Analyzing the acceptance of Air Taxis from a potential user perspective

Extending the Technology Acceptance Model towards an Urban Air Mobility Acceptance Model (UAMAM)
Master Thesis in General Management

Title: Analyzing the acceptance of Air Taxis from a potential user perspective
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Key terms: Urban Air Mobility, Air Taxis, Technology Acceptance Model

Abstract

Background: A continuously growing urban population leads to congested urban areas. As a result, people are wasting time being stuck in traffic. One way of solving this problem is to use the air for moving people. Thus, companies all over the globe are working extensively on approaches for Urban Air Mobility such as air taxis.

Purpose: The purpose of this thesis is the identification of key determinants influencing the acceptance of air taxis from a potential user perspective. Thereby, the thesis develops the Urban Air Mobility Acceptance Model (UAMAM) as an extension of the Technology Acceptance Model (TAM).

Method: An explanatory online survey was conducted to test the hypotheses in the proposed UAMAM. Data from 321 respondents living in cities larger than one million inhabitants representing the potential target group was collected. Partial Least Squares Structural Equation Modeling (PLS SEM) was used to assess the measurement model in terms of validity and reliability and the structural model in terms of hypotheses testing and strength of relationships between proposed variables. Further, a multigroup analysis has been examined to identify significant differences among groups.

Conclusion: The results show that the attitude, which is strongly influenced by the perceived usefulness, as well as subjective norm, travel cost and the personal innovativeness are key determinants affecting the users’ behavioral intention to use air taxis. Further, moderating effects of age on the relation between time saving and behavioral intention as well as on the relation between personal innovativeness and behavioral intention were identified. Additionally, moderating effects of occupational status on the relation between travel cost and behavioral intention were found.
Acknowledgement

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<tr>
<td>AVE</td>
<td>Average Variance Extracted</td>
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<tr>
<td>CR</td>
<td>Composite Reliability</td>
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<tr>
<td>CO₂</td>
<td>Carbon Dioxide</td>
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<tr>
<td>eVTOL</td>
<td>Electrical Vertical Take-off and Landing</td>
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<td>FAA</td>
<td>Federal Aviation Administration</td>
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<td>H</td>
<td>Hypothesis</td>
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<td>MICOM</td>
<td>Measurement Invariance of Composite Models</td>
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<td>PLS</td>
<td>Partial Least Squares</td>
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<td>RQ</td>
<td>Research Question</td>
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<td>SEM</td>
<td>Structural Equation Modelling</td>
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<td>SRMR</td>
<td>Standardized Root Mean Square Residual</td>
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<td>TAM</td>
<td>Technology Acceptance Model</td>
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<td>TPB</td>
<td>Theory of Planned Behavior</td>
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<td>TRA</td>
<td>Theory of Reasoned Action</td>
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<tr>
<td>U.N.</td>
<td>United Nations</td>
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<tr>
<td>UAM</td>
<td>Urban Air Mobility</td>
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<td>UAMAM</td>
<td>Urban Air Mobility Acceptance Model</td>
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<tr>
<td>VIF</td>
<td>Variance Inflation Factor</td>
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<td>VTOL</td>
<td>Vertical Take-off and Landing</td>
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1. Introduction

This chapter introduces Urban Air Mobility (UAM) as an extensively discussed topic when talking about the future of urban mobility. The chapter starts with a general background emphasizing the reasons for the emergence of UAM and exposes the meaning of UAM. Further, it highlights key elements determining if UAM will become reality. The public acceptance as one determining element is discussed as missing in previous research. Based on that the research problem, the research purpose as well as the research question are explained. The structure of the thesis is described at the end of this chapter.

1.1 Background

Traveling in urban areas seems to become an increasing problem. In the most congested cities, it is not unlikely, that a driver spends up to 100 hours stuck in traffic per year (Lineberger, Hussain, Mehra, & Pankratz, 2018). People waste millions of hours on the road. In San Francisco, for example, an average resident spent 230 hours in 2015 commuting to her or his office and back losing hours of productivity every day (Holden & Goel, 2016). She or he spends approximately 102 hours yearly in traffic jams. Moscow and New York share the rank with 91 hours a year (Grandl et al., 2018). In Munich, drivers spend 51 hours yearly in stop-and-go traffic (Grandl et al., 2018). This means that more money needs to be spent on fuel, there is less time for retreat or productive work and subsequently, the stress level and the blood pressure is elevated (Holden & Goel, 2016). Spending time in traffic jams, therefore, causes higher emissions due to the increased fuel consumption and next to that the loss of human life due to the high stress level (Grandl et al., 2018). The growth of populations and the rise of urbanization could worsen the challenges of being stuck in traffic since the urban populations grow twice as fast as the total population (Aaronson, Mester, Mallory, & Hattori, 2018; Lineberger et al., 2018). As estimated by the U.N., in 2050 up to 80 percent of the global population will live in cities and urban areas (Grandl et al., 2018). This causes the increasing problem that in many places the physical space to build urban infrastructure is already exhausted (Lineberger et al., 2018). Furthermore, in many big cities, the transportation infrastructure is derelict and accompanied by a low motivation to upgrade it through investments (Aaronson et al., 2018). The provided infrastructure has already or is about to reach its
limits and it becomes too costly adding new infrastructure solutions. Moreover, the disadvantages for residents’ quality of life needs to be taken into consideration (Grandl et al., 2018). To sum up, it is too costly coming up with special solutions or there is no space for it. Lineberger et al. (2018) suggest two solutions approaching this problem. The first one is to use the power of data for improving the transportation supply and demand by balancing it in a better way. The second one is to use the air to move people. Advances in hybrid or fully electric propulsion as well as autonomy and data analytics unlock new opportunities for travel and transportation (BOEING NEXT, n.d.). Those advances in electric propulsion and aircraft technology open new possibilities of mobility and argue for the emergence of the so called Urban Air Mobility (UAM) (Baur, Schickram, Homulenko, Martinez, & Dyskin, 2018). UAM as a broad term meaning the transportation of goods and persons in urban areas by using flying objects, also known as flying vehicles, flying cars or drones (Baur et al., 2018). There is a high interest from large companies especially in the aerospace and automotive industry as well as from transportation providers like Uber. Huge investments are made to develop technologies for UAM (Aaronson et al., 2018). More than 70 manufacturers, including the Airbus S.A.S. and the Boeing Corporation, are working on different concepts (Fernando, 2018).

In order to give a sense of time, two studies estimate the market launch. According to Grandl et al. (2018), electric passenger drones will begin to provide services for commercial mobility in 2025. Those air mobility providers will focus on airport and city center connections, especially for business travelers. In 2035 they assume to already have personal or rented passenger drones (Grandl et al., 2018). In Munich, for example, Baur et al. (2018) estimate about 100 passenger drones being in service for air taxi services, airport shuttles and intercity flights in 2030 growing to approximately 800 flying vehicles in 2050.

According to Grandl et al. (2018), the technology, the infrastructure, law and regulations as well as social acceptance will be the key elements that need to be considered. Baur et al. (2018) introduce the same key factors and add the service providers as an essential key element. Furthermore, Holden and Goel (2016) line up with the previously mentioned and described the key factors in even more detail. They define the factors certification process, vehicle efficiency, vehicle performance and reliability, battery technology, air traffic control, safety, cost and affordability, emissions, aircraft noise, infrastructure and pilot training as crucial determinants (Holden & Goel, 2016). Additionally, in that
context, Lineberger et al. (2018) name regulations, technology, infrastructure, air traffic management, safety and psychological barriers. Concluding, the psychological barrier related to the social and public acceptance is one very important key element affecting if this vision is becoming a reality or not. According to Taherdoost (2019), it is crucial to consider user acceptance for the development of new technologies. Technology adoption can be increased through considering and emphasizing the factors influencing the user acceptance (Taherdoost, 2019). In general, the literature on technology adoption considers the factor of acceptance as crucial. The leading theory analyzing user acceptance of new technologies or innovations is the Technology Acceptance Model (TAM) (Bagozzi, 2007). Although there is a huge variety of several theories on technology acceptance, the TAM protrudes as a widely applied construct in different fields of technology acceptance (Venkatesh, Morris, Davis, & Davis, 2003).

1.2 Problem statement

Reflecting upon the background, the public acceptance is considered as crucial factor influencing the adoption and emergence of UAM. The social acceptance in the context of UAM is mentioned as a key determinant in almost every study and article about UAM but, as we found out, the actual acceptance is not or very limited researched so far. The public acceptance of UAM and air taxis are not researched sufficiently for making valuable statements about the perceptions and concerns of future users that could be used by affected parties such as future air taxi providers or current air taxi developers. Most of the studies and articles are examining the importance of the factor public acceptance beneath several others, but are not commenting it further. Current research and activities are more related to technical feasibilities, infrastructure and legislation. Moreover, the above described TAM is immature in the field of mobility in general and non-existent in the field of UAM. At the moment, most extensions of the TAM are related to information and computer technology (Marangunić & Granić, 2015). Many articles declare the importance of extending the TAM in order to improve the predictive validity of it (Marangunić & Granić, 2015). Finally, information about differences in the context of demographical comparisons in the context of UAM acceptance cannot be found in the literature.
1.3 Research purpose and question

Summarizing, two gaps have been identified in the present literature. Since various studies and articles claim, that the public acceptance will be a barrier of the commercial feasibility of UAM, we identified a research gap related to the lack of analysis regarding the public acceptance of UAM from a potential user perspective. Next to that, the TAM has never been applied in the context of UAM. Thus, by extending the TAM towards UAM we fill a second gap in the existing literature. Therefore, this thesis examines the key determinants influencing the potential users’ acceptance of UAM by integrating those key determinants into the TAM and extending it to an Urban Air Mobility Acceptance Model (UAMAM). According to the background provided above, we assume the future users’ to be the ones living in large cities. By analyzing the acceptance of the assumed future users, we help the companies working on flying vehicles and air taxis to better understand the users’ needs and perceptions influencing their intention to use air taxis. Involved persons in the topic of UAM could learn from the outcome of the research and consider the determinants we found in our research. All companies and institutions could benefit from understanding consumer behavior as well as users’ concerns. Next to that, we increase the awareness of UAM as a modern mobility approach and add value to the existing literature of technology acceptance by making it applicable in a new field. The purpose of this thesis is the development of the Urban Air Mobility Acceptance Model (UAMAM). The thesis identifies key determinants of UAM acceptance and adoption and analyses the human perceptions and concerns towards the usage of air taxis. This thesis also provides demographical comparisons of air taxi acceptance. Since the whole construct of UAM is intended to reach the broader population in the long term, we decided to focus on the broader target group living in cities larger than one million inhabitants for our research. Further, we focus on the acceptance and intention of potential users living in cities larger than one million inhabitants in regard to the shuttle and air taxi services only, which is the most realistic and near-term approach of UAM (Grandl et al., 2018). Based on the purpose, we created this explicit research question. We aim to answer this research question in our thesis by proposing and testing the UAMAM.

_RQ: What are the key determinants influencing the acceptance of air taxi services from a potential user perspective?_
1.4 Structure of the thesis

The following Figure 1 visualizes the structure of the thesis and gives a guideline in order to clarify the general thesis approach.

Figure 1: General thesis approach

Source: own figure

Coming from the background we set up a research question that is answered at the end of this thesis. In order to create a basic understanding of technology acceptance and Urban Air Mobility, we start with reviewing the literature on those topics. For proposing the UAMAM, we assume the air taxi service to be similar to passenger air transportation and public transportation in terms of human concerns and perceptions. Further, we extend that determinants that have been found when reviewing the literature on passenger air transportation and public transportation with determinants coming from previous TAM extensions. Based on those three chapters, we propose the UAMAM and its hypotheses. As a next step, we provide the way of how to answer the research question and therefore
develop an entire methodological framework including the description of the chosen quantitative survey strategy. After that we describe the data analysis procedure starting with descriptive information analyzed using SPSS as well as the hypotheses testing and UAMAM testing. Finally, we analyze the influence of some of the demographics on the hypotheses. In our conclusion, we summarize the empirical findings and results with referring to the research question and finally answer it. The discussion provided in the very end of this thesis discusses the results and gives theoretical as well as practical implications. It shows the limitations of the thesis and proposes future research areas.
2. Frame of reference

The following chapter provides the theoretical framework of the thesis. Firstly, we present how we have proceeded in our search for relevant literature. Secondly, we summarize current knowledge about UAM. Thirdly, we introduce the TAM as the most used theory when analyzing technology acceptance. Fourthly, we use the current knowledge on attitudes towards passenger air transportation and public transportation from a user perspective to find the most relevant variables for the UAMAM. Finally, we connect and extend those variables with previously used variables in TAM extensions and propose the UAMAM with its hypotheses.

2.1 Reviewing procedure

Among the existing scientific literature databases, we decided to use Web of Science, Microsoft Academic, Google Scholar and Primo. All databases provide several search options and filters, which allowed us to narrow down to the most relevant and appropriate literature. In order to find relevant literature, a systematic approach was examined. Based on our research topic, we have divided the search mainly into three parts. Firstly, we looked for relevant literature on UAM. We started with the keywords “urban air mobility” and “air taxi”, which were then extended with new keywords such as “flying vehicle”, “passenger drone”, “flying car” and several others due to the enhanced knowledge during the review. The first part of our search revealed only a small amount of literature on UAM as it is a fairly new topic. Secondly, we searched for articles and studies on technology acceptance. In the context of technology acceptance, the literature revealed further keywords such as "technology adoption", "prior acceptability", "consumer behavior", "usage intention" and "adoption behavior", that helped us to find the most relevant literature. In contrast, the second search in the area of technology acceptance showed a large number of results. Thirdly, we combined both topics in our search. The combination of UAM and technology acceptance did not lead to any relevant literature. Therefore, we assumed that UAM can be observed as a new way of public transportation through the air. Thus, for proposing the UAMAM we considered the literature on attitudes towards passenger air transportation and public transportation. In order to obtain more specific context-related literature, we checked the references of relevant articles as well as researched where those relevant articles have been cited. In short, we followed a snowball
approach. In order to distinguish between appropriate and non-appropriate literature, we considered the impact factor and the number of citations as the main defining factors. In the context of UAM, however, we have decided to consider articles and studies without or with a low impact factor due to the limited availability of suitable literature and less research in this area. We mainly used company studies instead of peer-reviewed articles on UAM but through comparing the variety of the studies we made sure that no misleading information is given in the thesis. Nevertheless, most of the retrieved studies are from very well-known and renowned consultancy companies such as The Boston Consulting Group Corporation or Roland Berger GmbH, which are assumed to be trustable sources.

