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Traveling on a Whim?

A qualitative case study on how business models for Mobility-as-a-Service can be designed and configured

by

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Abstract

Title: Traveling on a Whim? A qualitative case study on how business models for Mobility-as-a-Service can be designed and configured

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Course: BUSN09 - Degree Project in Strategic Management

Purpose: The purpose of the study is to gain a deeper understanding of how MaaS business models can be designed and configured.

Theoretical Perspective: The theoretical perspective is provided by a preliminary framework which consists of a synthesis between Business model theory and MaaS literature.

Methodology: A qualitative single case study was employed with an abductive research approach.

Empirical Foundation: The empirical findings show how the prioritization between marketing and technology is of high importance, a new partnership, the important role of the investor to provide financial resources and a new value proposition of "getting the job done".

Conclusion: Show insights into the logic of how MaaS Providers can offer the "idea" of the car through subscription-based mobility, employ prioritization as a key activity, as well as the emergence of a new business logic for MaaS Providers.

Keywords: Business Model, Business Model Canvas, Sustainable Urban Mobility, Mobility-as-a-Service (MaaS)

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The opportunity to investigate how business models can be designed and configured for MaaS services has been a very eventful and fun process. To be able to learn more about how sustainable urban mobility can be achieved, through services such as MaaS, has been both educational and challenging.

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Table of Contents

List of Abbreviations

Application Programming Interface (API)

Business model (BM)

Business model innovation (BMI)

Business model canvas (BMC)

Mobility-as-a-Service (MaaS)

Mobility service providers (MSP) refers to all service operators that are offering transport or mobility services to users.

Mobility-as-a-Service (MaaS) Provider and Mobility-as-a-Service (Maas) Operator is used interchangeably within literature. The concept of MaaS Provider will be adopted in this study as the actor that offers the MaaS service to users.

List of Tables

List of Figures

1. Introduction

1.1 Background

Mobility is defined as the ability and potential for individuals and goods to move from one location to another (Costa, Neto & Bertolde, 2017). Traditionally, mobility in developed countries and societies have revolved around owning and driving a car (Pritchard, 2022; Sumantran, Fine, & Gonsalvez, 2017; Sustainable Development Commission, 2011). The unique characteristics in private vehicles, and hence its attractiveness, lies in its ability of offering convenient, fast, door-to-door mobility for all needs of everyday life (Arias-Molinares & García-Palomares, 2020a), thus individual freedom (Anable, 2005). However, this mode of transport comes at a price. Growing traffic volumes within urban areas has resulted in increased congestion, pollution and emissions (Adriazola-Steil & Colin, 2013; Barreto, Amaral & Baltazar, 2018; Bernardo, Fageda & Flores-Fillol, 2021; ERTICO - ITS Europe, 2019). Moreover, a car-centric society reduces mobility for people not owning a car, thus contributing to social exclusion (Sustainable Development Commission, 2011). In turn, this has led to sustainability having a key role in the debate regarding how the issues with the current urban planning and development system, which still centers around car-infrastructure (Pritchard, 2022), can be addressed (Bibrie & Krogstie, 2017). The conventional approach to transport planning is thus transforming and experiencing a paradigm shift (Banister, 2008; Filippi 2022). An alternative approach has emerged as a response to the transportation management, referred to as sustainable urban mobility (Banister, 2008; Barreto, Amaral & Baltazar, 2018; Filippi, 2022).

To address sustainable urban mobility, car sharing, bike sharing and micromobility options have been introduced alongside car travel and public transport. However, to reach the benefits of this new mobility system in which a wide range of mobility services are available, a multimodal approach needs to be adopted (ERTICO - ITS Europe, 2019). Mobility as a Service (MaaS) enables the multimodal approach by integrating various forms of transport into one digital platform, in which travelers can plan, choose and pay for their multimodal journey (Arias-Molinares & García-Palomares, 2020b; Barreto, Amaral & Baltazar, 2018; ERTICO - ITS Europe, 2019).

1.2 Problem Statement

In the transition towards a more sustainable society, business model innovation is acknowledged as an essential component (Bocken & Short, 2016). Moreover, the rise of the MaaS concept and its eminent potential to contribute to sustainable urban mobility has received attention from academia (Arias-Molinares & García-Palomares, 2020b; Barreto, Amaral, & Baltazar, 2018; Mulley, Nelson & Wright, 2018; Pritchard, 2022). MaaS business models have, if designed correctly, the potential to be the lever of change into sustainable urban mobility (Sarasini, Sochor & Arby, 2017). This is achieved through shifting the focus from a car-centric society to a user-centered and convenient way of moving (Barreto, Amaral, & Baltazar, 2018; Hoveskog, Bergqvist, Esmaeilzadeha & Blanco, 2022). In order to reap the benefits of MaaS, which integrates multiple service providers into one single platform, fundamental business model innovation is needed (Beutel, Samsel, Mensing & Krempels, 2014; Hoveskog et al. 2022). However, this has shown to be challenging due to the complexity of a MaaS system (Hoveskog et al. 2022).

Literature shows how difficulties exist regarding how MaaS Business models can be designed in order to achieve sustainable urban mobility, thus illustrating the importance of gaining deeper insights into this area of research. Firstly, one of the significant challenges when implementing MaaS business models is the involvement of many stakeholders within the MaaS ecosystem (Kamargianni & Matyas, 2017). Coordinating and aligning the interests and operations of these diverse stakeholders can be complex and challenging, leading to difficulties in establishing effective partnerships and collaborations (Hoveskog et al. 2022; Kamargianni & Matyas, 2017). Secondly, the integration of multimodal service provision to allow travelers to plan, book and pay for all their mobility needs, requires open markets for reselling of tickets as well as open and standardized data formats and Application Programming Interfaces (API's) (Polydoropoulou, Pagoni, Tsirimpa, Roumboutsos, Kamargianni & Tsouros, 2020).

Although some scholars have tried to integrate these and address the complexity of designing MaaS business models (Hoveskog et al. 2022; Polydoropoulou et al. 2020; Sochor, Arby, Karlsson, & Sarasini, 2018; Van Den Heuvel, Kao & Matyas, 2020), this research body is still young. It is further highlighted how, due to the concepts' novelty, the literature is relatively

immature and different research streams within the topic have recently begun surfacing (Maas, 2022). Due to the novelty of the topic, previous literature has not been able to provide a comprehensive view of how business models for MaaS can be designed and configured, hence why this study aims to contribute. The relevance to contribute to how MaaS business models can be developed to create and capture sustainable value is further enhanced by its promising outlook to drive sustainable urban mobility.

