarely (something like 10% of the times)	17 (29.8%)
Occasionally (something like 30% of the times)	10 (17.5%)

Sometimes (something like 50% of the times)	8 (14%)
Frequently (something like 70% of the times)	13 (22.8%)
Usually (something like 90% of the times)	4 (2.1%)
Almost all (> 90%)	6 (10.5%)
I walk, use the bike, e-scooter (as electricity comes from hydropower)[e]	
Rarely (something like 10% of the times)	25 (23.4%)
Occasionally (something like 30% of the times)	29 (27%)
Sometimes (something like 50% of the times)	22 (20.5%)
Frequently (something like 70% of the times)	19 (17.7%)
Usually (something like 90% of the times)	7 (6.5.%)
Almost all	10 (9 %)
Other non- low-carbon alternative (e.g., scooter that runs on gasoline)[f]	
Almost none (< 10 %)	2 (34,8%)
Rarely (something like 10% of the times)	1 (21.7%)
Almost all (> 90%	3 (43.5 %)

Note. [b] Reflect the number of participants that choose "Car from car sharing provider" as alternative means of transport besides public transport in Table 2.

[c -f] Reflect these who choose "Personal car (EVs, hybrid)", "Personal car (none EVs, hybrid)", "I walk, use the bike, e-scooter (as electricity comes from hydropower)" and "Other non-low-carbon alternative (e.g., scooter that runs on gasoline)" respectively.

Table 6.11b *Likeliness of Continuous Using Shared car or Personal car (EVs, hybrid) (text description of infographic Table 6.1 in Chapter 6)*

Likeliness of using shared car in the abovementioned percentage [g]	n (%)
Very unlikely	1 (10%)
Neutral	3 (30%)
Somewhat likely	3 (30%)
Likely	1 (10%)
Very likely	2 (20%)
Likeliness of electric car in the abovementioned percentage [h]	
Very unlikely	1 (3%)
unlikely	1 (3%)

neutral	3 (8%)
Somewhat likely	3 (8%)
Likely	11 (30%)
Very likely	18 (3%)

Note. [g-h] Reflect the number of participants that answer their use percentage of "Car from car sharing provider" and "Personal car (none EVs, hybrid)" as alternative means of transport in Table 3 respectively.

Table 6.13. *Information that Considered as Private by Participants (a multiple-choice question)(text description of infographic Table 6.13)*

Type of Information	n (%)
Telephone number	79 (42.2%)
E-mail	66 (35.5%)
Address	96 (51.3%)
Payment related information (e.g., credit card)	112 (59.9%)
Mobility	97 (51.9%)
Image	96 (51.3)
Browser	103 (55.1)
Event	73 (39%)
Other	31 (16.6%)

Table 6.12 *Descriptive statistics of Intention to use before privacy concern (text description of infographic Table 6.12)*

	N	Mean	Std. Deviation
EV	36	5.89	1.369
Share car	10	5.6	1.506

Collective transport	155	6.1	1.295