2.2 Urban Air Mobility (UAM)

Today, UAM is not a fantasy anymore (Grandl et al., 2018). UAM provides an opportunity to mitigate the challenges of urban areas (BOEING NEXT, n.d.). The deployment of UAM is making steady progress all over the world (Grandl et al., 2018). When it comes to the term UAM or, as Grandl et al. (2018) call it, vertical mobility, there are mainly four services that need to be mentioned. Inspection, goods delivery, supporting services, and passenger transport. This thesis focuses on passenger transport only, an air mobility offering for transporting passengers (Grandl et al., 2018). The following chapters provide an insightful overview of Urban Air Mobility in order to get a basic understanding of it.

2.2.1 Technological concepts

To get an idea of flying vehicles or air taxis, we provide a set of technical concepts below. Reviewing the literature, there is a multitude of different concepts of flying vehicles for passengers. To bring clarity into the darkness and to prevent confusion we reviewed several studies. The studies of the Roland Berger GmbH, the Porsche Consulting GmbH, and the Deloitte GmbH seem to cover the different technical approaches sufficiently. In a study of the Deloitte GmbH the distinction between passenger drones, traditional flying cars, and revolutionary vehicles is explained (Lineberger et al., 2018). They define passenger drones as an electric or hybrid-electric quadcopter with four or more rotors being driven autonomous, manually piloted or remotely piloted. Further, they define traditional flying cars as vehicles possible to be driven in a car configuration as well as being reconfigurable to an airplane. Revolutionary vehicles are defined as a combination
of both (Lineberger et al., 2018). The study of the Porsche Consulting GmbH distinguishes the concepts multirotor, lift and cruise and tilt-x (Grandl et al., 2018). They define the multirotors as a rotorcraft having at least two motors. The lift and cruise concept represents a hybrid model having fixed-wings and rotors enabling vertical take-off and landing. Further, they introduce the tilt-x concept having wings and rotors and all of them can be tilted (Grandl et al., 2018). Finally, in the study of the Roland Berger GmbH, Baur et al. (2018) distinguish between multicopters, quadcopters, hybrid concepts, convertible aircraft concepts and fixed-wing vectored thrust concepts. The first and the second concept is representing wingless concepts with a different number of rotors. They define hybrid concepts as aircrafts with forward-facing propellers as well as upward-facing propellers for take-off and landing phases. The tilt-wing or convertible aircraft concept is similar to the tilt-x concept explained above. Additionally, they introduce a fixed-wing vectored thrust concept, where the aircraft is equipped with variable-direction fans in a more or less fixed wing (Baur et al., 2018).

What most of them have in common is the opportunity of vertical take-off and landing (VTOL). Therefore, they do not require a runway. In general, they are designed to transport between two and five passengers, they are highly energy efficient and they have decreased or zero emissions (Lineberger et al., 2018). They are quieter and less expensive than helicopters (Grandl et al., 2018). Having electrical drives with zero emissions they are also called electrical VTOL, or short eVTOL (Baur et al., 2018). Those flying vehicles could make it possible to fly over all the traffic jams, traveling from one location to another (Baur et al., 2018). To sum up, the proposed main benefits are fast transportation and therefore saving time, flexibility in the sense of on-demand mobility as well as low infrastructure costs (Grandl et al., 2018). Further, there should be a safe and enjoyable flight experience (Baur et al., 2018). To further trigger the imagination, the following picture shows a virtual scenario of Urban Air Mobility developed by the German company Lilium GmbH.
2.2.2 Different forms of UAM
There are several different approaches for the forms UAM could take in the future. Fernando (2018) describes the approaches airport shuttle, general air taxi services, and air ambulance as future usability models. The Porsche Consulting GmbH highlights the approaches of personal aircraft ownership, aircraft rental, on-demand air taxi services, air bus services and rescue operations (Grandl et al., 2018). The Roland Berger GmbH focusses on air taxis, airport shuttles and intercity flights (Baur et al., 2018). Finally, the Boston Consulting Group Corporation distinguishes air vehicles as a supplement to helicopters with limited use, as a replacement for car services providing transportation on key routes only, as a replacement for car services on many urban roads and lastly as a replacement for car services as a door-to-door transportation (Aaronson et al., 2018).

Comparing those different UAM approaches, we conclusively assume that there are fundamentally three usability models for flying vehicles: personal ownership or rental with door to door transportation, air taxi or intercity services including shuttle services on more or less key routes and air ambulance services. As described above, this thesis focusses on the air taxi services as the closest approach to feasibility in terms of time.

2.2.3 Current challenges
According to Grandl et al. (2018), there are the main challenges in the development of the aircraft system, the certification and law as well as the infrastructure next to the social acceptance that needs to be considered. In the context of the technical development, Baur
et al. (2018) propose that there will be initial pilot projects starting around 2020. In 2017 there were test flights in Dubai already (Baur et al., 2018). At the moment, one crucial characteristic still in development is the range (Baur et al., 2018). The estimation is a range up to 250 kilometers that will be reached between 2025 and 2030 (Baur et al., 2018). Those most probably tilt-wing air crafts will carry up to five passengers with a speed up to 300 kilometers per hour (Baur et al., 2018).

Concerning the certification and legislation, it is expected that Urban Air Mobility will be a highly regulated market (Grandl et al., 2018). Currently, existent certification standards are used for evaluating the feasibility of different technical concepts (Grandl et al., 2018). However, according to Grandl et al. (2018), those certification standards will not be sufficient. The authorities are willing and ready to develop new certification standards and they are also motivated to provide test areas (Grandl et al., 2018). The U.S. based Federal Aviation Administration (FAA) and the equivalent agencies are making progress and have already started to discuss the legislation with manufacturers (Lineberger et al., 2018). Lineberger et al. (2018) propose proper air traffic management as an essential part of the system.

The infrastructure, which includes proper take-off and landing zones as well as charging stations, still needs to be installed (Lineberger et al., 2018). For that, a collaboration of urban planners and commercial stakeholders is needed (Lineberger et al., 2018). According to Grandl et al. (2018), a key success factor for creating an appropriate infrastructure is a thoughtful integration to the overall transportation network of the city. To find a balance between benefits and disturbances is crucial (Grandl et al., 2018). Grandl et al. (2018) propose about 100 take-off and landing sites in megacities of five million inhabitants and more in order to provide sufficient service. In order to have safe infrastructure, Baur et al. (2018) estimate the adoption of a robust cellular network enabling communication between the eVTOL aircrafts and other flying vehicles and objects as well.

As mentioned above, social acceptance is one crucial barrier to commercial feasibility among those challenges (Grandl et al., 2018). The public acceptance of potential users will be analyzed in the thesis.
2.3 Technology acceptance

Generally speaking, acceptance is related to the agreement that something is satisfactory or right (Cambridge University Press, 2014). In the field of marketing and technology adoption, acceptance is defined as the willingness of the society to use a new product or service (Cambridge University Press, 2014). Related to the context of this thesis, air taxi acceptance is described as the positive decision of the society towards using this innovation (Taherdoost, 2019).

2.3.1 Importance of considering the acceptance

When it comes to the usage of innovations, the perceptions of the users are in focus. Users are people who decide using a technology or not (Taherdoost, 2019). Next to the users, decision makers in the process of technology development play a crucial role if a technology is adopted after the development or not. They decide about the specifications and other features of an innovation (Taherdoost, 2019). To be successful in developing new technologies, decision makers need to be aware of the factors and reasons, that lead individuals to use a particular innovation (Taherdoost, 2018). Examining user acceptance will provide them with useful information about the relative likelihood of the later success of new technologies (Taherdoost, 2019). Davis (1985) proposes, that especially in the earlier development phase these findings have the greatest value. Concluding, a perfectly designed and developed technology will still fail when no one is willing to use it (Taherdoost, 2019). Just to offer a new technology to the market is not enough. In order to be successful in society, it has to be accepted and used appropriately by the chosen user group (Agarwal & Prasad, 1997). User acceptance occupies an inevitable key position of any new technological development. Raising the factors influencing user acceptance in a positive way will increase the likelihood of technology adoption (Taherdoost, 2019).
2.3.2 Investigating the acceptance

Various literature examined different factors influencing technology usage extensively. In the past, the main focus was on the research fields of marketing, social psychology and organizational theory (Agarwal & Prasad, 1997). The research reveals a huge variety of theories and models which have been developed to investigate the usage, whereby the Theory of Reasoned Action (TRA) acted as a starting point (Alomary & Woollard, 2015). Venkatesh et al. (2003) emphasize its importance saying it “is one of the most fundamental and influential theories of human behavior” (p.428). The TRA was developed in the two scientific works by Fishbein and Ajzen (1975) and Ajzen and Fishbein (1980). As shown in Figure 3 they determine the dependency of human behavior on the three main cognitive components attitude, subjective norm and behavioral intention (Venkatesh et al., 2003). The term attitude toward act or behavior is defined as “an individual’s positive or negative feelings (evaluative affect) about performing the target behavior” (Fishbein & Ajzen, 1975, p. 216). Subjective norm is defined as “the person’s perception that most people who are important to him think he should or should not perform the behavior in question” (Fishbein & Ajzen, 1975, p. 302).

Figure 3: Theory of Reasoned Action (TRA)

The combination of subjective norm and the individual’s attitude towards a given situation shapes the behavioral intention. This intention influences the individual’s actual behavior (Alomary & Woollard, 2015). According to Alomary and Woollard (2015), the theory may enable to forecast an individual’s behavior by connecting perceptions, standards and attitudes to an individual's intention to decide something. Based on the TRA, models, and theories about technology adoption have been developed. Despite the huge variety of models and theories available in the literature, the Technology Acceptance
Model (TAM) stands out as it has been widely applied to a diverse set of technologies and user target groups since 1985 (Venkatesh et al., 2003). The TAM has been the leading model in the context of technology acceptance for about twenty years (Bagozzi, 2007). It can be considered as a robust and validated model with predictive power (King & He, 2006). Further, Mathieson (1991) recommends the TAM as a model that provides a quick solution to collect knowledge about individuals’ perceptions of using a technology.

2.3.3 Technology Acceptance Model (TAM)

The core construct of the TAM shown in Figure 4 was introduced by Davis (1985) and consists of the three components system features and capabilities, user’s motivation to use the system and actual system use.

Figure 4: Basic TAM construct

He assumed that the motivation towards using a new technology is mainly influenced by external stimulus. The users’ motivation towards using a system leads to the actual system use (Chuttur, 2009). Based on other research studies in the field of technology acceptance and mainly through the influence of the Theory of Reasoned Action, established by Fishbein and Ajzen (1975), a conceptual model was defined (Davis, Bagozzi, & Warshaw, 1989; Hsiao & Yang, 2011). Davis et al. (1989) introduced the Technology Acceptance Model as shown in Figure 5. The proposed TAM illustrates that the attitude toward using a technology is crucially dependent on the two variables perceived usefulness and perceived ease of use. Perceived usefulness, originally analyzed in the context of information technology acceptance is defined as “the degree to which a person believes that using a particular system would enhance his or her job performance” (Davis, 1989, p. 320). The other variable perceived ease of use is defined as “the degree to which a person believes that using a particular system would be free of effort” (Davis, 1989, p. 320). Furthermore, the model suggests that the behavioral intention to use
depends on the perceived usefulness. The users’ behavioral intention to use determines the actual system use (Davis, 1989).

Figure 5: TAM including the TRA

Source: own figure based on Davis et al. (1989).

Over the years the TAM model has been continuously developed and extended. Modifications of the TAM aimed to improve its predictive validity and to enhance the understanding of the factors influencing the acceptance of technologies in various fields of research (Marangunić & Granić, 2015). For proposing the UAMAM in the following chapter, the TAM construct introduced by Davis (1989) and Davis et al. (1989) shown in Figure 5 is used as the basic construct to elaborate on.

2.4 Proposing the UAMAM

As described above, the form of UAM addressed in this thesis is an air taxi service. The typical customer journey for air taxi services is described by Grandl et al. (2018). They estimate that in the beginning there will be so called vertiports where the departure and arrival of air taxis will happen, without end-to-end transportation (Grandl et al., 2018). This scenario seems to be very similar to current public transportation systems. Therefore it is assumed, that this form of UAM can be seen as a new way of public transportation in urban areas through the air and therefore as a combination of public transportation and passenger air transportation systems. In order to extend the TAM with the key determinants influencing the acceptance of air taxis, we analyze the consumers’ perceptions and attitudes towards using passenger air transportation systems as well as public transportation in the following. After that, we elaborate further determinants from previous extensions of the TAM that can be adopted for the UAMAM considering the
findings in the chapters of public transportation and passenger air transportation. This approach is executed since there are no previous extensions of the TAM addressing air transportation systems or public transportation.

2.4.1 Passenger air transportation

In the following, we firstly investigate the determinants influencing the society when it comes to using air transportation systems. When reviewing the literature, studies emerge which mainly focus on the various factors influencing consumer satisfaction in regard to airlines. However, this literature allows conclusions to be drawn about the most important factors influencing users’ decision making to use air transportation systems.

The price and the service quality are introduced as influencing the overall customer satisfaction (Clemes, Gan, Kao, & Choong Michelle, 2008). Service quality is differentiated even more precisely into sub dimensions such as timeliness, convenience, helpfulness, comfort or safety and security (Clemes et al., 2008). Furthermore, Molesworth and Koo (2016) refer to service quality and price as important in the decision-making process of air travelers. Therefore, service quality as well as costs play a crucial role in the decision making process of air travelers towards aircraft usage and passenger air transportation systems. However, the degree of influence in the decision making process is not the same for all travelers. Hence, the literature distinguishes between persons who travel for business reasons and those who travel for leisure reasons (Gilbert & Wong, 2003). With regard to the variable price, business passengers are less sensitive to prices than tourist travelers (Ringle, Sarstedt, & Zimmermann, 2011). Another factor, which is discussed in the literature as a key driver towards air travel is the perceived safety, which is connected to the physically perceived risk of flying (Ringle et al., 2011). The accident rates in aviation have decreased over the past 20 years, but passengers are still aware that accidents cannot be completely avoided (Ringle et al., 2011). Therefore, perceived safety has an impact on air travelers towards choosing specific airlines and in general towards using air transportation systems at all (Ringle et al., 2011). Airlines often claim safety as the number one priority (Ringle et al., 2011). Additionally, Clemes et al. (2008) outline the importance of the determinant assurance and reasoned it with two studies, which approved the impact of assurance on customer satisfaction. Gilbert and Wong (2003) one of the sources to which Clemes et al. (2008) refer, contextualizes the term assurance in the context of security and describe well trained and vigilant employees
as measures of security, which will give air travelers more confidence. Additionally, timeliness and time saving aspects are terms which are discussed in the literature to have an influence on customer perception towards airlines (Clemes et al., 2008; González-Savignat, 2004; Jacobson & Kuhltau, 1977). Timeliness is introduced as a determinant, which describes the speed and promptness of the service provided by the airline (Clemes et al., 2008). Supporting this, Gilbert and Wong (2003) claim that on-time performance for flights is a highly ranked attribute. González-Savignat (2004) examines the existence of a time saving advantage by choosing air crafts only on distances, which are longer than three hours of traveling. The time-saving advantage of traveling by plane lacks on shorter distances, due to time spend for check-in, boarding and waiting time at the airport. Thus, travelers tend to downgrade the importance of time saving on short-haul flights (Jacobson & Kuhltau, 1977). The determinants of convenience, helpfulness or comfort have been found as further factors which stimulate customers’ satisfaction towards air traveling. Clemes et al. (2008) introduce convenience as a determinant in the context of departure and arrival times, check-in, ticket-reservation and convenient flight connections (Clemes et al., 2008). Helpfulness as a determinant is associated with air traveling in the context of service personnel and how the staff interacts with their customers (Clemes et al., 2008). Clemes et al. (2008) tested the influence of comfort on service quality with respect to the passengers’ in-flight comfort. In-flight comfort is defined as the passengers’ flight experience given through for example a comfortable seat and enough leg room (Clemes et al., 2008).