1.3 Purpose of the Study

This research study aims to achieve a deeper understanding of how business models for complex MaaS services are to be designed to be able to contribute to sustainable urban mobility. This involves understanding the stakeholders' relations that influence its business model, what activities are required for the integration of different services into its platform, and how one manages to create and deliver value and capture value. Existing literature emphasizes the importance of creating a MaaS business model that is able to tap into the potential of the service, however, a comprehensive approach is lacking. Moreover, with the continuous evolution of MaaS business models points to the importance of new empirical data. With MaaS becoming a more and more emergent topic, the contributions of this study will be valuable both to practitioners and scholars of business model innovation in relation to MaaS. Furthermore, as business model innovation is rooted in strategic management research, the study will also contribute to this area of research. This study thus aims to enrich existing business model innovation theory in relation to MaaS, thus addressing the current gap in literature.

1.4 Outline of the thesis

The outline of the thesis will be as follows: The following chapter will present the literature review, which is divided into two different areas of research, Business Model Theory and Sustainable Urban Mobility. This chapter aims to show what previous research has discussed regarding the research areas within this study. The literature review concludes with a preliminary framework where the Business Model Canvas and Maas literature are synthesized. The methodology chapter presents how the research was conducted and the choices made along the research process are thoroughly motivated and explained. The fourth chapter represents the empirical findings. This chapter is structured in line with the preliminary framework where the various components of Whim's business model is

explained and studied. This is followed by the analysis, where the empirical findings are discussed in relation to previously presented literature, thus highlighting the contributions of this study. This chapter ends with a developed framework with regards to how business models for MaaS can be designed and configured based on our findings. Lastly, conclusion includes the main contributions, as well as the practical and theoretical implications of the study. Future research is furthermore suggested.

2. Literature review

The following chapter will present three different sections. Section 2.1 will introduce and define business models, followed by the business model canvas and thereafter business model innovation and the importance of dynamic capabilities. Sustainable urban mobility will be introduced in section 2.2. which is followed by the rise of Mobility-as-a-Service (MaaS) as a potential facilitator. The section will thereafter illustrate how the business model canvas looks like for MaaS Providers. The last section, 2.3, will conclude into a preliminary framework of how business models for MaaS schemes are to be designed and configured according to previous literature.

2.1. Business models

2.1.1 Business models - An ambiguous concept

The concept of business models gained attention during the internet era in 1990's, when dot com companies pitched innovative business models, centered around delivering products and services to customers through the use of the internet, to attract venture capital funding (Amit & Zott, 2001; Betz, 2002; Hawkins, 2004; Shafer, Smith & Linder, 2005). Whilst the concept received momentum and has gained attention from both practitioners and academia ever since (Hawkins, 2004; Zott, Amit & Massa, 2011), no common and widely adopted definition of the term has appeared (Shafer, Smith & Linder, 2005; Zott, Amit & Massa, 2011). However, although definition's come from various disciplines, literature on the business model concept repeatedly highlights the firm's value creation and value capture mechanisms to be what the business model aims to explain (Chesbrough, 2007; Shafer, Smith & Linder, 2005; Teece, 2010; Zott, Amit & Massa, 2011). As the survival and success of any firm relies on its ability to both create and capture value (Shafer, Smith & Linder, 2005), and do so over a sustained amount of time (Achtenhagen, Melin & Naldi, 2013), an understanding of what business models are, how they can be used, and changed is essential (Shafer, Smith & Linder, 2005). One framework that was developed to remove the fuzziness around the concept and to enable description, understanding and assessment of a business model is the Business Model Canvas (BMC) (Osterwalder & Pigneur, 2010). The following sections will therefore present what a business model is, using the Business Model Canvas framework (BMC), and how a firm can innovate the business model to create sustainable success.

2.1.2 Business Model Canvas

The Business model Canvas framework, as seen in Figure 1, consists of nine building blocks, which aims to explain and illustrate “the rationale of how an organization creates, delivers, and captures value” (Osterwalder & Pigneur, 2010, p. 14). When studying the development, design and analysis of business models, the business model canvas framework is the most commonly employed tool by academia and practitioners (Polydoropoulou et al. 2020). Thus, this framework will be employed in this study as a design and analysis tool, mapping out the components and configurations of a business model for MaaS. The nine different building blocks of this framework will be described in the following paragraphs, based on the Osterwalder and Pigneur (2010) book “*Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers".*

The first building block is about the *Customer Segment,* and they are described as vital in order for a business model to survive in the long run. It consists of any group of people or organizations that a business wants to satisfy and reach with their offering. In order to better fulfill customers’ needs, a firm may categorize customers with similar attributes and needs into well-defined customer segments. When having decided upon which customer segment(s) to serve, and thus also which to disregard, the firm should design their business model according to the needs of the chosen customer segment(s). However, depending on what customer segment(s) the firm chooses to serve, the business model differs since the needs of each customer segment are different. A business model that distinguishes between customers with somewhat differing characteristics is a segmented customer segment, which means employing slightly different value propositions, distribution channels, customer relationships and revenue streams for the different segments. When a firm serves two separate segments with vastly differing needs, and thus employs completely different value propositions, it serves a diversified segment. Finally, a firm can serve a multi-sided market segment. This refers to when a firm serves two or more independent customer segments, which both are needed to make the business model work.

As seen above, a core element of the business model is the *Value Proposition.* This is a bundle of different products and services a business offers to create value for their specific customer segment. Value propositions can be designed in different ways, such as conveying how there is no similar offering in the market, highlighting its improved performance, or its

ability to be customized to meet customer's specific needs. “Getting the job done” is another way of creating value, where the operator makes sure everything runs smoothly, thus allowing the customer to focus on their own business. Other ways are design, brand/status, lower prices, increased accessibility, as well as improved convenience. Spreading the value proposition to your customer segments is done through different *Channels.* Different channels have different purposes and an organization can use its own channels, partner channels, or by combining them. An organization’s own channels is when they reach out via for example their own website, while the usage of a partner channel refers to reaching out via a retailer or partner-owned website. Using the right combination of channels is critical in order to realize how customers want to be reached as well as generating revenues, as different channels differ in terms of reach and price.