Summarized, several determinants can be found in the literature, that influence air travelers’ choice towards using air transportation systems. After discussing the literature on passenger air transportation, we consider the determinants of time saving, cost of travel and service quality including safety and convenience in terms of the ease of use as the most relevant ones to be considered in proposing the UAMAM.

2.4.2 Public transportation

Public transportation includes the public provision of buses, rail, coaches, ferries, trams and taxis as well as hired cars (Redman, Friman, Gärling, & Hartig, 2013). With the increasing problem of urbanization described above, public transportation is important especially in urban settings (Mouwen, 2015). Each time using public transport travelers have to choose between different transport opportunities and each transport opportunity
has different advantages and disadvantages (Beirão & Cabral, 2007). Beirão and Cabral (2007) conducted a study analyzing the perceptions and attitudes of travelers towards public transport and they describe several factors influencing the decision to choose a particular transport opportunity. Furthermore, Redman et al. (2013) describe the attributes attracting the usage of public transportation. Since the previous literature on quality attributes of public transportation creates a large number of determinants, the attributes could be divided into physical and perceived attributes (Redman et al., 2013). Redman et al. (2013) introduce eight physical attributes determining the likelihood to use public transportation. Reliability, meaning the congruence between actual service and route timetable and thus the timeliness. Frequency, meaning the number of operations during a period. Speed, meaning time needed from one point to the other. Accessibility, meaning the number of people to which public transport is reasonably available and accessible. Price, meaning the cost of travel. Information provision, meaning the availability of necessary information to travel properly. Ease of transfers, meaning the ease of transport connections and duration of waiting time. Vehicle condition, meaning the appropriate maintenance and the physical conditions. Redman et al. (2013) add the perceived attributes comfort, safety, convenience, and aesthetics. Comfort refers to the perceived level of comfort of the journey, e.g. noise level and air conditioning. Safety refers to the perceived feeling of safety during travel. Convenience refers to the ease of use and how simple the transport can be booked, accessed and used. Aesthetics refer to the general appeal of the transport system and the waiting areas (Redman et al., 2013). According to Beirão and Cabral (2007), the most important factors why people perceive public transportation as beneficial are travel time and cost. However, travel time can be considered as an advantage and a disadvantage at the same time. When it comes to traveling into the city center, the bus for example is considered faster than the private car. On the other hand, when it comes to traveling across metropolitan regions, public transportation opportunities are perceived as more time consuming than private car usage (Beirão & Cabral, 2007). Considering the costs of public transportation, it is acknowledged as cheaper and more cost saving in comparison to using the car (Beirão & Cabral, 2007). Further perceived considerations of public transportation according to Beirão and Cabral (2007) are the increased convenience of not having to drive and the opportunity to socialize and relax. Chowdhury and Ceder (2016) describe the users’ self-efficacy as important. This emphasizes the travelers’ confidence and perceived ease of
use as a determining factor for using public transport (Chowdhury & Ceder, 2016). Reviewing literature on the choice of travel mode, it is often relied on the Theory of Planned Behaviour (TPB) (Bamberg, Ajzen, & Schmidt, 2003). According to Bamberg et al. (2003) attitude, subjective norm and perceived behavioral control, the key elements of the TPB, are influencing the intention to use public transportation. Using the TPB, Bamberg et al. (2003) found, that the TPB can be adopted towards predicting the usage of public transportation. Chen and Chao (2011) went one step further and combined the TPB with the TAM to examine the intentions why private vehicle users are switching towards public transport. They introduce habit as an important variable influencing the switching intentions. In fact, they conclude that habit has a negative effect on the decision towards the usage of public transportation instead of private car usage (Chen & Chao, 2011). They verified that attitude, subjective norm and perceived behavioral control have a positive effect on switching intentions. Even more, they found out that subjective norm is influencing the decision towards public transportation the most (Chen & Chao, 2011). Summarizing the previous literature on perceptions towards public transportation there are several factors influencing the attitude towards public transportation. However, we consider reliability in terms of timeliness, speed in terms of time saving aspects, convenience in terms of ease of use, the social or subjective Norm, the habit to change as well as the cost of travel and the perceived safety as the most relevant determinants for proposing the UAMAM.

2.4.3 Previous extensions of the TAM
As mentioned above, the TAM is described as a valid and very influential theory to describe the acceptance of individuals in the context of information systems (Lee, Kozar, & Larsen, 2003). Reviewing the variables used in previous extensions of the TAM until 2003, Lee et al. (2003) introduce 25 different external factors determining the acceptance in the context of information systems. One of those summarized variables is complexity (Lee et al., 2003). Complexity is the degree of perceived ease of use and the difficulty to understand (Rogers, 1983). Another external variable listed by Lee et al. (2003) is the self-efficacy, introduced by Bandura (1971). According to Lee et al. (2003), it means the confidence or the belief of someone to perform a behavior properly and correct. We assumed that the self-efficacy is therefore closely connected to the perceived ease of use. Additionally, they name personal innovativeness as determining variable (Lee et al.,
2003). Agarwal and Karahanna (2000) described personal innovativeness as a person’s trait and willingness to try out innovations and new technologies (Lee et al., 2003). Furthermore, subjective norm and social influence are described as important variables to consider (Lee et al., 2003).

Additionally, after 2003, the theory was used for analyzing the acceptance of several different technologies not only in the context of information systems. Kim and Shin (2015) conducted a study analyzing the key psychological quality factors influencing the user acceptance and adoption of smart watches. This study demonstrated that the previous TAM predictors perceived ease of use, perceived usefulness and attitude are valid in the context of smart watch acceptance as well (Kim & Shin, 2015). Pavlou (2003) integrate trust and perceived risk as variables of behavioral and environmental uncertainty in the context of e-commerce. Trust is described as a variable dependent on the degree of risk involved in a given situation and therefore related to the perceived risk (Pavlou, 2003).

We assumed that trust and perceived risk is closely connected to the perceived security or safety of a technology. Taking into account the automation use, also an Automation Acceptance Model was developed as an extension of the TAM (Ghazizadeh, Lee, & Boyle, 2012). Ghazizadeh et al. (2012) highlight trust in technology as an important factor to consider in predicting automation acceptance. Further, an Urban Services Technology Acceptance Model was developed (Sepasgozar, Hawken, Sargolzaei, & Foroozanfa, 2018). In the context of smart cities and the implementation of citizen centric technologies, Sepasgozar et al. (2018) demonstrate the validity of perceived security, perceived ease of use, perceived usefulness, reliability, self-efficacy, cost reduction and time saving as factors influencing the acceptance of urban services technology (Sepasgozar et al., 2018). Finally, as described above, the behavioral intention is influenced by several factors and is determining the actual use or acceptance of a technology as well (Davis, 1989).

Summarizing and reviewing the previous literature on TAM extensions, there are several variables influencing the acceptance that have been applied and proven in different contexts. The variables considered as interesting and important for the UAMAM are personal innovativeness, subjective norm, perceived ease of use, perceived usefulness, attitude, perceived security, reliability, cost of the service, time saving and the behavioral intention.
2.4.4 Defining the variables of the UAMAM

Reflecting upon the previous chapters analyzing the variables influencing the key determinants of passenger air transportation usage and public transportation as well as previous TAM extensions, the following list of variables will be considered in proposing the UAMAM. Firstly, the concerns towards passenger air transportation and public transportation were considered as variables to introduce in the UAMAM. Secondly, in order to come up with hypotheses and correlations between those variables, previous literature on TAM extensions were used. Therefore, the variables determining the acceptance of passenger air transportation systems and public transportation are matched with previously used variables and also extended with previous TAM variables in the following Table 1.
Table 1: Summary of collected determinants and final variables

<table>
<thead>
<tr>
<th>Passenger Air Transportation</th>
<th>Public Transportation</th>
<th>Previous TAM extensions</th>
<th>Proposed variables of the UAMAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>Social Norm</td>
<td>Subjective Norm</td>
<td>The Subjective Norm related to the concerns caused by one’s social environment</td>
</tr>
<tr>
<td>Time Saving</td>
<td>Speed</td>
<td>Time Saving</td>
<td>The Time Saving aspects in comparison to other transportation alternatives</td>
</tr>
<tr>
<td>Cost</td>
<td>Cost</td>
<td>Cost of the Service</td>
<td>The Travel Cost of air taxi services</td>
</tr>
<tr>
<td>Safety</td>
<td>Safety</td>
<td>Perceived Security</td>
<td>The Perceived Safety of travelling with air taxis</td>
</tr>
<tr>
<td>-</td>
<td>Reliability</td>
<td>Reliability</td>
<td>The Reliability of the air taxi service in the context of timeliness</td>
</tr>
<tr>
<td>-</td>
<td>Habit</td>
<td>Personal Innovativeness</td>
<td>The Personal Innovativeness to overcome one’s habit and try something new</td>
</tr>
<tr>
<td>Convenience</td>
<td>Convenience</td>
<td>Perceived Ease of Use</td>
<td>The Perceived Ease of Use of air taxi services</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>Perceived Usefulness</td>
<td>The Perceived Usefulness of air taxi services</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>Attitude</td>
<td>The Attitude Toward Using the air taxi service in the context of the motivation to use</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>Behavioral Intention</td>
<td>The Behavioral Intention to use air taxi services</td>
</tr>
</tbody>
</table>

Source: own table

2.4.5 Developing the UAMAM

According to Fishbein and Ajzen (1975) and Venkatesh and Bala (2008), the subjective or social norm is influencing the behavioral intention in a positive way (H1). Next to that, the reduced costs or cost of service in general as well as time saving aspects are considered as positively influencing the behavioral intention (H2 and H3) (Sepasgozar et al., 2018). Kim and Shin (2015) proposed that the costs are negatively influencing the behavioral intention. Moreover, Sepasgozar et al. (2018) found that there is a positive influence of reliability and perceived safety on behavioral intention (H4 and H5). According to Lee et al. (2003) and Agarwal and Karahanna (2000), the personal innovativeness is positively influencing the behavioral intention to use a technology (H6). Adopting the TAM by
Davis et al. (1989) described above, there is a positive influence of perceived ease of use and perceived usefulness on the attitude toward using (H7 and H8). Further, the attitude toward using is positively influencing the behavioral intention to use (H9) (Davis et al., 1989). The hypotheses created are visible in Table 2. Resulting from these hypotheses, Figure 6 shows the proposed UAMAM.

Table 2: Hypotheses

<table>
<thead>
<tr>
<th>Hypotheses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>H1:</strong> Subjective Norm has a positive effect on air taxi user's Behavioral Intention</td>
</tr>
<tr>
<td><strong>H2:</strong> Time Saving has a positive effect on air taxi user’s Behavioral Intention</td>
</tr>
<tr>
<td><strong>H3:</strong> Travel Cost has a negative effect on air taxi user’s Behavioral Intention</td>
</tr>
<tr>
<td><strong>H4:</strong> Perceived Safety has a positive effect on air taxi user’s Behavioral Intention</td>
</tr>
<tr>
<td><strong>H5:</strong> Reliability has a positive effect on air taxi user’s Behavioral Intention</td>
</tr>
<tr>
<td><strong>H6:</strong> Personal Innovativeness has a positive effect on air taxi user’s Behavioral Intention</td>
</tr>
<tr>
<td><strong>H7:</strong> The Perceived Ease of Use has a positive effect on air taxi user’s Attitude Toward Using</td>
</tr>
<tr>
<td><strong>H8:</strong> The Perceived Usefulness has a positive effect on air taxi user’s Attitude Toward Using</td>
</tr>
<tr>
<td><strong>H9:</strong> The air taxi user’s Attitude Toward Using has a positive effect on air taxi user’s Behavioral Intention</td>
</tr>
</tbody>
</table>

Source: own table

Figure 6: Proposed UAMAM

Source: own figure
3. Methodology

The following chapter contains the research method. It establishes the methodological framework for the research and describes the research philosophy, research approach, and time horizon as well as the research strategy. It illuminates the data collection and how the data was analyzed with respect to research quality and research ethics.

All the methodological stages can be summarized in a model (Saunders, Lewis, & Thornhill, 2009). To visualize all these stages of our study, we adopted the research onion of Saunders et al. (2009) and used their model to build our methodological framework. In our opinion the research onion by Saunders et al. (2009) makes it possible to clarify the entire methodology in the easiest way. The adapted research onion in Figure 7 consists of the five layers philosophy, approach, strategy, time horizon, and data collection and data analysis.

Figure 7: The research onion

Source: own figure based on Saunders et al. (2009)

The purpose of this model is to increase the readers’ understanding of how we approached our study (Saunders et al., 2009). The model should enhance the comprehensibility of our methodological framework by providing an overview of all the methodological choices we made.
3.1 Research philosophy

In research, the term philosophy is related to the nature of knowledge and its creation (Saunders et al., 2009). It includes different important assumptions in regard to how each individual observes the world (Saunders et al., 2009). Generally, there are the three assumptions of ontology, epistemology and axiology (Saunders et al., 2009). However, mainly discussed among philosophers are the philosophies of epistemology and ontology (Easterby-Smith, Thorpe, & Jackson, 2015).

According to Easterby-Smith et al. (2015), the two terms of ontology and epistemology are defined as follows: “Ontology is about the nature of reality and existence; epistemology is about the theory of knowledge and helps researchers understand best ways of enquiring into the nature of the world” (p.134).

Saunders et al. (2009) discuss the philosophical positions of objectivism and subjectivism within ontology. From an objectivistic stance, the researchers claim social individuals as existent in reality but external to social actors who deal with their existence (Saunders et al., 2009). In contrast, subjectivistic researchers focus on the existence of social actors as well but believe that social phenomena arise from perceptions and activities of these social actors (Saunders et al., 2009). Further, Saunders et al. (2009) categorize the positions of positivism, realism, and interpretivism to epistemology. The positivistic position claims the existence of an observable social reality and the creation of law-like generalizations (Saunders et al., 2009). Realism asserts, that what we perceive is reality and objects exist independently whether each individual is aware of their existence or not (Saunders et al., 2009). A researcher, who takes an interpretive stance wants to figure out distinctions amongst individuals in their role as social actors (Saunders et al., 2009).

Based on the intended procedure, objectivism and a positivistic position was assessed as the most suitable perspective.

According to the frame of reference on technology acceptance and in particular of those articles that extend the TAM, we have noticed the existence of deep knowledge in this research area. Proposing the UAMAM we considered previous literature on public transportation and passenger air transportation systems as well as previous TAM extensions. Thus, when creating the final model of our literature review, the UAMAM, we took an external and observing perspective using existing knowledge, which aligns with a positivistic position.
It allows us to consider the world from an objective stance and allows us to draw generalizations based on the statistical data, in our case collected through surveys (Easterby-Smith et al., 2015). Next to that, collecting data and statistically analyzing the data in terms of hypotheses testing implies an independent observer and therefore a positivistic position. There is no or very little possibility to influence the data-set and thus the results are excluded from any change or adaption. Further, the applied Likert scale excludes the possibility for interpretation, which aligns with positivism.

3.2 Research approach

The literature distinguishes between three main approaches: deductive, inductive and abductive approach (Saunders, Lewis, & Thornhill, 2012). The deductive approach includes the formulating of a theory as well as hypotheses. Based on the hypotheses, the research strategy is chosen in order to test those (Saunders et al., 2009). The inductive approach includes the collection of data and the building of a theory, whereby the theory is based on the previous data analysis (Saunders et al., 2009). The abductive approach is considered to be a combination of deduction and induction. It aims to generate a new theory or adjust an existing one through exploring phenomena’s, identifying themes and explaining patterns. Afterwards, the outcome is tested, often through additional data collections (Saunders et al., 2012).

Our research follows a deductive approach by developing hypotheses and the UAMAM based on the existing literature. We tested the hypotheses, which we set up and aimed to confirm the UAMAM. Our choice of a deductive approach suits the positivistic research position described above (Saunders et al., 2009). Saunders et al. (2009) mention a few crucial characteristics that should be considered when following a deductive approach. The following characteristics were considered as relevant for our research and support the decision for the deductive approach. Firstly, the willingness to analyze causal relationships needs to be considered (Saunders et al., 2009). In our thesis, we explain relationships between variables proposed in the UAMAM. Secondly, a highly structured methodology should be applied in the research (Saunders et al., 2009). Through following a highly structured questionnaire and adopting statements from previous literature, we immensely increase the reliability. Thirdly, operationalized concepts need to be existent, meaning that facts and outcomes can be measured (Saunders et al., 2009). Following a
quantitative approach and using SPSS and SmartPLS 3.2.8 for the analysis and presenting them in a demonstrative way, guarantees the measurability of results. Finally, the results need to allow generalization (Saunders et al., 2009). Providing and analyzing a sample of 321 usable responses allow us to generalize the outcomes.

3.3 Research design

The research design in the adapted research onion shown in Figure 7 covers the two layers of research strategy and time horizon. Further, the research design covers the research purpose. It is distinguished between exploratory, explanatory and descriptive (Saunders et al., 2009). Having proposed the research purpose in the introduction of this thesis, it is still necessary to explain in which position it will be answered. According to Saunders et al. (2009) the exploratory research aims to gather new insights and to evaluate phenomena from a new perspective. The descriptive research aims to portray accurate scenarios or situations, or even persons (Saunders et al., 2009).

In our study, we established causal relationships, represented through hypotheses and analyzed relations between variables. Therefore, our approach corresponds to an explanatory study where causal relationships are identified, often used in quantitative research (Saunders et al., 2009).

Quantitative research aims to examine an issue on a larger scale than qualitative studies (Easterby-Smith et al., 2015). However, quantitative studies cannot or can very limited explain why specific results were obtained or observations were made (Easterby-Smith et al., 2015). In our study, trying to research a phenomenon on a global scale and trying to identify relationships among variables a quantitative explanatory study seems to be appropriate.

3.3.1 Survey strategy

The choice of an appropriate research strategy should support to answer the research question (Saunders et al., 2009). However, also other factors influence the choice of a suitable research strategy such as the established knowledge in this particular research area, the philosophical foundations, the time restriction and the access to potential participants and to other sources of data. Saunders et al. (2009) distinguish between several research strategies. One of them is the survey research strategy. We decided to use this strategy since it is generally selected in combination with a deductive approach.
(Saunders et al., 2009). The survey strategy, in our case coming from a quantitative nature and aiming to reveal how a population feels or acts in relation to a particular issue, supported us to figure out how the population perceives air taxis and opinions and if they would use this new form of mobility or not (Saunders et al., 2012). Additionally, Easterby-Smith et al. (2015) consider surveys as an appropriate solution to collect data about behaviors and opinions on a large scale as long as the sample is chosen wisely. Therefore, this strategy seems to be adequate for our study and especially for fulfilling its purpose. In the same way, it provides a solution in order to gather data in an economic way from a huge sample of the population (Saunders et al., 2009). Other advantages of a survey strategy are the perceived authority and the comprehensibility of surveys within the society (Saunders et al., 2009). This mainly because people are regularly confronted with the outcomes of surveys in newspapers and magazines (Saunders et al., 2009). Finally, this strategy supports us as researchers. Once our data was collected, we were able to work independently (Saunders et al., 2009). This means we were not dependent on others information and were able to obtain our restricted time frame. We are aware that the survey strategy has limitations as well, such as the lack of reasoning why observations were made or the risk the respondents are not answering honestly or are interrupted by someone when filling the survey. However, for answering our research questions, and especially intending to numerically evaluate the hypotheses from a large sample representing a large population, the survey strategy seems to be appropriate.

3.3.2 Time horizon

In regard to the time horizon, it is distinguished between cross-sectional and longitudinal studies (Saunders et al., 2009). Cross-sectional studies deal with a specific phenomenon or phenomena at a specific time, whereas longitudinal studies aim to investigate processes of alteration over a period of time (Easterby-Smith et al., 2015; Saunders et al., 2009). For this thesis, a cross-sectional horizon is chosen mainly because of academical time constraints. The given time frame for this thesis was about four months. Furthermore, based on our choice of a survey strategy we assume the cross-sectional time horizon as appropriate for our thesis. Saunders et al. (2009) support this decision by mentioning the application of cross-sectional studies regularly in combination with a survey strategy.
3.4 Data collection and data analysis

The center of the adjusted research onion are data collection and the analysis. We firstly illuminate on the data collection and then explain the choices we made for the data analysis.

3.4.1 Data collection

In this chapter the sampling method, the questionnaire as well as the actual data collection procedure is described.

Sampling

In general, because of time saving, cost saving, and effort saving reasons, it requires to use a sampling method for research, since the collection of all the available data is impossible (Saunders et al., 2009). The sample, where data is collected from consists of different cases and is selected from the full set of cases, namely the population (Saunders et al., 2009). In order to answer the research question, a suitable sample needs to be selected (Saunders et al., 2009). Therefore, the literature distinguishes between two types of sampling methods (Saunders et al., 2009). Probability sampling and non-probability sampling. In probability sampling the probability for each case to be chosen is equal (Saunders et al., 2009). Since we wanted to reach the population in large cities, we applied a non-probability sampling approach. Because of having chosen particular cities with a number of inhabitants larger than one million, not every individual had an equal chance of answering the survey, which implies a non-probabilistic sampling approach (Saunders et al., 2009).

Following the literature review above, we concluded that large cities are in focus when it comes to UAM adoption in the future, especially in the early stage. Therefore, we decided to limit our population to large cities with more than one million inhabitants. As described above, those cities suffer the most from urbanization, traffic jams and crowded infrastructure. For spreading the survey, we used the snowball sampling approach, which is a sampling technique of non-probability sampling, for spreading the survey further (Saunders et al., 2009). We shared the survey with people in our social network living in cities larger than one million inhabitants. We kindly asked them to share the survey with people they know living in cities larger than one million inhabitants. With this approach, we tried to create a global sample representing the overall perceptions towards air taxis.
from a potential user perspective. To make sure the sample is limited to those inhabitants we also included a filter question in our questionnaire asking for their residency. However, we were aware that snowball sampling includes some considerations. The likelihood of the sample to be fully representative for the population is relatively low, but the collected cases only included people living in cities larger than one million inhabitants and therefore had the required characteristics (Saunders et al., 2009). According to Saunders et al. (2009), snowball sampling is especially an appropriate approach when it is difficult to identify and reach required cases. Since our social network is limited and very less appropriate participants would have been reached, the snowball sampling approach was the proper approach for the data collection. This is also supported by less or no costs at all that were required (Saunders et al., 2009). Considering the restrictions mentioned above, we think that this approach of snowball sampling was the most appropriate in order to achieve good results within a short time for answering the research question.

**Questionnaire**

In general, questionnaires are usually applied in explanatory or descriptive research (Saunders et al., 2009). Descriptive means that the variability in different phenomena is analyzed and identified (Saunders et al., 2009). Explanatory means that the relationship between variables is analyzed (Saunders et al., 2009). Since this thesis aims to test the proposed UAMAM and in that context tries to verify the relationship between the variables, the research indicates an explanatory approach as described above. The data collection was executed through a survey. An online questionnaire was created by using the software Qualtrics. According to Saunders et al. (2009), there is a distinction between questionnaires depending on the amount of contact the researcher has with the respondents. In our case, we used the approach of a self-administered questionnaire, where the respondents are the ones to complete the questionnaire (Saunders et al., 2009). We chose to use the internet for our data collection, which means we adopted the approach of an internet-mediated questionnaire (Saunders et al., 2009). There are several reasons why we chose to conduct an internet-mediated questionnaire. Firstly, the probability, that a large sample can be reached is much higher than through other questionnaires (Saunders et al., 2009). Since we tried to reach a preferably large sample, which is relevant for answering the research question, this is an important factor
to consider (Saunders et al., 2009). Moreover, the time of data collection is predicted as being less in comparison to other collection methods (Saunders et al., 2009). Since the time frame of the thesis collecting data and analyzing it was about four weeks, this was an important consideration as well. Further, by using a software offered by the university, in our case Qualtrics, the financial resources could be reduced dramatically (Saunders et al., 2009). Summarizing, the available time, the financial resources, the best way to reach a large sample and also the ease of further processing the data were factors, that have been considered choosing the internet-mediated questionnaire (Saunders et al., 2009).

As mentioned above the questionnaire starts with general questions on the topic and personal details and demographics including the current residency. This category aims to determine whether the respondent lives in a city with a number of inhabitants larger than one million and is therefore valuable and suitable for the study or not. If the respondent answered that he or she is not living in a city larger than one million inhabitants, he or she could not fill the rest of the questionnaire and was excluded. In general, collecting personal information makes it possible to draw conclusions on how individual characteristics influence the results of the survey, which is shown through the examined multigroup analysis. After the demographics and general questions, the questionnaire included statements for building the constructs or variables. Setting up those statements, we relied on the previous literature through adopting and adapting statements from previous TAM studies. The respective literature that has been used is referenced in Table 3. For assessing the statements we adopted the Likert-style rating scale (Saunders et al., 2009). The respondent is asked to give an opinion about his or her agreement or disagreement with a given statement (Saunders et al., 2009). We decided to use a five categories ordinal Likert scale with an agreement type of rating (Saunders et al., 2009). A five categories Likert scale is assumed to give the respondent the possibility to assess his or her agreement or disagreement in an appropriate manner, or even hold a neutral position. The categories in the scale were: strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, strongly disagree (Saunders et al., 2009). The participants had no opportunity to omit statements since we made every step a compulsory one.

For increasing the response rate, we considered the suggestions by Saunders et al. (2009). We decided to keep the questionnaire as short as possible in order to increase the response rate (Saunders et al., 2009). Next to that, by introducing the topic briefly to the
respondents, we made sure that he or she fully understands the topic and tried to increase their interest and motivation for the topic and the following questionnaire. With easy understandable questions and language, we attempted to generate a user-friendly questionnaire shown in Table 3 (Saunders et al., 2009). The original questionnaire can be found in Appendix 1.

Table 3: Questionnaire

<table>
<thead>
<tr>
<th>Categories</th>
<th>Statements / questions</th>
<th>Statements adopted and adapted from ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>General questions on the topic and demographics</td>
<td>1. Have you ever heard of air taxis before?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Are you living in a city with more than one million inhabitants?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Do you think that people in your city are stuck in traffic a lot?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. In which city do you currently live?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. What is your sex?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. What is your nationality?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. What is your age?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. What is your highest educational level?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9. What is your current occupational status?</td>
<td></td>
</tr>
<tr>
<td>Subjective Norm</td>
<td>10. SN1: People who influence my behavior would think that I should use air taxis.</td>
<td>Venkatesh and Bala (2008)</td>
</tr>
<tr>
<td></td>
<td>11. SN2: My social environment would support the use of air taxis.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12. SN3: People who are important to me would think that I should use air taxis.</td>
<td></td>
</tr>
<tr>
<td>Time Saving</td>
<td>13. TS1: I believe that using air taxis could reduce the travel time.</td>
<td>Sepasgozar et al. (2018)</td>
</tr>
<tr>
<td></td>
<td>14. TS2: Using air taxis would prevent time spent in traffic jams.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15. TS3: I believe that by using air taxis for intra-city transport I could travel in the fastest possible time.</td>
<td></td>
</tr>
<tr>
<td>Travel Cost</td>
<td>16. TC1: I believe that travelling by air taxi could be expensive.</td>
<td>Kim and Shin (2015)</td>
</tr>
<tr>
<td></td>
<td>17. TC2: The price of air taxi services could be a burden to me.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>18. TC3: I believe that I would use air taxis if the price is reasonable.</td>
<td></td>
</tr>
<tr>
<td>Perceived Safety</td>
<td>19. PercSafe1: I believe that it would be safe to travel with air taxis.</td>
<td>Sepasgozar et al. (2018)</td>
</tr>
<tr>
<td></td>
<td>20. PercSafe2: I believe that air taxis would have enough safety regulations to make me feel comfortable with using it.</td>
<td></td>
</tr>
</tbody>
</table>
21. **PercSafe3**: I feel assured that legal institutions would protect me from risks.

**Reliability**

22. **Reli1**: I believe that air taxis are generally reliable in the context of timeliness.
23. **Reli2**: I believe that air taxis would guarantee an on-time arrival.
24. **Reli3**: I believe that air taxis offer an accurate service in the context of timeliness.

**Personal Innovativeness**

25. **PersInn1**: If I heard about a new technology, I would look for ways to experiment with it.
26. **PersInn2**: Among my peers, I am usually the first to try out new technologies.
27. **PersInn3**: I like to experiment with new technologies.