The next building block, *Customer Relationships,* aims to illustrate what form of relationship an organization has with its customer segments. The relationship can differ depending on why it was established, reasons such as customer acquisition, customer retention and boosting sales. One form of Customer Relationships is personal assistance which entails engaging with a real customer representative during or after purchase. Self-service means no personal relationship since everything should already be provided in order for the customer to be self-sufficient. Automated services combine automated processes with customer self-service, for example through a personal online profile where a customized experience can be offered based on previous transactions.

The fifth building block is *Revenue Stream,* which aims to show how much earnings a company has brought in from each of their customer segments. A revenue stream can be either transaction-based, which means one-time payments, or recurring revenue where payments are received continuously. There are different ways of generating revenue streams, such as asset sale and usage fee, where the former refers to the selling of a physical product and the latter refers to an increase in payment during increased usage. Subscription fees refers to a financial income from selling ongoing access to a service, and brokerage fees are when the middlehand takes out a commission. Licensing fees generate revenues without having to commercialize a service, but instead by giving customers permission to use protected intellectual property in exchange for licensing fees. Different price mechanisms may also affect the amount of revenue generated, the main ones being fixed and dynamic pricing. Following this are the *Key Resources* within an organization, which are described as the key

assets for the business model to function and perform. Depending on the business model, different key resources are required, and different forms exist. Physical resources refer to the physical assets of the firm, such as buildings and IT infrastructure, while some business models may need extensive financial resources such as cash or stock options. The intellectual resources highlight the importance of brand, partnerships and the overall intellectual property while human resources refer to the people within the organization.

For the business model to function, and the organization to create, capture and deliver value, it undertakes various actions, in which the main ones are called *Key Activities*. Similar to key resources, these differ depending on what type of business model the organization employs. Key activities can be either related to production, in terms of design and manufacturing; problem solving; or platform/network, in which businesses with a platform as a key resource have continuous development, improvement and maintenance of their platform as key activities. Moreover, most firms use a network of suppliers and partners to acquire resources or conduct activities, instead of owning all resources and conducting all activities that are embedded in a firms' business model. Thus, when assessing the business model, it is important to take the *Key Partnerships* into account.

Partnerships can take different forms and be arranged for different reasons. A buyer-supplier partnership is generally formed to optimize allocation of activities and resources or to create economies of scale, with the aim of reducing costs. The relationship is arranged to assure reliable supply, and can include outsourcing or shared infrastructure. A strategic alliance can be formed when two parties want to reduce risks in an uncertain environment, and decide to share resources for a mutually beneficial project. Another reason for forming a strategic alliance can be to extend the firm's capabilities by relying on a partner firm to provide certain resources and performing certain activities. This could for example be access to customers, licenses or knowledge. A joint venture is an extended type of strategic alliance in which two or more parties share resources and operate within a new business entity. Lastly, the *Cost Structure* takes into account the main costs that are necessary for a business model to function. All of the aspects above are costly for the company, however the cost structure can differ between business models. Cost-driven business models are built around minimizing costs, while value-driven business models have a greater focus on value creation, such as offering a premium value proposition and personalized service. However, many business models settle in the middle. Certain characteristics are furthermore associated with the cost

structures, such as fixed costs, variable costs, economies of scale and scope. The BMC template, which maps out the nine building blocks that constitutes a business model, is illustrated in figure 1.

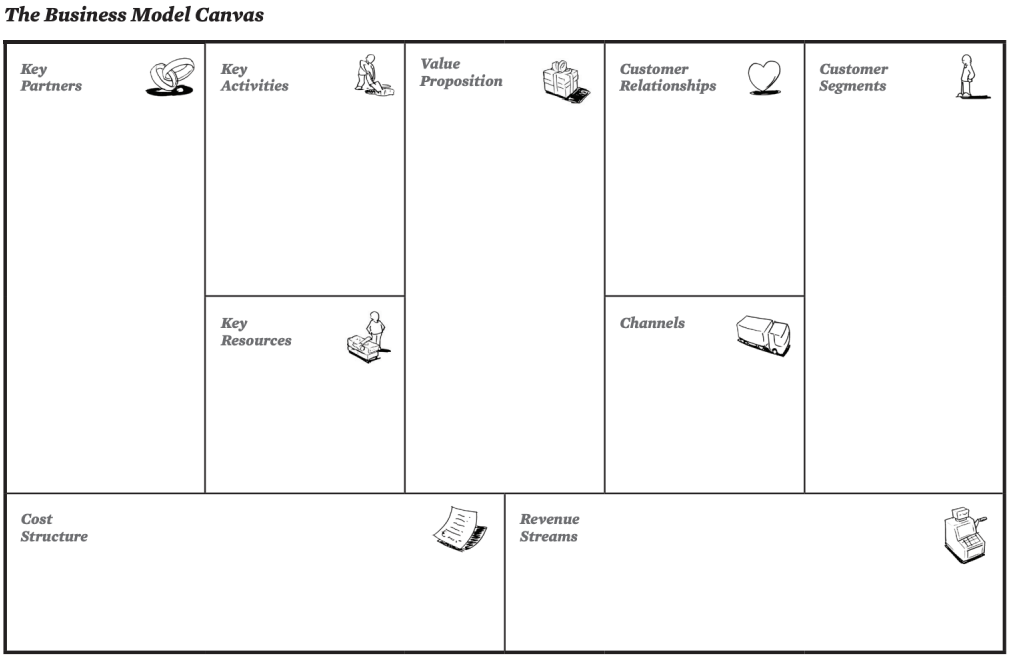

Figure 1: *The Business Model Canvas Template (Osterwalder & Pigneur, 2010)*

2.1.3 Business Model Innovation

Whilst the Osterwalder and Pigneur (2010) BMC addressed the debate around the ambiguity of the concept, another discussion revolves around whether the business model is to be viewed as something static or dynamic (Demil & Lecocq, 2010). The BMC has been criticized for being static, meaning that although this approach helps mapping out the different components to describe and understand how an organization creates, delivers and captures value (Chesbrough & Rosenbloom, 2002; Magretta, 2002), the blueprint given is time-specific and does thus not explicitly explain interrelations between the components or how the BM evolves over time (Demil & Lecocq, 2010; Khodaei & Ortt, 2019; Sinkovics, Sinkovics & Yamin, 2014). Understanding interrelations between BM components has been stated important to understand how change affects the business model (Demil & Lecocq, 2010). This is because as change occurs in an organization, whether it be from external or internal environment, core components of the business model are affected. By understanding the interrelations, one understands how a change in one component may affect another, and thus how the whole BM evolves alongside change (Demil & Lecocq, 2010).