**Perceived Ease of Use**

28. **PEOU1**: I believe that air taxi services would be easy to use.
29. **PEOU2**: I think that using air taxis would not require a lot of effort.
30. **PEOU3**: I believe that operating the air taxi service would be easy for me.

**Perceived Usefulness**

31. **PU1**: I think that using air taxis would provide a valuable service for me.
32. **PU2**: I would find air taxis useful.
33. **PU3**: I believe that using air taxis would be an effective way to travel.

**Attitude Toward Using**

34. **Att1**: I believe that using air taxis is a good idea.
35. **Att2**: I have a favorable attitude towards using air taxis in the future.
36. **Att3**: I believe that using air taxis would be beneficial.

**Behavioral Intention**

37. **BI1**: I could expect my use of air taxis in the future.
38. **BI2**: I would encourage everyone to use air taxis.
39. **BI3**: I intend to use air taxis in the future.

Source: own table

**Pre-test**

We conducted a pre-test over two days by inviting 18 people in our immediate surrounding also studying at Jönköping International Business School to participate. The test aimed to improve the quality of our questionnaire through the collection of feedback from our respondents (Mooi & Sarstedt, 2011). The pre-test was executed in a way that we, the researchers, were present when the participants were filling the first survey draft.
This made it possible for them to intuitively give feedback and also discuss and reflect on the improvements they mentioned. Afterwards, based on the feedback we collected, we made changes in our questionnaire and adapted the survey immediately. Firstly, they criticized the structure of the first part of the survey. We changed the structure according to their recommendations and therefore started with the general questions followed by the demographics and personal details. Next to that, we got positive feedback for our introduction about air taxis. The participants described that we have chosen a good balance between giving sufficient information to understand the topic and excluding non-essential information, which enabled them to answer the statements about air taxis in an appropriate manner. Some of our statements within the survey were not totally clear to the participants. We specified these questions to ensure the comprehensibility in our study.

**Actual data collection**

We collected our data over eleven days, from 1st of April until the 11th of April, 2019. Our survey was shared through the channels Facebook, WhatsApp, and e-mail. Firstly, we sent a link of the survey to the people we know living in cities larger than one million inhabitants. Secondly, we asked those people within our reach to share it further. This snowball sampling approach made it possible to create a global scope. The initial goal of the study was over 300 respondents living in cities larger than one million inhabitants. The collected 321 usable responds increased the validity and reliability of the data collected (Easterby-Smith et al., 2015; Saunders et al., 2009). The length of the survey was approximately five minutes.

**3.4.2 Data analysis – Partial Least Squares Structural Equation Modelling**

We used SPSS and the software SmartPLS 3.2.8 to quantitatively evaluate our data collected through the survey. After conducting our survey, we directly transferred the data from Qualtrics to SPSS in order to clean the data-set, which is according to Mooi and Sarstedt (2011) required to avoid errors. With the filter question in the beginning “Are you living in a city with more than one million inhabitants?” we limited our population to people living in cities larger than one million inhabitants and thus guaranteed the collection of the target group we aimed for. Respondents answering this question with “no” were excluded from the survey. The detailed cleaning procedure is described in
chapter 4.1. As described previously, we made every statement a compulsory statement for proceeding and thus there were no missing parts in the answered surveys. Firstly, we investigated descriptive statistics in SPSS. Doing so provided us with an overview of our collected data. Secondly, the evaluation of the UAMAM was executed by using the software SmartPLS 3.2.8. SmartPLS 3.2.8 is a widely used software for executing the Partial Least Squares Structural Equation Modelling, in short PLS SEM (Wong, 2013). The software was chosen mainly because of free availability and the comprehensible user interface that made it possible for us to get familiar with the software in a short time. SEM is a multivariate data analysis where relationships among variables are analyzed (Wong, 2013). SEM offers several benefits compared to a regular factor analysis or multiple regression, which could have been used for testing the hypotheses instead of PLS SEM (Chin, 1998). SEM provides flexibility in terms of modeling the relationship between dependent and independent variables (Chin, 1998). Further, measurement assumptions or theoretical assumptions of executing the PLS SEM can be tested directly (Chin, 1998). This method allows using a small sample size for better outcomes (Sepasgozar et al., 2018). We chose PLS SEM because of the described set of benefits and because it has been used successfully in most of the past and recent studies conducting research on TAM extensions (Lee et al., 2003). Using PLS SEM, the interpretation and analyses usually take two steps into consideration (Hulland, 1999). One is to assess the measurement model and the second is to assess the structural model (Hulland, 1999). Therefore, we started analyzing the validity and reliability through testing the measurement model (Hulland, 1999). Assessing validity and reliability gave us allowance to further proceed with the hypotheses testing. Hypotheses testing was assessed by testing the structural model (Hulland, 1999). The model, visualized in Figure 8, shows how the measurement model and the structural model are connected.
Finally, a test of the model fit was examined to evaluate the structural model (Hulland, 1999).

3.4.3 Data analysis – Multigroup analysis

For analyzing the influence of demographics on the relationships among variables in the UAMAM, we conducted a multigroup analysis. A multigroup analysis is a method of moderator analysis (Hair, Sarstedt, Hopkins, & Kuppelwieser, 2014). For performing a multigroup analysis the moderator variable has to be categorical (Hair et al., 2014). Further, usually only two categories can be existent (Hair et al., 2014). The multigroup analysis then assesses the difference between the two groups in terms of relationships and path coefficients between variables (Hair et al., 2014). It analyzes the path coefficients of the two groups and identifies significant differences between the two groups (Schlägel & Sarstedt, 2016). Before that, a pre-evaluation in order to decide if the data was satisfactory for a multigroup analysis has to be executed through the Measurement Invariance of Composite Models (MICOM) procedure (Hair et al., 2014; Schlägel & Sarstedt, 2016).

We chose the multigroup analysis because it offers the possibility to directly interpret and assess the results in terms of differences between groups. In addition to the result that a moderator shows a significant difference, it directly calculates the path coefficient of each group and allows to draw conclusions from that.
3.5 Research ethics

Ethical issues are important to consider while conducting research. In general, the chosen research design should not expose the participants of a study to the risk of pain, harm, material disadvantage or embarrassment (Saunders et al., 2009). Therefore, we have to prevent all concerns, which could emerge at all stages of our study (Saunders et al., 2009). Relevant stages of ethical considerations were the way we got access to our survey participants, the research topic itself and the entire processing of our data including analysis of our data, the data collection process and in the end the reporting of our outcome (Saunders et al., 2009). Easterby-Smith et al. (2015) and Saunders et al. (2009) provide a similar overview of key principles in research ethics illustrated in Table 4. For our research, we have obtained and addressed them.

Table 4: Ethical principles

<table>
<thead>
<tr>
<th>Ethical principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ensuring that no harm comes to participants</td>
</tr>
<tr>
<td>2. Respecting the dignity of research participants</td>
</tr>
<tr>
<td>3. Ensuring a fully informed consent of research participants</td>
</tr>
<tr>
<td>4. Protecting the privacy of research participants</td>
</tr>
<tr>
<td>5. Ensuring the confidentiality of research data</td>
</tr>
<tr>
<td>6. Protecting the anonymity of individuals or organizations</td>
</tr>
<tr>
<td>7. Avoiding deception about the nature or aims of the research</td>
</tr>
<tr>
<td>8. Declaration of affiliations, funding sources and conflicts of interest</td>
</tr>
<tr>
<td>9. Honesty and transparency in communicating about the research</td>
</tr>
<tr>
<td>10. Avoidance of any misleading or false reporting of research findings</td>
</tr>
</tbody>
</table>

Source: own table based on Easterby-Smith et al. (2015)

The protection of informants, respondents and research subjects is addressed in the first six key principles, whereas the last four focus on the protection of the integrity of the research community through preventing bias and ensuring accuracy in the results (Easterby-Smith et al., 2015). Addressing those ten ethical principles in our survey, we can assure an ethical approach of research (Easterby-Smith et al., 2015; Saunders et al., 2009). Saunders et al. (2009) and Easterby-Smith et al. (2015) agree that the first ethical
consideration, ensuring that no harm comes to participants, is the central consideration of the following ethical principles.

At the beginning of the survey, we informed the participants about the purpose and the content of the survey as well as the institution of education. Further, we offered them to contact us via e-mail in case of any questions, suggestions or when they want to be informed about the final results. Based on the given information the respondent could decide whether to participate or not. All this information was given to the participants on a cover page shown in Figure 9. We also informed the participants that their answers will only be used for academic purpose and in the context of this thesis.

Figure 9: Initial page of the survey

Furthermore, we made sure that the survey is voluntary, anonymously and confidential by making use of the software Qualtrics. Personal data was restricted to age, residency, nationality, sex, occupational status and highest educational level. With this approach, we protected our respondents from harm.

For addressing the last four principles we introduced a clear aim of the study to the participants and also informed them that we intend to complete our master thesis with this survey. We gave them information about the educational institution and about ourselves and offered them to contact us if any issues or uncertainties appear. For analyzing the data we were aware that an objectivistic perspective and a positivistic position as described previously in this thesis is vital in order to avoid misinterpretation (Saunders et al., 2009). By doing so, we addressed the issue of the protection of integrity.
Additionally, we came across the fact that currently the third gender option diverse is given in job offerings. We decided to adopt this in our survey as well in order not to discriminate anyone.

### 3.6 Research quality

To ensure the quality and credibility of our research we focused on validity and reliability (Saunders et al., 2009). Easterby-Smith et al. (2015) refer to reliability as “the consistency of measurement in a composite variable formed by combining scores on a set of items” (p. 880), whereas validity is described as “the extent to which measures and research findings provide accurate representation of the things they are supposed to be describing” (p. 885).

To proof external validity is crucial for each research since it describes the degree to which the gained findings can be applied to other contexts (Saunders et al., 2009). Therefore, the research needs to be representative for the selected population. This requires a wisely chosen sample in order to be able to derive statistical generalizations afterwards (Saunders et al., 2009). In our case, we generated a sample of 321 respondents living in cities larger than one million inhabitants all over the globe. We assume that this sample is representative for generalizing the result. However, we were aware that the larger the sample the more valid the results. We were also aware that the consideration of cultural differences, different nationalities, different locations, different genders, and different ages is important for the interpretation. Furthermore, the questionnaire was designed through adopting variables from previous TAM studies that were already used in different contexts. Therefore, we used the variables of the previous studies and adapted it in the context of air taxis.

Internal validity is also called measurement validity. It guarantees that the questionnaire measures what the researcher aims to measure (Saunders et al., 2009). As described above, we adopted and adapted statements from previous studies on TAM extensions. Those statements were proven in several contexts already, which increases the probability that those statements lead to reasonable results. Next to that, we conducted a pre-test including 18 participants. The pre-test ensured mainly whether the chosen instruments and questionnaire elements are adequately precise and robust in order to measure variables (Easterby-Smith et al., 2015). We kindly asked the participants for feedback on
the questionnaire, which helped us to improve the survey and adapt it. We made sure that the understanding of us, the researchers, and the respondents is congruent.

According to Saunders et al. (2009) reliability is related to the consistency of a questionnaire. This means it needs to be solid in the sense of producing equal results under other conditions such as various samples and times. One method suggested by Saunders et al. (2009) is to add check-questions in the questionnaire. They aim to reveal, that questions asked with the same content in a different way leading to the same outcome. We applied this by using at least three statements for analyzing each variable or construct. Those statements have only a slightly different meaning and therefore can be seen as check-questions next to their purpose of building the items for the variables. We were aware that these questions increase the length of the questionnaire, which can decrease the willingness of individuals to answer the survey (Saunders et al., 2009). However, in order to avoid bias, we used at least three statements for each variable in the questionnaire to keep it reliable but still short. We tried to keep the balance between similar questions and the length of the questionnaire (Saunders et al., 2009).
4. Data analysis and empirical findings

The following chapter presents and analyses the empirical findings of our survey. Firstly, we describe the collected data set. Secondly, we examine a deeper analysis of validity and reliability as well as the hypotheses testing. The data analysis was executed by applying the approach of Partial Least Squares Structural Equation Modelling (PLS SEM) using the software SmartPLS 3.2.8. Finally, the influence of socio-demographic information is analyzed by examining a multigroup analysis.

4.1 Description of data set

Our collected data set consists of 461 responds, whereby 87 of them were filled by participants who live in cities with less than one million inhabitants. We deleted these responses since we aimed for investigating the acceptance of air taxis in cities with more than one million inhabitants. Additionally, we filtered for those respondents, who have not finished the questionnaire. It revealed, that 53 surveys have not been completed, therefore we deleted those from the remaining data set of 374 surveys. After our data cleaning process, 321 usable responds remained.

In the beginning, we asked our participants if they have ever heard of air taxis as a future mobility approach. From the 321 respondents, 57.3% have heard of air taxis as a realistic future approach for mobility before and 42.7% have not. Currently, the topic of air taxis is frequently discussed, what could reason for over half of the participants have heard of this new mobility technology before. Additionally, we asked about their opinion on traffic in the city they live in. 79% of our respondents believe that people are stuck in traffic a lot in their city. The following pie charts in Figure 10 below illustrate the responses to this descriptive information.
Afterwards, our questionnaire asked for personal data and socio-demographic information of the participants, including age, nationality, the city they currently live in, occupational status, educational level, and sex.

Table 5 below shows the demographical characteristics of the respondents.

<table>
<thead>
<tr>
<th>Sex</th>
<th>n (%)</th>
<th>Educational level</th>
<th>City</th>
<th>n</th>
<th>Nationalities</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>159 (49.5)</td>
<td>Less than high school</td>
<td>Abu Dhabi</td>
<td>10</td>
<td>Bulgarian</td>
<td>5</td>
</tr>
<tr>
<td>Male</td>
<td>162 (50.5)</td>
<td>High school degree</td>
<td>Shenzhen</td>
<td>10</td>
<td>English</td>
<td>5</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td>Bachelor degree</td>
<td>Mumbai</td>
<td>11</td>
<td>British</td>
<td>5</td>
</tr>
<tr>
<td>Under 20</td>
<td>6 (1.9)</td>
<td>Master degree</td>
<td>Berlin</td>
<td>12</td>
<td>Italian</td>
<td>6</td>
</tr>
<tr>
<td>20-29</td>
<td>183 (57.0)</td>
<td>Doctorate</td>
<td>Paris</td>
<td>13</td>
<td>Austrian</td>
<td>7</td>
</tr>
<tr>
<td>30-39</td>
<td>63 (19.6)</td>
<td>Other</td>
<td>London</td>
<td>14</td>
<td>French</td>
<td>9</td>
</tr>
<tr>
<td>40-49</td>
<td>32 (10.0)</td>
<td>Student</td>
<td>São Paulo</td>
<td>15</td>
<td>American</td>
<td>13</td>
</tr>
<tr>
<td>Over 50</td>
<td>37 (11.5)</td>
<td>Others cities &lt; 9 respondents</td>
<td>Hamburg</td>
<td>17</td>
<td>Indian</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mexico City</td>
<td>44</td>
<td>Chinese</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Munich</td>
<td>73</td>
<td>Others &lt; 5 respondents</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Others cities &lt; 9 respondents</td>
<td>86</td>
<td>Mexican</td>
<td>51</td>
</tr>
</tbody>
</table>

Source: own table based on SPSS output

Our collected data set of 321 usable cases is almost equally split up in female (49.5%) and male (50.5%) respondents. This means our results can be said to be based on an equal gender distribution. The respondents of our survey were mainly in the age group between 20 and 29, which corresponds to a share of 57.0%. The second highest proportion with 19.6% were people between the years 30 and 39. Additionally, we asked our respondents about their educational level and their occupational status. It turned out, that most of our participants had a bachelor degree (47.7%), which means they can be counted to the higher educated proportion of the population. Further, most of the respondents were
employed, in particular 62.9%. The statistics also indicated, that in our survey people from over 36 nationalities took part, living in more than 50 different cities.