The adoption of the dynamic, transformational approach has been stated to help managers reflect on both how one can align the firm's business model to a changing environment, such as to new customer demands or technological change, but also how one actively can innovate the BM (Chesbrough & Rosenbloom, 2002). By innovating and employing new business models for new technologies, a firm can unlock the latent value within the technology, transform it to market outcomes and capture value from it (Chesbrough & Rosenbloom, 2002). In such, the role of the business model in commercializing new ideas and technologies was highlighted (Chesbrough, 2010; Chesbrough & Rosenbloom, 2002). The implications for firms is the importance of recognizing if a current business model does not align with a change, to adjust the current BM or innovate a new one to find a suitable BM - and to dare to execute on it (Chesbrough & Rosenbloom, 2002).

In order for an organization to successfully adapt and innovate their business model to changes in the environment, dynamic capabilities are described as crucial (Teece, 2018). Dynamic capabilities refers to an organization's ability to sense, seize, and transform its business model by redirecting and extending existing resources and capabilities with external resources to adapt to changing circumstances (Teece, 2007). Adopting dynamic capabilities is equally important if an employed business and its underlying logic about customer needs, revenue streams and cost structure, shows to be incompatible to the ecosystem (Teece, 2007). Following a dominant logic too strictly, and thus filtering out all information that does not align with that logic, can lead firms to miss seeing new business opportunities and potentially valuable uses of technology which do not align with their prevailing business model (Chesbrough, 2010). How fast and to what extent an organization is able to allocate their resources, and thus change the logic of their business model in accordance with wavering customer needs and desires, demonstrates the strength of an organization's dynamic capabilities (Teece, 2018).

An organization's capability to sense changes in the external environment refers to the importance for an organization to constantly scan their environment in order to identify potential business opportunities or threats in the market. This is followed by seizing opportunities which involves meeting these possible threats or business opportunities by exploiting them through testing and committing resources. The potential problem or opportunity must therefore be addressed (Teece, 2007). Lastly, the capability of transforming

is described how, due to the changing environment, the internal processes and structures need to change and be reconstructed accordingly. Thus, this component refers to the capacity of an organization to adapt their existing resources and capabilities within the organization to an evolving environment (Teece, 2007). Adopting these dynamic capabilities is crucial for an organization due to their capacity of generating long-lasting profitability as well as providing the ability for organizations to construct and modify their business model (Teece, 2018).

It is mentioned by Yi, Chen and Li (2022), how changes regarding how an organization creates and captures value is occurring, and it is argued for how a business model can be considered part of an ecosystem of various stakeholders. The idea of how business models are merely firm-centric is thus changing and shifting towards a notion of how a business model is an "ecosystem-embedded construct" (Yi, Chen & Li, 2022, p. 1). The business ecosystem is described as exceeding both the firm's and industry's boundaries (Yi, Chen & Li, 2022) where various stakeholders work in collaboration, such as companies, institutions, customers, regulatory entities, as well as competitors (Amit & Zott, 2015). It is described how "companies coevolve capabilities around a new innovation: they work cooperatively and competitively to support new products, satisfy customer needs, and eventually incorporate the next round of innovations" (Moore, 1993, n.p.).

Moreover, it is mentioned by Frishammar and Parida (2019) how the ecosystem delivers a solution through a combination of resources. Gaining resources from stakeholders within the ecosystem is therefore a necessity to achieve business model innovation and acquire competitive advantages (Yi, Chen & Li, 2022). However, resources are inadequate to achieve business model innovation on their own (Yi, Chen & Li, 2022). In addition to resources, the importance of dynamic capabilities are highlighted in order to be able to utilize and manage the resources effectively, thus converting resources into outputs (Yi, Chen & Li, 2022; Yuan, Xue & He, 2021). Organizational learning is mentioned as a key dynamic capability when it comes to the relationship between stakeholders and business model innovation (Yi, Chen & Li, 2022). During the process of innovating, organizational learning can prove beneficial for firms in terms of reallocating and reconstructing the stakeholder's resources, which is when value creation can be achieved (Demil, Lecocq, Ricart & Zott, 2015; Yi, Chen & Li, 2022).

2.2 Sustainable Urban Mobility

Sustainable mobility has gained increased attention among academic literature, and the research field is continuously growing (Gallo & Marinelli, 2020). The concept of sustainable mobility derives from the "sustainable development" definition in the 1987 United Nations report Our Common Future, more commonly referred to as the Brundtland report (Gallo & Marinelli, 2020). In this report sustainable development was defined as the "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs."* (UN. Secretary-General & World Commission on Environment and Development, 1987, p. 54). However, the actual concept of "sustainable mobility" was introduced a couple of years later in the 1992 report "Green Paper on The Impact of Transport on the Environment" (Gallo & Marinelli, 2020; Holden, Banister, Gössling, Gilpin & Linnerud, 2020). A common strategy for sustainable mobility was presented in the report, which was to *"enable transport to fulfill its economic and social role while containing its harmful effects on the environment"* (European Commission, 1992, p. 5). The arising issues surrounding transportation were thus addressed in order to facilitate a transition towards more sustainable modes of transport in urban areas as well as a general decrease in urban car traffic (European Commission, 1992; Holden, Gilpin & Banister, 2019).

Sustainable mobility and its related concepts have furthermore gained an increasing role in the political arena as well as in transport policy (Barreto, Amaral & Baltazar, 2018; Gallo & Marinelli, 2020; Puhe, 2014). This is partly illustrated by the establishment of Sustainable Urban Mobility Plans (SUMPs), which is a strategic plan with the purpose of creating more liveable cities by improving the mobility among both people and organizations (European Commission, n.d.). However, despite the growing interest among academia and policy makers, no globally agreed upon definition for sustainable mobility and its operationalization have been reached (Holden et al. 2020). Holden et al. (2020) illustrates how sustainable mobility ought to embody the aspects of sustainable development, thus referring to taking economic, social and environmental aspects into account.