4.2 Partial Least Squares Structural Equation Modelling

As described in chapter 3.4.3, when using PLS SEM, the interpretation and analyses usually take two steps into consideration (Hulland, 1999). One is to assess the measurement model and the second is to assess the structural model (Hulland, 1999). With this approach, it is ensured, that the constructs and its measures provide reliability and validity before going further and drawing conclusions about the particular path or construct relationships when analyzing the structural model (Hulland, 1999).

4.2.1 Measurement model

Therefore, firstly the measurement model, that is according to Wong (2013) also called the outer model, is analyzed. The measurement model is described through the measures and constructs (Hulland, 1999; Wong, 2013). This means for example that the construct of the independent variable subjective norm and the three items of subjective norm represent a measurement model. Therefore, it analyses the relation to the variables (Sepasgozar et al., 2018). In particular, the validity as well as the reliability of the constructs and its measures can be analyzed through the measurement model and thus, the usability of the constructs including the items is tested (Sepasgozar et al., 2018). Wong (2013) suggests to analyze reliability, convergent validity, and discriminant validity. This is supported by Hulland (1999), who suggests to analyze item reliability and convergent validity as well as discriminant validity to assess the measurement model.

Item reliability is tested by analyzing the loadings, or simple correlations among the construct and its measures (Hulland, 1999; Wong, 2013). Approved by multiple researchers, loadings larger or equal to 0.7 can be accepted (Hulland, 1999). A value larger or equal to 0.7 implies that the measures and its construct represent more shared variance than error variance (Hulland, 1999). Loadings of items that are lower than 0.5 imply that the item should be deleted (Hulland, 1999). In our study, the loadings are shown in Table 6. They show a variation from 0.815 to 0.969. This indicates a proper loading of items on the corresponding constructs (Sepasgozar et al., 2018).

Convergent validity can be described through Cronbach’s α, the Composite Reliability (CR) and the average variance extracted (AVE) (Sepasgozar et al., 2018). Cronbach’s α was examined in order to test the internal consistency of the variables (Sepasgozar et al.,
According to Cronbach (1951), a value above 0.7 implies high validity. In our case, Cronbach’s α values shown in Table 6 are well above 0.7 and the test for internal consistency can, therefore, be seen as fulfilled. Further, the Composite Reliability (CR) coefficient separates the coefficient explaining the correlation of measures in one dimension (Sepasgozar et al., 2018). A value above 0.7 validates the criteria of Composite Reliability as satisfactory (Fornell & Larcker, 1981; Sepasgozar et al., 2018). In our case, the CR values shown in Table 6 are well above 0.7 and therefore above the recommended minimum value. Finally, the average variance extracted is a measure of convergent validity (Sepasgozar et al., 2018). According to Fornell and Larcker (1981), a value above 0.5 is acceptable, and therefore the AVE values in our case shown in Table 6 well above 0.7 imply that this validity criterion is fulfilled as well.
Table 6: Measurement Model Assessment

<table>
<thead>
<tr>
<th>Construct</th>
<th>Item</th>
<th>Cronbach’s Alpha</th>
<th>Loading</th>
<th>Composite Reliability</th>
<th>Average Variance Extracted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude Toward Using</td>
<td>Att1</td>
<td>0.913</td>
<td>0.934</td>
<td>0.945</td>
<td>0.852</td>
</tr>
<tr>
<td></td>
<td>Att2</td>
<td>0.915</td>
<td>0.926</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Att3</td>
<td>0.909</td>
<td>0.909</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behavioral Intention</td>
<td>BI1</td>
<td>0.915</td>
<td>0.886</td>
<td>0.947</td>
<td>0.856</td>
</tr>
<tr>
<td></td>
<td>BI2</td>
<td>0.925</td>
<td>0.925</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BI3</td>
<td>0.964</td>
<td>0.964</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived Ease of Use</td>
<td>PEOU1</td>
<td>0.899</td>
<td>0.900</td>
<td>0.938</td>
<td>0.834</td>
</tr>
<tr>
<td></td>
<td>PEOU2</td>
<td>0.967</td>
<td>0.967</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PEOU3</td>
<td>0.969</td>
<td>0.969</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived Safety</td>
<td>PercSafe1</td>
<td>0.896</td>
<td>0.888</td>
<td>0.935</td>
<td>0.829</td>
</tr>
<tr>
<td></td>
<td>PercSafe2</td>
<td>0.927</td>
<td>0.927</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PercSafe3</td>
<td>0.880</td>
<td>0.880</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived Usefulness</td>
<td>PU1</td>
<td>0.881</td>
<td>0.906</td>
<td>0.926</td>
<td>0.808</td>
</tr>
<tr>
<td></td>
<td>PU2</td>
<td>0.875</td>
<td>0.875</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PU3</td>
<td>0.949</td>
<td>0.949</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal Innovativeness</td>
<td>PersInn1</td>
<td>0.882</td>
<td>0.915</td>
<td>0.928</td>
<td>0.811</td>
</tr>
<tr>
<td></td>
<td>PersInn2</td>
<td>0.833</td>
<td>0.833</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PersInn3</td>
<td>0.949</td>
<td>0.949</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reliability</td>
<td>Reli1</td>
<td>0.871</td>
<td>0.824</td>
<td>0.922</td>
<td>0.798</td>
</tr>
<tr>
<td></td>
<td>Reli2</td>
<td>0.913</td>
<td>0.913</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reli3</td>
<td>0.938</td>
<td>0.938</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subjective Norm</td>
<td>SN1</td>
<td>0.831</td>
<td>0.867</td>
<td>0.899</td>
<td>0.749</td>
</tr>
<tr>
<td></td>
<td>SN2</td>
<td>0.828</td>
<td>0.828</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SN3</td>
<td>0.898</td>
<td>0.898</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time Saving</td>
<td>TS1</td>
<td>0.824</td>
<td>0.857</td>
<td>0.895</td>
<td>0.741</td>
</tr>
<tr>
<td></td>
<td>TS2</td>
<td>0.850</td>
<td>0.850</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TS3</td>
<td>0.877</td>
<td>0.877</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travel Cost</td>
<td>TC1</td>
<td>0.835</td>
<td>0.894</td>
<td>0.896</td>
<td>0.743</td>
</tr>
<tr>
<td></td>
<td>TC2</td>
<td>0.871</td>
<td>0.871</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TC3</td>
<td>0.815</td>
<td>0.815</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: own table based on SmartPLS 3.2.8 output

Discriminant validity refers to the representation to what extent measures of one construct are differing from measures of other constructs, while the constructs are part of the same model (Hulland, 1999). In the context of PLS, a widely applied criterion for measuring or testing the discriminant validity is, that more variance of a construct should be shared with its corresponding items or measures in comparison to other constructs (Hulland, 1999). Or simply expressed, a variable should share more variance with its items than with any other variables (Sepasgozar et al., 2018). This was assessed by executing the Fornell-Larcker criterion (Fornell & Larcker, 1981). Table 7 shows that the values in the very right of each row are higher than the values below these very right values or in other words, the value on top of each column is the highest. This indicates that the interaction of constructs with its own indicators is higher than with other constructs (Sepasgozar et al., 2018). Thus, the discriminant validity of the constructs is tested successfully (Hulland, 1999).
Table 7: Fornell-Larcker criterion

<table>
<thead>
<tr>
<th>Attitude Toward Using</th>
<th>Behavioral Intention</th>
<th>Perceived Ease of Use</th>
<th>Perceived Safety</th>
<th>Perceived Usefulness</th>
<th>Personal Innovativeness</th>
<th>Reliability</th>
<th>Subjective Norm</th>
<th>Time Saving</th>
<th>Travel Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude Toward Using</td>
<td>0.923</td>
<td>0.925</td>
<td>0.407</td>
<td>0.428</td>
<td>0.913</td>
<td></td>
<td>0.848</td>
<td>0.424</td>
<td>0.910</td>
</tr>
<tr>
<td>Behavioral Intention</td>
<td>0.791</td>
<td>0.374</td>
<td>0.394</td>
<td>0.318</td>
<td>0.900</td>
<td>0.491</td>
<td>0.366</td>
<td>0.424</td>
<td>0.374</td>
</tr>
<tr>
<td>Perceived Ease of Use</td>
<td>0.424</td>
<td>0.442</td>
<td>0.386</td>
<td>0.369</td>
<td>0.505</td>
<td>0.594</td>
<td>0.360</td>
<td>0.624</td>
<td>0.349</td>
</tr>
<tr>
<td>Perceived Safety</td>
<td>0.394</td>
<td>0.318</td>
<td>0.442</td>
<td>0.369</td>
<td>0.505</td>
<td>0.635</td>
<td>0.354</td>
<td>0.634</td>
<td>0.271</td>
</tr>
<tr>
<td>Perceived Usefulness</td>
<td>0.318</td>
<td>0.442</td>
<td>0.369</td>
<td>0.505</td>
<td>0.315</td>
<td>-0.122</td>
<td>-0.212</td>
<td>-0.216</td>
<td>-0.029</td>
</tr>
</tbody>
</table>

Source: own table based on SmartPLS 3.2.8 output

Through establishing the validity of the measurement model described above, we conducted a confirmatory factor analysis, allowing to merge the items of each construct into one construct (Lowry & Gaskin, 2014).

4.2.2 Structural model

In Table 8 the values that have been calculated using the software SmartPLS 3.2.8 for assessing the structural model are shown in the following.

Table 8: Structural Model Assessment

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Independent variable</th>
<th>R² dependent variable</th>
<th>f²</th>
<th>VIF</th>
<th>Q²</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1 Behavioral Intention</td>
<td>Subjective Norm</td>
<td>0.694</td>
<td>0.125</td>
<td>1.632</td>
<td>0.553</td>
</tr>
<tr>
<td>H2 Behavioral Intention</td>
<td>Time Saving</td>
<td>0.694</td>
<td>0.001</td>
<td>1.970</td>
<td>0.553</td>
</tr>
<tr>
<td>H3 Behavioral Intention</td>
<td>Travel Cost</td>
<td>0.694</td>
<td>0.022</td>
<td>1.070</td>
<td>0.553</td>
</tr>
<tr>
<td>H4 Behavioral Intention</td>
<td>Perceived Safety</td>
<td>0.694</td>
<td>0.002</td>
<td>1.356</td>
<td>0.553</td>
</tr>
<tr>
<td>H5 Behavioral Intention</td>
<td>Reliability</td>
<td>0.694</td>
<td>0.021</td>
<td>1.622</td>
<td>0.553</td>
</tr>
<tr>
<td>H6 Behavioral Intention</td>
<td>Personal Innovativeness</td>
<td>0.694</td>
<td>0.021</td>
<td>1.303</td>
<td>0.553</td>
</tr>
<tr>
<td>H7 Attitude Toward Using</td>
<td>Perceived Ease of Use</td>
<td>0.719</td>
<td>0.000</td>
<td>1.281</td>
<td>0.579</td>
</tr>
<tr>
<td>H8 Attitude Toward Using</td>
<td>Perceived Usefulness</td>
<td>0.719</td>
<td>1.965</td>
<td>1.281</td>
<td>0.579</td>
</tr>
<tr>
<td>H9 Behavioral Intention</td>
<td>Attitude Toward Using</td>
<td>0.694</td>
<td>0.451</td>
<td>2.336</td>
<td>0.553</td>
</tr>
</tbody>
</table>

Source: own table based on SmartPLS output

R², the coefficient of determination, is 0.694 for the dependent variable behavioral intention (Wong, 2013). This means that the independent variables connecting with the dependent variables behavioral intention explain 69.4% of the variance in the dependent
variable (Wong, 2013). Same counts for attitude toward using as dependent variable, where 71.9% of the variance is explained by the independent variables perceived usefulness and perceived ease of use (Wong, 2013). These high values can be accepted in terms of the predictive power of the model. The closer the values to 1, the higher the predictive accuracy (Hair et al., 2014). The predictive power was further tested with the cross-validated redundancy (Q²). According to Hair et al. (2014), the cross-validated redundancy (Q²) measures predictive relevance, too. They suggest that a value larger than 0 for Q² indicates a predictive relevance of the model (Hair et al., 2014). With a value of 0.553 for the dependent variable behavioral intention and 0.579 for the dependent variable attitude toward using, the predictive relevance of the model is approved.

The value of $P^2$ is determined as the effect size (Sepasgozar et al., 2018). According to Wong (2013), the effect size is the strength of the relationship between two variables. It shows, how much an independent variable contributes to the $R^2$ value of the dependent variable (Wong, 2013). According to multiple researchers, the effect size should be analyzed in addition to just testing the significance of relationships (Wong, 2013). The value of $P^2$, representing the strength of the relationship, therefore behaves the same way than the path coefficient described below, meaning that a high path coefficient implies a high $P^2$ and vice versa.

Testing multicollinearity is necessary to make sure, that independent variables are not having the problem of collinearity (Wong, 2013). Independent variables should not be highly related to each other and therefore multicollinearity should not be existent (McCormick, Salcedo, & Poh, 2015). According to Wong (2013), this can be measured through the Variance Inflation Factor (VIF). A value lower than 5 can be considered as satisfactory to avoid collinearity (Wong, 2013). In our case, the values for VIF are below 5 and therefore no problematic collinearity is existent influencing the results of the analysis.

To test whether the hypotheses are significant or not, the t-value or alternatively the p-value was assessed. The t-value indicates a significance on a $p = 5\%$ level when being larger than 1.96 and on a $p = 1\%$ level when being larger than 2.58 (Wong, 2013). The t-value follows a two-tailed t-test for analyzing if a relationship is significant or not (Wong, 2013).