Whilst different initiatives for sustainable mobility have been proposed, a majority of these have mainly focused on the environmental issues with the current transportation system, not taking the social and economical factors into consideration (Gallo & Marinelli, 2020). This is further highlighted by Hüging, Glensor and Lah (2014) who argue that urban transport

investments should be done with the aim of creating the highest amount of value, both economic, social and environmental. Furthermore, despite the growing number of sustainability initiatives being implemented in cities and the increasing role of sustainability in policy making, sustainable urban mobility is still a highly unresolved issue (Brůhová Foltýnová, Vejchodská, Rybová & Květoň, 2020). The difficulty to operationalize sustainable mobility is further mentioned by Holden et al. (2020) who define sustainable mobility as a "wicked problem", in which no clear solution can be provided due to the numerous actors-involvement.

The mobility sector is described as standing at the crossroads where multiple trends are affecting its course of action (Ackermann, 2021). Two such trends are digitalization and technological advancement in for example Information and Communications Technologies (ICT) (Ackermann, 2021). The opportunities these trends bring has caused concepts such as integration, interconnectivity, optimization of transport services, as well as smart and seamless mobility, to be heavily discussed within the industry, in addition to sustainability (Kamargianni & Matyas, 2017). One concept that covers these areas, and that has gained significant traction from both academia and the industry in the pursuit of sustainable urban mobility, is Mobility-as-a-Service (MaaS) (Ackermann, 2021; Arias-Molinares & García-Palomares, 2020a; Mitropoulos, Kortsari, Mizaras & Ayfantopoulou, 2023).

2.2.2 Mobility-as-a-Service

The first definition and mentioning of MaaS in academic literature was provided by Sonia Heikkilä who, in her master thesis, defined MaaS as *"a system in which a comprehensive range of mobility services are provided to customers by mobility operators"* (Arias-Molinares & García-Palomares, 2020b; Heikkilä, 2014, p. 8; Kim, Choo, Choi & Lee, 2021; Lopez-Carreiro, Monzon, Lois & Lopez-Lambas, 2021). The report was supervised by the founder of MaaS Global in Helsinki and "father of MaaS", Sampo Hietanen, and has been heavily cited thereafter (Arias-Molinares & García-Palomares, 2020b; Heikkilä, 2014; Sakai, 2019). Following this, Hietanen (2014), formulated his own definition of MaaS, which is commonly referred to, alongside Heikkilä (2014), as one of the earliest comprehensive definitions (Ackermann, 2021; Sochor et al. 2018). The regularly cited definition describes MaaS as a mobility distribution model that fulfills users' transport needs by combining

different transport modes and delivering these in tailored monthly mobility packages through one single interface (Arias-Molinares & García-Palomares, 2020b; Hietanen, 2014).

However, no consensus has yet been reached within academic literature in terms of its definition (Ackermann, 2021; Maas, 2022; Sakai, 2019; Strömberg, Karlsson & Sochor, 2018). Building on definitions and components highlighted by previous scholars and practitioners, the following MaaS definitions will be adopted: "Mobility as a Service is a user-centric, intelligent mobility distribution model in which all mobility service providers' offerings are aggregated by a sole mobility provider, the MaaS provider, and supplied to users through a single digital platform" (Kamargianni & Matyas, 2017, p. 4). Moreover, this study will include the sustainability perspective in its working definition, as this perspective is highlighted by many scholars (Hoveskog et al. 2022; Jittrapirom, Caiati, Feneri, Ebrahimigharehbaghi, Alonso-González & Narayan, 2017).

Previous literature has elaborated on who this MaaS Provider, that aggregates other mobility service providers' offerings and offers these to customers, should be (Kamargianni & Matyas, 2017). Depending on if the MaaS Provider is public or private, the business model will differ (Hoveskog et al. 2022). Due to the purpose of this paper, and the case study chosen being a private company, the below section will examine business models for a private, commercial MaaS Provider. Whilst previous literature uses the terms MaaS Operator and MaaS Provider interchangeably, this study will employ the term MaaS Provider to describe the actor who delivers the MaaS type of service to customers.

2.2.3 Business Model Canvas for MaaS

The concept of MaaS is illustrated as a key facilitator in the transition to a world without private vehicles (Arias-Molinares & Carlos García-Palomares, 2020a; Loubser, Marnewick & Joseph, 2021). However, unlocking the promising potential of MaaS has been shown difficult due to the complexity of a MaaS system, and it is described how fundamental business model innovation is required to reap its benefits (Hoveskog et al. 2022). If designed correctly, MaaS services can serve as a catalyst for sustainable urban mobility (Sarasini, Sochor & Arby, 2017), and it is therefore deemed essential for MaaS providers to innovate and employ new business models, that allows them to commercialize and derive value from their services (Chesbrough, 2010; Chesbrough & Rosenbloom, 2002).

In order to understand how a private MaaS Provider creates, delivers, and captures value, the coming section will present how business models for private MaaS Providers are to be designed according to previous literature. Previous literature has addressed the MaaS concept in terms of describing its core characteristics (Jittrapirom et al. 2017), created prototype business models (Polydoropoulou et al. 2020) and conceptualized business models for MaaS as a relational multi-actor ecosystem (Hoveskog et al. 2022). The authors of this paper will translate these findings and describe them as business model components of the BMC framework (Osterwalder & Pigneur, 2010). This will be done in order to map out the components and possible configurations of a MaaS Provider's business model. As the framework provides a comprehensive visual representation of a business model (Osterwalder & Pigneur, 2010), the adoption of the framework will aid the understanding of how such business models can be designed for a MaaS provider. Due to the purpose of this paper, and the case study chosen being a private company, the below section will examine business models for a private, commercial MaaS Provider.

Moreover, the implementation of a MaaS Provider's business model expresses an underlying logic of how it will be able to create and capture value. With changes in the MaaS Provider's environment, this logic can become irrelevant, causing a need for BM reconfiguration and innovation (Teece, 2007). Since a MaaS service is a user-centric service with the purpose of providing easy and seamless mobility for the actual customer (Kamargianni & Matyas, 2017), it will be crucial for the MaaS provider to be able to adapt its business model to its environment and customer needs. In alliance with Teece (2007), the ability of the MaaS Provider to sense, seize and transform its business model and associated resources will depend on its degree of dynamic capabilities.