Further, the path coefficients were used for analyzing the UAMAM. The standardized path coefficients show the strength of the relationship between independent and
dependent variables (Sepasgozar et al., 2018). The standardized path coefficients can adopt values from +1 to -1. The closer the value to +1, the stronger a positive relationship is existent (Hair et al., 2014). The closer the value to -1, the stronger a negative relationship is existent (Hair et al., 2014). Therefore, it is crucial to assess the strength of the relationship additionally to testing the significance (Hair et al., 2014). Weak relationships, even though significant, should be treated carefully when giving managerial implications (Hair et al., 2014).

Table 8 above shows that H1, H8, and H9 are supported on a p = 0.1% level, H3 and H6 are supported on a p = 5% level and therefore confirmed, whereas H2, H4, H5 and H7 are not supported.

According to our empirical findings considering the whole sample four of the proposed nine hypotheses are not supported. The findings show that the observed sample is not considering time saving aspects, reliability in terms of timeliness and perceived safety as relevant for their behavioral intention or willingness to use air taxi services. Further, the perceived ease of use has no influence on their attitude toward using.

However, five hypotheses are supported. Subjective norm has a highly significant positive effect on potential air taxi users’ behavioral intention to use air taxis. The path coefficient and therefore the strength of the relationship is very high. Subjective norm has a major influence on the behavioral intention to use air taxis. Travel cost has a significant negative effect on the behavioral intention to use air taxis. Even though, the strength of the effect measured through the path coefficient is relatively low, there is still a significant influence on the overall intention to use. This means, the stronger the respondents agree to the items measured for the variable travel cost, such as “I believe that air taxi services could be expensive”, the less they show a behavioral intention to use air taxis. Personal innovativeness shows a significant positive effect on the behavioral intention even though, personal innovativeness is contributing relatively less to the overall behavioral intention of potential users. This is shown with the relatively low path coefficient. Perceived usefulness has a highly significant positive effect on attitude toward using. The perceived usefulness is the main contribution to users’ attitude toward using air taxis. It shows a very strong relationship illustrated through a relatively high path coefficient.
Attitude toward using has a highly significant positive effect on the potential users’ behavioral intention towards using air taxis. The strength of the relationship is relatively high in comparison to other relationships.

4.2.3 Model fit

Another step in confirming the UAMAM was the testing of the model fit (Picón-Berjoyo, Ruiz-Moreno, & Castro, 2016; Sepasgozar et al., 2018). One common possible index assessing the model fit is the standardized root mean square residual (SRMR) value, which determines the fit of data and model (Henseler, Hubona, & Ray, 2016; Picón-Berjoyo et al., 2016). A SRMR of 0 would imply a perfect fit and a value below 0.08 indicates an acceptable model fit. Therefore, in our case, a SRMR of 0.053 confirms a good fit of the model (Henseler, Hubona et al., 2016; Picón-Berjoyo et al., 2016).

4.3 Multigroup analysis

For analyzing the influence of demographics on the relationships among variables in the UAMAM, we conducted a multigroup analysis. For investigating those differences we aimed at building appropriate groups, as Latan and Noonan (2017) suggest. A rule of thumb is that one group should be less than 50% larger than the other group (Latan & Noonan, 2017). When the difference is larger than that, there is a chance that the results could include bias (Latan & Noonan, 2017). Therefore, we were aware of possible bias in some cases and treated the results carefully. Among a variety of possible groups that could be built, we decided to analyze the differences of groups that could be formed, based on emergent differences in the literature. When conducting the literature review, it was especially emergent that in the context of new technologies sex and age play a differentiating role when it comes to the acceptance or adoption of those (Venkatesh, Thong, & Xu, 2012). Thus, the first categories we decided to analyze is sex and age. Further, the educational level has a major differentiating influence on technology adoption and use (Riddell & Song, 2012). However, depending on the technology and several other factors, it can be said that the higher the educational level, the more extensive the adoption of new technologies (Riddell & Song, 2012). For the category of educational level, it was not possible to form approximately equally sized groups. Additionally, the literature suggests that there are differences in culture in terms of technology adoption (Im, Hong, & Kang, 2011). We assume that nationality and residency are closely connected to culture and therefore differentiating when it comes to
the adoption of new technologies. An interesting comparison we decided to conduct was, therefore, a comparison between two cities, where an appropriate number of respondents came from.

Since Mexico City and Munich were the cities with the most respondents, this was a perfect fit in terms of a comparison between a very large city and a small city as well as in terms of a European city and an American city. Next to that, we assume that also the occupational status is influencing technology adoption and acceptance. Summarizing, sex, age, occupational status, and cities were chosen as categories and groups within those categories were formed. The groups are listed in Table 9 below.

Table 9: Formed groups for the multigroup analysis

<table>
<thead>
<tr>
<th>Gender</th>
<th>Occupational status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A: male</td>
<td>Group A: student</td>
</tr>
<tr>
<td>n = 162</td>
<td>n = 93</td>
</tr>
<tr>
<td>Group B: female</td>
<td>Group B: employee</td>
</tr>
<tr>
<td>n = 159</td>
<td>n = 202</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>City</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A: younger than 30</td>
<td>Group A: Munich</td>
</tr>
<tr>
<td>n = 189</td>
<td>n = 73</td>
</tr>
<tr>
<td>Group B: 30 and older</td>
<td>Group B: Mexico City</td>
</tr>
<tr>
<td>n = 132</td>
<td>n = 44</td>
</tr>
</tbody>
</table>

Source: own table

4.3.1 MICOM

Before conducting a multigroup analysis, it is necessary to examine a measurement invariance assessment. When measurement invariance is existent, it is guaranteed, that differences among defined groups are not resulting from differences in the outer or measurement model (Henseler, Ringle, & Sarstedt, 2016; Picón-Berjoyo et al., 2016). Measurement invariance of composite models (MICOM) was tested using the permutation procedure with 5000 permutations and a significance level of p = 5% in SmartPLS 3.2.8. Conducting the MICOM test, we had to consider three steps (Henseler, Ringle et al., 2016). Establishing configural invariance was the first step and automatically proceeded by the software SmartPLS 3.2.8 (Picón-Berjoyo et al., 2016). The second step was the testing of compositional invariance (Henseler, Ringle et al., 2016). The correlation between the composites should not be significantly different from the value 1 in order to assume compositional invariance (Henseler, Ringle et al., 2016; Picón-Berjoyo et al., 2016). This indicates that the composites were established in a
similar way for all groups (Henseler, Ringle et al., 2016). Step three assesses the equality of the composite means and variances (Henseler, Ringle et al., 2016). Again, the mean values of the constructs of all groups as well as the variance of the constructs of all groups should not be significantly different in order to guarantee full measurement invariance (Henseler, Ringle et al., 2016). Table 10 shows the p-values that have been calculated for step two and three. Considering a significance level of p = 5%, the constructs marked in **bold** are not significant for all the steps and therefore show full measurement invariance (Milfont & Fischer, 2010; Picón-Berjoyo et al., 2016). Only for the boldly marked constructs, full measurement invariance is existent across the defined groups since every construct shows non-significant p-values on a p = 5% level for the respective parameters. Some researchers suggest, that cross-group comparison, in our case defined as multigroup analysis, should only be conducted when full measurement invariance is guaranteed (Milfont & Fischer, 2010; Picón-Berjoyo et al., 2016). However, according to Milfont and Fischer (2010), full measurement invariance is rather unrealistic, and therefore partial measurement invariance is sufficient and appropriate for conducting a multigroup comparison. Partial measurement invariance is existent when only a subset of parameters across the defined groups is invariant (Milfont & Fischer, 2010).
Table 10: MICOM significance results

<table>
<thead>
<tr>
<th>Source</th>
<th>MICOM significance results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Therefore, the MICOM test</td>
<td></td>
</tr>
<tr>
<td>conducted above suggests</td>
<td></td>
</tr>
<tr>
<td>performing a multigroup analysis</td>
<td></td>
</tr>
<tr>
<td>with the defined groups for sex, age, occupational status, and city. However, due to disagreements among researchers how partial measurement invariance should be treated (Putnick &amp; Bornstein, 2016), we refrained from analyzing and interpreting relationships between constructs where one or both involved constructs showed unsatisfactory measurement invariance or partial measurement invariance, shown in Table 10 above. Or in other words, we only took constructs into consideration that are marked with a bold fond for the defined groups in Table 10 above.</td>
<td></td>
</tr>
</tbody>
</table>
4.3.2 Multigroup analysis results

Only the following three relations showed significant differences within all the four categories, in which the multigroup analysis has been conducted. In the following Table 11, only the identified significant differences among groups are summarized.

Table 11: Summarized significant differences from the multigroup analysis

<table>
<thead>
<tr>
<th></th>
<th>Path coefficient</th>
<th>Path coefficient</th>
<th>p-values</th>
<th>p-values</th>
<th>p-values permutation</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal Innovativeness</td>
<td>0.203</td>
<td>0.016</td>
<td>0.000</td>
<td>0.722</td>
<td>0.006</td>
<td>Yes</td>
</tr>
<tr>
<td>Time Saving</td>
<td>0.161</td>
<td>-0.057</td>
<td>0.022</td>
<td>0.310</td>
<td>0.015</td>
<td>Yes</td>
</tr>
<tr>
<td>Occupational status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travel cost</td>
<td>-0.039</td>
<td>-0.184</td>
<td>0.354</td>
<td>0.001</td>
<td>0.049</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Source: own table based on SmartPLS output

For evaluating the multigroup analysis results, the column p-values permutation is from importance to identify significant differences between groups. As illustrated in Table 11, it can be concluded that for the relationship between personal innovativeness and behavioral intention (H6) as well as between time saving and behavioral intention (H2) there is a significant difference for the groups 30 and older and younger than 30. The relationships between the constructs for both cases personal innovativeness to behavioral intention and time saving to behavioral intention are not significant for the group younger than 30. This means that time saving aspects are only relevant for the group of 30 and older. Their behavioral intention to use air taxis is developed by the aspect of saving time with a relatively high path coefficient. Next to that, the personal innovativeness is not influencing the behavioral intention to use air taxis for the respondents younger than 30, whereas personal innovativeness represents a relatively strong effect on the behavioral intention for respondents at the age of 30 and older.

Further, when observing the two groups employees and students, one can see that the relationship between travel cost and behavioral intention (H3) has significant differences. The relationship is only significant for the group of students. This means, that the group of employees developed their behavioral intention of using air taxis regardless of travel cost, whereas the group of students represent a relatively high path coefficient and therefore a strong influence of travel cost on their behavioral intention to use air taxis.
4.4 Summary and interpretation of results

The following model illustrated in Figure 11 visualizes the final results of the data analysis including moderating effects of age and occupational status. As long as the positivistic research position allows interpretations, they are made in the following.

Figure 11: UAMAM

Source: own figure

As mentioned above, according to our empirical findings four of the proposed nine hypotheses are not supported considering the whole sample.

Subjective norm has a highly significant positive and relatively strong effect on potential air taxi users’ behavioral intention to use air taxis. Subjective norm has a major influence on the behavioral intention to use air taxis. This aligns with the findings of Chen and Chao (2011), who found that in the context of public transportation subjective norm even has the highest influence on the users’ decision-making towards using public transportation.

Since especially time saving is the proposed benefit that is emergent among researchers when reviewing the literature on air taxis and Urban Air Mobility such as Lineberger et al. (2018), Grandl et al. (2018) or Baur et al. (2018), the non-significant effect is a surprising result. The respondents argued that air taxi services are indeed saving time, however, no effect on their behavioral intention to use was identified. We collected a fair share of people living in very big cities such as Mexico City and of people living in rather smaller cities such as Munich and both showed no effect of time saving aspects on the behavioral intention to use air taxis. However, considering the moderator of age in this
case, we concluded that only the participants older than 30 showed a significant positive effect of time saving aspects on the behavioral intention to use. According to a study conducted by Oppong (2019), older people are tending to value their time more than younger people, especially in comparison to money. Considering time as a very valuable source makes it clear, that saving time is more relevant for the people older than 30. Even though the factor of travel cost was identified as a key determinant for the whole sample influencing their behavioral intention to use air taxis, it must be said that the strength of the relationship is relatively low. However, previous literature in different contexts found that travel cost is indeed a main factor influencing the behavioral intention towards technology adoption and therefore supports this finding (Kim & Shin, 2015; Sepasgozar et al., 2018). According to the multigroup analysis, travel cost has only an influence on the behavioral intention to use air taxis for students when comparing to employees. Assuming that students on average are younger than employees in our survey, this result aligns with the previously mentioned value of time and money. Students, representing the younger generation, tend to value their money more than their time (Oppong, 2019). Therefore, travel cost is a key determinant for the acceptance of air taxi services from a student perspective but not from an employee perspective.

Next to that, the impact of perceived safety on the intention to use is not supported in our study. However, according to Grandl et al. (2018), law and regulations for infrastructure as well as technical feasibility are two of the major concerns when discussing air taxis. This implies that a lot of effort is put into guaranteeing safety when using those services, although it is not an influencing factor according to the results.

Davis et al. (1989) described the perceived ease of use as a major determinant influencing the attitude towards new technologies. This was approved by several studies according to Lee et al. (2003). In particular, until 2003 the perceived ease of use was supported as being a key determinant influencing the behavioral intention to use in 58 out of 101 studies (Lee et al., 2003). Even more surprising is the result of our study, that the perceived ease of use is not supported. Assuming that the perceived ease of use is represented through comfort and convenience of travel, it seems logical that reliability in terms of timeliness, which is closely connected to the convenience of travel, is also not supported in our study. According to the literature review at the beginning of this thesis, convenience in traveling and ease of use play a vital role in technology adoption,
especially in the context of public transportation (Beirão & Cabral, 2007; Davis et al., 1989).

The personal innovativeness shows a significant difference between the participants 30 and older and younger than 30. This means that for the older generation personal innovativeness is a major factor influencing the behavioral intention to use, whereas for the younger generation this key determinant is not relevant. For the older generation, it depends on if a potential user is highly innovative in order to show a high behavioral intention to use, whereas this consideration does not need to be made for the younger generation. It shows that younger generations are willing to use air taxis or show the behavioral intention to use air taxis regardless of their personal innovativeness.

Perceived usefulness has a highly significant positive and very strong effect on the attitude. The respondents consider the perceived usefulness as an extremely important determinant for their attitude toward using air taxis. Further, attitude toward using has a highly significant positive effect on the potential users’ behavioral intention towards using air taxis and thus potential users’ when showing a high attitude toward using also show a high behavioral intention to use air taxis. Attitude toward using as a key determinant for technology adoption was found in several contexts (Davis, 1989; Sepasgozar et al., 2018).
5. Conclusions

In this chapter we present the conclusions of the thesis. The research question described in the very beginning is answered and therefore key determinants influencing the acceptance of air taxi services from a potential user perspective are presented.