Customer segment

Depending on what business model the MaaS provider employs, the customers of a MaaS provider could be private users, companies, or both, thus making it either a B2C, B2B or a mix (Arias-Molinares & García-Palomares, 2020b; Kamargianni & Matyas, 2017). The private customers of a MaaS provider ranges from commuters to tourists, young to elderly, students to families (Polydoropoulou et al. 2020). According to Arias-Molinares and Garcia-Palomares (2020b) these groups differ in terms of characteristics, where some may seek affordable options and others want privacy, thus showing the importance of offering

different plans for different groups. Due to the customer's slightly different needs, one can see how a MaaS provider serves a segmented market where slightly different packages are provided to meet specific customer needs (Arias-Molinares & García-Palomares, 2020b; Osterwalder & Pigneur, 2010; Polydoropoulou et al. 2020). Scholars further highlight young people as the most likely adopters of MaaS (Kamargianni & Polydoropoulou, 2013; Klein & Smart, 2017; Polydoropoulou et al. 2020). Their differing behavior towards technology, smartphones and car ownership make them account for a significant customer segment for MaaS Providers to consider (Kamargianni & Polydoropoulou, 2013; Klein & Smart, 2017; Polydoropoulou et al. 2020). Another type of customer segment is corporate clients, in which the MaaS provider can offer MaaS services to employees through their employer (Polydoropoulou et al. 2020; Sochor et al. 2018). If the MaaS provider chooses to serve both private users and companies, and these two groups have very varying needs, justifying completely different value propositions, this would imply a diversified customer segment.

Value Proposition

MaaS is described as a user-centric paradigm that brings together different modes of transportation to offer users a seamless mobility (Jittrapirom et al. 2017). The rise of digitalization and the integration of Intelligent Communication Technology (ICT) to the transport sector, has enabled service operators to communicate and share information with each other, resulting in many new transport applications on the market (Arias-Molinares & Carlos García-Palomares, 2020a; Janušová & Čičmancová, 2016; Maas, 2022; Mangiaracina, Perego, Salvadori & Tumino, 2017). By integrating these and allowing travelers to plan, book and pay for their multimodal journey on the same platform, a MaaS Provider delivers a one-stop-shop (Hoveskog et al. 2022), that has the ability to provide travelers an easy and seamless urban mobility (Arias-Molinares and García-Palomares, 2020b; Jittrapirom et al. 2017; Maas, 2022; Matyas, 2020; Mitropoulos et al. 2023) and eliminate the dependency on private cars (Kamargianni & Matyas 2017). The integration of multiple mobility applications into one service provider, and the new experience this entails for users, is illustrated by figure 2. Moreover, a MaaS service has through the use of ICT, the ability to offer personalized and customized trip solutions (Jittrapirom et al. 2017). These are based on users' stated preferences and travel history, and both of these components enable MaaS to fulfill users' specific mobility needs (Jittrapirom et al. 2017; Narayanan & Antoniou, 2023). Hence, the value proposition of MaaS is to simplify the way of moving, by offering a convenient, accessible and personalized form of mobility to users.

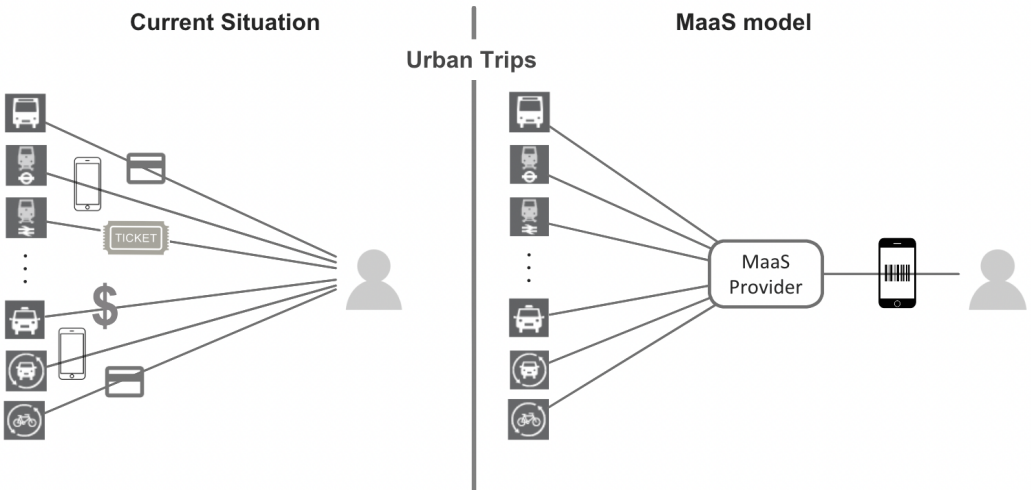

Figure 2: *With and without MaaS from a user's perspective (Kamargianni & Matyas, 2017)*

Channels

It has been highlighted by previous literature how app-based mobility services can, in addition to their own application, use MaaS platforms to reach out to their customers (Gilibert & Ribas, 2019). In other words, MaaS providers have been highlighted by previous literature as a distribution channel for different mobility services. However, how MaaS services reach their customer segment through different channels have not been thoroughly addressed. Polydoropoulou et al. (2020) describes how MaaS providers mainly use their own application and website to reach out to customers, in other words their own channels. Moreover, it is mentioned how channels such as television, newspapers and social media are used to reach and attract new customers (Polydoropoulou et al. 2020). Customers could furthermore be reached through third-party retailers who market the MaaS service on their own channels (Polydoropoulou et al. 2020), which can be interpreted as partner channels.

Customer Relationship

It is described by literature that the essence and core of a MaaS provider is its ability to offer simplicity, convenience and customization to their customers. With the integration of ICT, MaaS providers are able to customize and individualize each trip for each individual based on their registered profile and previous travels (Jittrapirom et al. 2017). Moreover, everything, in terms of mobility and different modes of transportation, should be included and accessible in one single interface. Based on this information, one can see how a MaaS provider has a

customer relationship that involves combining automated processes with self-services, due to their ability of utilizing data and providing everything in order for the traveler to be self-sufficient. Furthermore, having customer service is described as one of the MaaS provider's main activities (Polydoropoulou et al. 2020). This form of customer relationship can in turn be interpreted as a form of personal assistance.

Key activities

However, in order to enable this seamless journey, the integration of multimodal transportation, such as public transport, car-sharing, ride-sharing, bike-sharing, taxi, car rental, and on-demand buses, is essential that can move the traveler from A to B in a single application (Jittrapirom et al., 2017; Matyas, 2020; Reyes García, Lenz, Haveman & Bonnema, 2020). Whilst the MaaS concept in a broad sense requires the integration of many different aspects, previous studies have shown how MaaS schemes differ on what functionalities they offer to users (Jittrapirom et al. 2017; Polydoropoulou et al. 2020; Sochor et al. 2018). This translates according to Sochor et al. (2018) to different levels of integration, resulting in different key activities for a MaaS provider depending on its service' level of integration. Moreover, all these integrations include some technical complexity and demand some standardized open data, although the extent differs between different levels (Sochor et al. 2018). The next paragraph describes the different levels according to Sochor et al. (2018) and presents what activities it creates for a MaaS Provider.

MaaS services with integration level 1 refers to an *integration of information,* and has the main key activity of improving the platform journey planning and helping travelers find the best possible routes (Sochor et al. 2018). Level 2 integration is referred to as the *integration of booking and payment,* where key activities are added in terms of offering travelers a convenient way of paying and booking trips within the same application as the travel planner. This will appeal to those already multi- or intermodal, however it will not create new customers. A level 3 MaaS service represents *integration of the service offer,* and this is a bundled, possibly subscription-based, unified service that offers a comprehensive mobility solution by taking care of the customer's entire mobility needs throughout the day. This version includes key activities such as journey planning, booking, payment and ticketing through a single interface, to be able to attract customers with larger budgets to give up their private vehicle. A level 3 MaaS service is local, which includes that it needs to find the optimal supplier(s) of each mode to develop the service with, and find politically adequate

contract models with the local or regional public transport authorities that enable the integration of suppliers services. The level 4 is *the integration of societal goals,* and includes reduced car ownership and use as well as the creation of a healthy and liveable city where key activities such as incentives, are incorporated into the platform to influence citizens' behaviors. Thus, depending on the level of integration, a MaaS provider can engage in different key activities and due to their characteristic of developing and improving the actual platform technology, they can be interpreted as platform management, which are platform/network related activities (Osterwalder & Pigneur, 2010).

Moreover, Polydoropoulou et al. (2020) highlight key activities such as providing customer service to the MaaS customers, which can be interpreted as problem-solving related, in terms of providing customer service and solving individual issues. Obtaining and processing customer data in terms of ensuring that customer needs are met, as well as understanding customer behavior through their travel patterns, are further key activities for a MaaS provider. Further key activities for a MaaS service, is highlighted by Polydoropoulou et al. (2020) who states marketing as one, which can be interpreted as a network/platform related activity in the form of platform promotion. However the role of marketing is not really elaborated on any further within literature.

Key Resources

In line with Osterwalder and Pigneur (2010), a MaaS business model has a set of key resources for their business model to function and perform. Literature shows how a MaaS Provider's IT infrastructure is crucial (Polydoropoulou et al. 2020). It describes how the actual technological platform and application is in itself a necessity for a MaaS provider, (Polydoropoulou et al. 2020). Moreover, since a MaaS provider includes car-related mobility services in their offering, vehicles such as cars, e-scooters, e-bikes etc, as well as charging stations for these electric vehicles can be considered key resources (Gilibert & Ribas, 2019). These key resources can in turn be seen as physical resources that are needed for a Maas provider to operate their business.

The IT infrastructure, ICT infrastructure, technical back-end solutions (such as big data and cloud-computing), are physical and intellectual resources that are crucial in a MaaS system in order to function (Jittrapirom et al. 2017; Kamargianni & Matyas, 2017). Moreover, standardized and open data formats and API's (Application Programming Interface) are an

important intellectual resources for a MaaS Provider, as it enables the integration of the other services included in the MaaS service (Jittrapirom et al. 2017; Kamargianni & Matyas, 2017; Polydoropoulou et al. 2020). The integrated payment methods furthermore provides longitudinal data where information and knowledge regarding customer's travel patterns can be obtained (Jittrapirom et al. 2017). These technological aspects of MaaS can, in accordance with Osterwalder and Pigneur (2010), be considered intellectual resources and vital for the provider in order to operate their services. Moreover, the novelty of the MaaS concept creates a conception that it will bring high economic and marketing costs (Jittrapirom, Marchau, Heijden & Meurs, 2018), which is why capital and financial resources are to be considered a key resource. Having specialists such as engineers who are able to operate these services is also crucial, which can be considered human resources (Polydoropoulou et al. 2020).

Revenue Stream

Another thing that characterizes MaaS is the rate-models employed, that both allow users access to MaaS services, whilst also generating revenues for MaaS Providers. Polydoropoulou et al. (2020) describes that the primary revenue stream for MaaS Providers relates to their sales of tickets to the different mobility services. If the MaaS provider is a company, which it is in this case, the revenues are gained from the direct sales of other mobility services tickets. The rate-models that MaaS providers usually employ to charge users for access to the mobility service are either subscription-based or pay-as-you-go-based (Jittrapirom et al. 2017; Polydoropoulou et al. 2020). In the former, the MaaS provider offers a bundled package of different transport modes based on the user need, of which users get access to certain km/minutes/points for an agreed time period, by recurring, oftentimes monthly, payments (Jittrapirom et al. 2017; Polydoropoulou et al. 2020). In the pay-as-you-go alternative, users are charged for the effective use of the service (Jittrapirom et al. 2017). Moreover, if the trip entails different modes, the user pays separately for each mode used, based on the prices set by each transport service provider (Polydoropoulou et al. 2020). It is furthermore described by (Sochor et al. 2018) how the subscription-based model can be more profitable since the pricing is non-transparent. This can prove beneficial for the MaaS provider and lead to higher average margin, if they are good at negotiations and understanding of customer needs (Sochor et al. 2018).

In accordance with Osterwalder and Pigneur (2010), the revenue streams can be interpreted as either recurring revenue or transaction-based revenue, depending on the revenue model

employed by the MaaS provider. In the subscription-based model, revenues come from subscription fees from selling ongoing access to their service and payments are received regularly every month, which is a recurring form of revenue stream (Osterwalder & Pigneur, 2010). Moreover, a fixed form of pricing mechanism is employed. However, for the pay-as-you-go model, a transaction-based revenue stream is provided through one-time payments. The revenue is generated through a usage fee, where the MaaS provider charges customers for the number of trips, with a dynamic pricing since the prices can change based on market conditions (Osterwalder & Pigneur, 2010).