Finding the key determinants influencing potential users’ perceptions and concerns towards using air taxis was the main purpose of the study. This purpose was described in the research question we set up in the beginning of this thesis. Conducting a survey research through spreading a questionnaire to potential users by focusing on participants living in cities larger than one million inhabitants, we collected 321 useable responds to answer the following research question:

*RQ: What are the key determinants influencing the acceptance of air taxi services from a potential user perspective?*

Considering the whole sample, key determinants that have been found are subjective norm, travel cost, personal innovativeness and attitude toward using, strongly influenced by the perceived usefulness. We found that the attitude toward using has the strongest influence on the behavioral intention to use air taxis, followed by subjective norm, personal innovativeness and travel cost. The attitude was approved previously by many researchers such as Davis et al. (1989) or Sepasgozar et al. (2018) to have a strong influence on the behavioral intention to use new technologies and therefore supports this finding. Additionally, Chen and Chao (2011) revealed subjective norm as the determinant with the highest influence on users’ intention to use public transportation, which supports the high influence of subjective norm in our case.

Further, we identified differences among groups in regard to age and occupational status. Time saving was identified as a key determinant only for the participants with the age of 30 and older. This is associated with the findings of Oppong (2019), who found that older people value their time more than money in comparison to the younger generation. Additionally, personal innovativeness is only a key determinant for the participants with the age of 30 an older. This means, that for older generations the behavioral intention to
use air taxis depends on if a person has a high personal innovativeness or not. For the younger generation, personal innovativeness is not influencing their behavioral intention to use air taxis. Finally, travel cost is only a key determinant for students in comparison to employees. This implies that students are more price sensitive than employees. Assuming, that on average employees are older than students, this can again be referred to the study of Oppong (2019), saying that younger generations value money more than older generations.
6. Discussion

This chapter provides a discussion of the findings. Further, it explains the studies implications to theory and practice and presents the limitations of the study. In the end of this chapter future research areas are proposed.

6.1 Discussion of results

Finally, to provide an overall assessment, we would like to share the believe that the research question was answered satisfactory. Analyzing a remarkable sample of 321 respondents made it possible to get an imagination of global air taxi acceptance and awareness. Proposing the Urban Air Mobility Acceptance Model and confirming it partly, indicates key determinants influencing the acceptance of air taxi services.

What was especially surprising for us, was the fact that four of the proposed nine hypotheses were rejected. Especially the determinant of time saving was expected to have an influence on users’ intention to use air taxis. This, because time saving aspects are the perceived number one benefit proposed by current air taxi developers (Baur et al., 2018; Grandl et al., 2018; Lineberger et al., 2018). We dare to assume, that hypotheses in terms of reliability, perceived ease of use, perceived safety and time saving are rejected mainly due to fact that people can hardly imagine air taxi services in regard to these factors. These determinants require a rather detailed imagination of how air taxi services are actually operated, whereas the supported determinants such as travel cost, subjective norm or personal innovativeness are assumed to be more independent from the actual air taxi services.

Furthermore, we would like to emphasize the environmental considerations of air taxis. We found that subjective norm has a relatively high impact on the willingness to adopt air taxi services and assume that nowadays the subjective norm is highly influenced by environmental concerns triggered by friends and family. Since subjective norm was already a key determinant when Chen and Chao (2011) conducted a study on public transportation, we found that for air taxi services the influence of subjective norm and environmental concerns is equally high. Therefore, it calms to have found subjective norm as a main factor influencing air taxi acceptance, since this could lead to an increase in environmental awareness and thus be beneficial for the environment.
6.2 Implications for theory and practice

The acceptance of new technologies within the society can be assumed to be difficult to measure since each individual has different subjective perceptions, expectations, and concerns about those. Nevertheless, it is highly important for decision makers of companies to know how people think and believe in order to prevent the failure of new technologies on the market (Taherdoost, 2019). Since high investments are required to bring air taxis to the market (McKinsey & Company, Ascension Global, Georgia Tech Aerospace Systems Design, & Crown Consulting Inc., 2018), it is crucial for companies to be aware of the perceptions of the potential future users in order to develop a successful new form of mobility. We examined the different influencing determinants and believe, that the outcome of our study is highly important for those companies. Additionally, we helped to establish a scientific fundament in this area, where future research can draw on. Therefore, we will discuss our implications for practice and theory in the following.

Our research aimed to test the validated and widely applied model of TAM in a new context and thus increased the predictive validity as proposed by Marangunić and Granić (2015). Based on the existing literature on air taxi services we assumed that users of the new forms of future urban mobility will have similar perceptions as they have nowadays in terms of passenger air transportation, public transportation systems and new technologies in general. Based on these derived determinants we built up hypotheses and proposed a modified model of the TAM, the UAMAM. This model was tested through a survey which allowed to reject or confirm our hypotheses. It turned out, that five of nine proposed hypotheses were supported. Therefore, we deliver a contribution to the existing TAM literature by approving these five variables in relation to air taxi services. Furthermore, the included moderator variables provide answers if a particular group is behaving differently. For instance, our analysis revealed that travel costs play a crucial role in their decision making towards using an air taxi service for students. In contrast, employees seem to be not affected by travel costs. Finally, we contribute new knowledge to the literature of Urban Air Mobility by investigating the acceptance of air taxi services from a user perspective. Since air taxis gain more and more attention within the public, as the test flight in the stadium of Vienna exemplifies (Knolle, 2019), the interest in getting to know the society’s perceptions about air taxis gets more and more important. A published study of February 2019 about the general acceptance of Urban Air Mobility
conducted by Airbus UTM indicates the need for more research in this area and confirms the relevance of our research topic (Airbus UTM, 2019).

Our research provides practical implications for air taxi service providers. Since this study investigated the perceptions towards Urban Air Mobility, in particular, air taxi services, companies currently developing air taxis or planning to offer air taxi services in the future could use our findings for further development, marketing or business development decisions. According to the findings, it seems that especially students are price sensitive towards air taxi services. Thus, in regard to marketing strategies, employees could be more interesting as a target group. As mentioned in the beginning of this thesis, Grandl et al. (2018) assume this service to be adopted by business travelers in the early stages. Focusing marketing effort on this target group is, therefore, one recommendation we want to give. In conclusion, our findings could support companies dealing with the topic of Urban Air Mobility by enabling them to offer respective air taxi service solutions to potential users. However, it seems that the potential users are not informed enough and it also seems that there is a lack of information, making it hard for potential users to imagine and therefore assessing the service as a whole. Generating a sufficient level of information could increase the accessibility to potential users’ thoughts and perceptions in a better way. Same counts for the variable of subjective norm showing a major influence on the intention to use air taxis. Having friends and family members with a positive attitude toward using air taxi services, which could be increased through a sufficient level of information or marketing efforts, could therefore also increase the intention to use air taxi services.

6.3 Limitations

In this section, we discuss the limitations in regard to the chosen theoretical framework, the research design, the collected data set as well as to the questionnaire.

6.3.1 Limitations related to the chosen theoretical framework

Due to the existing literature in the field of public transportation, passenger air transportation and the literature on TAM extensions we built up our hypotheses by assuming that the future potential users of air taxi services will have similar concerns as they have when using public transportation or air transportation nowadays. Therefore, the proposed UAMAM is based on this assumption. However, according to Grandl et al. (2018) describing the customer journey when using air taxi services previously in this
thesis, there are major similarities between public transportation or passenger air
transportation and estimated air taxi services, which are supporting this assumption.

In our theoretical background when we describe the future of Urban Air Mobility, we do not cite from highly ranked journals as in the other parts of our literature review. This is due to the reason that this field of research just emerged over the last years and studies in highly ranked journals do not exist. Therefore, we have cited company studies of well-known consultancies instead. Nevertheless, we are certain that the combination of the company studies especially the comparison of those builds a scientifically solid foundation.

6.3.2 Limitations related to the research design
The research is limited to a quantitative approach. The human concerns are analyzed through a questionnaire in order to reach more respondents than through a qualitative approach. Therefore, the deep insights into psychological behavior and perceptions are not gathered in this study. Those deeper insights could be gathered through a qualitative study, for example through conducting semi-structured or in-depth interviews with potential users of UAM. However, the ground-breaking TAM was almost entirely used and extended through a quantitative approach and is therefore approved in the context of quantitative studies. Even more we aimed to research on a global scale and thus, the quantitative approach was more appropriate especially in terms of the philosophical position we took.

6.3.3 Limitations related to the collected data set
The number of respondents collected through the thesis is limited to 321. Understanding the attitudes and perceptions of 321 respondents gives very good insights into the general population. However, more respondents would increase the generalizability of key determinants influencing the acceptance of air taxi adoption. Especially in the context of comparisons between inhabitants from cities in different countries and participants with different nationalities, a higher number of respondents from the respective cities or with the respective nationalities needs to be collected, in order to conduct representative comparisons between those.
Another limitation is the lack of knowledge about air taxis and Urban Air Mobility. Our research revealed, that only 57% have ever heard of air taxis as a realistic future approach for urban mobility before. Even though we included a picture and information in the questionnaire, the lack of information and knowledge could highly influence their perceptions towards air taxi services. Therefore, repeating the same study when Urban Air Mobility approaches and air taxis are better known within the society, different results could be expected.

6.3.4 Limitations related to the data analysis
In the data analysis, we did not consider the application of control variables. This could have provided us with information about individual demographical differences and could have enhanced the accuracy of the results. However, with the application of the multigroup analysis, we conducted a moderator analysis, which is similar to the application of control variables and directly allowed us to make interpretations based on the significance and the path coefficients for each group.

6.4 Future research
This section provides some general ideas for further research on the topic of Urban Air Mobility and air taxis in particular.

6.4.1 Comparison of air taxi acceptance over time
During our thesis, we noticed huge discussions in the field of Urban Air Mobility, since some well-known newspaper published articles about air taxi services and even test flights in the stadium of Vienna (Knolle, 2019). As described previously, we assume that there is still a lack of knowledge and information that is currently enhanced through the information provided in newspapers and on websites. Therefore, it could be interesting for future research to repeat a similar study in order to compare its results with the results of this thesis. This could be from high scientific interest, not only to analyze how perceptions towards are taxis have changed but also to analyze how the perceptions and acceptance are related to the level of knowledge of the respective participants.

6.4.2 Research on the perceptions of indirectly affected inhabitants of cities
In our study we investigated only the user acceptance, meaning that the research and analysis focused on features that are limited to the usage of air taxis. But how do people
perceive urban air mobility as an indirectly affected person? This means that it is also of high interest for future researchers to investigate the acceptance of inhabitants of large cities not using but observing this new approach of urban mobility. How do people perceive the environmental impact of air taxis or the noise level caused by those?

6.4.3 Research on autonomous air taxis

In our thesis, we considered the acceptance of piloted air taxis and not the autonomous operation of those. Even though it was not explicitly described that we followed the approach of piloted air taxis, we believe that when analyzing autonomous air taxis, more determinants should have been introduced such as trust. However, both approaches are highly discussed. Including the feature of an autonomous operation would most probably change perceptions in terms of key determinants. Therefore, a comparison between piloted and autonomous operations would be of high interest for further research.
7. References


8. Appendices

Appendix 1: Questionnaire

Introduction

Welcome to our survey on air taxi acceptance!

This survey is conducted within the scope of our master thesis at the Jönköping International Business School. The purpose is to understand the public acceptance of air taxis in the context of urban air mobility.

Be ensured that your participation is voluntary and your answers will be kept confidential and anonymous. We cannot trace back individual answers and they will be analyzed as a whole. The answers will be used for academic purpose only.

The questionnaire will take approximately 5 minutes of your time. If you have further questions, suggestions or want to be informed about the results, do not hesitate to contact us:

Lucas Rohlik: rolu18pe@student.ju.se
Sebastian Zeck: stze17kop@student.ju.se

In order to get familiar with the topic, we would kindly ask you to read the following short description carefully.

Description UAM and air taxis

Source: Lilium

This picture shows a possible scenario for air taxi services made by the German company Lilium.
Urbanization and crowded cities are increasing the time for travelers and commuters spent in traffic. Therefore, air taxi services aim to use the air for moving people much faster especially for intra-city and short inter-city distances. Currently, companies and institutions are working on aircraft technologies, infrastructure, and regulations extensively.

Personal details and demographics

Have you ever heard of air taxis as a realistic future approach for urban mobility before?

- Yes
- No

Are you living in a city larger than 1 million inhabitants?

- Yes
- No

Do you think that people in your city are stuck in traffic a lot?

- Definitely yes
- Probably yes
- Might or might not
- Probably not
- Definitely not

In which city do you currently live?

What is your sex?

- Male
- Female
- Diverse

What is your nationality?

What is your age?
What is your highest educational level?

- Less than high school
- High school degree
- Bachelor degree
- Master degree
- Doctorate
- Other

What is your current occupational status?

- Employed
- Unemployed
- Retired
- Student
- Disabled
- Other

Subjective norm

People who influence my behaviour would think that I should use air taxis.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

My social environment would support the use of air taxis.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree
People who are important to me would think that I should use air taxis.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Time saving

I believe that using air taxis could reduce the travel time.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Using air taxis would prevent time spent in traffic jams.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

I believe that by using air taxis for intra-city transport I could travel in the fastest possible time.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Travel cost

I believe that travelling by air taxi could be expensive.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree
The price of air taxi services could be a burden to me.
- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

I believe that I would use air taxis if the price is reasonable.
- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Perceived safety

I believe that it would be safe to travel with air taxis.
- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

I believe that air taxis would have enough safety regulations to make me feel comfortable with using it.
- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

I feel assured that legal institutions would protect me from risks.
- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree
Reliability

I believe that the air taxi service is generally reliable in the context of timeliness.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

I believe that air taxis would guarantee an on time arrival.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

I believe that air taxis offer an accurate service in the context of timeliness.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Personal innovativeness

If I heard about a new technology, I would look for ways to experiment with it

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Among my peers, I am usually the first to try out new technologies.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
I like to experiment with new technologies.

- Strongly disagree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Perceived ease of use

I believe that air taxi services would be easy to use.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

I think that using air taxis would not require a lot of effort.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

I believe that operating the air taxi service would be easy for me.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Perceived usefulness

I think that using air taxis would provide a valuable service for me.
Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

I would find air taxis useful.
- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

I believe that using air taxis would be an effective way to travel.
- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

Attitude

I believe that using air taxis would be a good idea.
- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

I have a favourable attitude towards using air taxis in the future.
- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

I believe that using air taxis would be beneficial.
- Strongly agree
- Somewhat agree
Behavioural intention

I could expect my use of air taxis in the future.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

I would encourage everyone to use air taxis.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

I intend to use air taxis in the future.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree
Appendix 2: SmartPLS model