Cost structure

In relation to the costs associated with being a MaaS Provider, there exists both fixed and variable costs. Fixed costs, meaning those that are not affected by the volume of service provision, includes the investment costs related to brand creation and the initial development of the service (Polydoropoulou et al. 2020). Other fixed costs include the amortization of the investments, and maintenance of the platform and its information systems (Polydoropoulou et al. 2020). Reaching economies of scale can enable MaaS Providers to reach customers fastly and efficiently whilst saving the expense of continually upgrading the platform (Hoveskog et al. 2022). The variable costs include those related to the provision of the services included in the MaaS service, costs of customer service and staff costs (Polydoropoulou et al. 2020). Moreover, due to the novelty of the MaaS concept, are costs related to marketing perceived to be high (Jittrapirom et al. 2018). Polydoropoulou et al. (2020) state marketing as a fixed operational cost that is not affected by changes in the number of customers served. The whole essence of a MaaS provider is to create value to customers by an improved, personalized mobility experience. In such, there are reasons to state the business model as more value-driven than cost-driven.

Key Partnerships

One returning topic in MaaS literature is the recognition of all actors involved in MaaS, referred to as the MaaS Ecosystem. This ecosystem is the wider network of stakeholders who interact and thus influence how a MaaS Provider creates and captures value (Kamargianni & Matyas, 2017). This aligns with previous business model literature who increasingly acknowledge business models as ecosystem-embedded constructs (Yi, Chen & Li, 2022), in which value creation happens together with partners (Amit & Zott, 2001). Based on the employed definition of MaaS in this paper, and the purpose of the study, the ecosystem

surrounding the MaaS Provider will be described (Kamargianni & Matyas, 2017). Understanding this complex set of exchange relationships and activities between the MaaS Provider and its partners helps, in alliance with Zott, Amit and Massa (2011), to understand how the MaaS provider creates value through collaboration with its partners.

MSP's, such as public transport, car-sharing, ride-sharing, bike-sharing, taxi, car rental, e-scooters and on-demand buses, are one of the primary partners to the MaaS Provider (Kamargianni & Matyas, 2017). This is because they supply their capacity of mobility services, as well as provide access to their data via API's (Application Programming Interfaces) (Kamargianni & Matyas, 2017; Polydoropoulou et al. 2020), that enables the MaaS provider to offer their mobility service. In return, the MaaS provider brings access to users in need of mobility, thus an opportunity to gain more customers and increased market share (Arias-Molinares and García-Palomares, 2020b; Hoveskog et al. 2022; Kamargianni & Matyas, 2017; Polydoropoulou et al. 2020). However, scholars describe a potential resistance MaaS Provider's can meet from MSP's, due to a lack of resources and financing to make the leap to enroll in the MaaS service (Polydoropoulou et al. 2020). The activities and resources the MSP's provide a MaaS Provider, that enable the business model to work, entails this partnership to be a strategic alliance. Moreover, the fundamental aspect of open data and open API's within the MaaS concept, make regulators and policy-makers key partners to a MaaS Provider by either hampering or enabling the service (Kamargianni & Matyas, 2017; Polydoropoulou et al. 2020). Ideal is a policy framework provided on a national level by the government, in order to circumvent different open standards across regions, or even on a global level, to enable MaaS to scale in several countries (Kamargianni & Matyas, 2017). Although regulators are not directly involved in a MaaS Provider's operations, they can significantly affect the success of a MaaS Provider's business model (Kamargianni & Matyas, 2017). In such, although not a formal, contractual, partnership, these are to consider as a partner of a MaaS Provider.

The essential function of data availability in MaaS makes Data Providers that can supply a MaaS Provider with data and analytics capabilities a supply partner (Kamargianni & Matyas, 2017). Moreover, since a key activity of the MaaS Provider is to provide integrated journey planning, ticketing and payment, actors that provide these services to a MaaS Provider are also supply partners (Kamargianni & Matyas, 2017). Investors, although not connected to the operations of the business model, are stated to have significant effect on the success of a

MaaS Provider's business model (Kamargianni & Matyas, 2017). The motive to consider investors as potential partners is due to their ability of providing a MaaS Provider with financial resources. Although Kamargianni and Matyas (2017) has stated that private investments can provide financing to the MaaS Provider, the scholars emphasis is on the investors' opportunities to exploit an estimated trillion dollar market, rather than how much a MaaS Provider relies on this financing. Moreover, the MaaS concept opens up for new types of issues that insurance companies are called in to provide solutions for, making them constitute a part of the MaaS ecosystem (Kamargianni & Matyas, 2017).

The above section presents how previous literature shows several different ways of how components of business models are to be designed. The way a given commercial MaaS decides to combine these and thus configure their business model, will consequently result in different types of business models. The employed business model reflects the MaaS Provider's hypothesis about what customers want and how the firm can best meet those needs, and get paid for doing so (Teece, 2007). Once employed, it demonstrates the way the enterprise, in this case the MaaS provider, "goes to market" (Teece, 2007 p. 1329). Thus, in order for an organization, such as a MaaS provider, to successfully reconfigure its business model if this business logic didn't find proof, or when changes in the environment make this logic irrelevant, dynamic capabilities are described as crucial (Teece, 2018).

2.3 Concluding Remarks and Preliminary Framework

By synthesizing business model theory and MaaS business model theory, this section presents a preliminary framework for how business models for private MaaS providers are to be configured. This framework showcases an underlying logic in terms of how the employed business model of how a private MaaS Provider creates, captures and delivers value. As the components of a business model relate to each other, changes happening to one of the components may affect others. As the MaaS provider acts within an ecosystem of partners that influences how it creates and captures value, its sustained value creation will depend largely on managing these relations, and addressing changes within the environment. Moreover, the user-centricity of the MaaS Provider's business model highlights the importance of adhering to changing customer demands. Thus, it is deemed required for a MaaS Provider to adopt *dynamic capabilities* in terms of sensing the environment, seizing

opportunities and transforming its business model accordingly. These are in turn demonstrated by how fast and to what extent the MaaS Provider is able to scan its environment for opportunities or barriers and act on them. To conclude, the complete framework highlights the business model configurations, as well as the ability to change these configurations, to how a MaaS Provider creates, delivers and captures value.

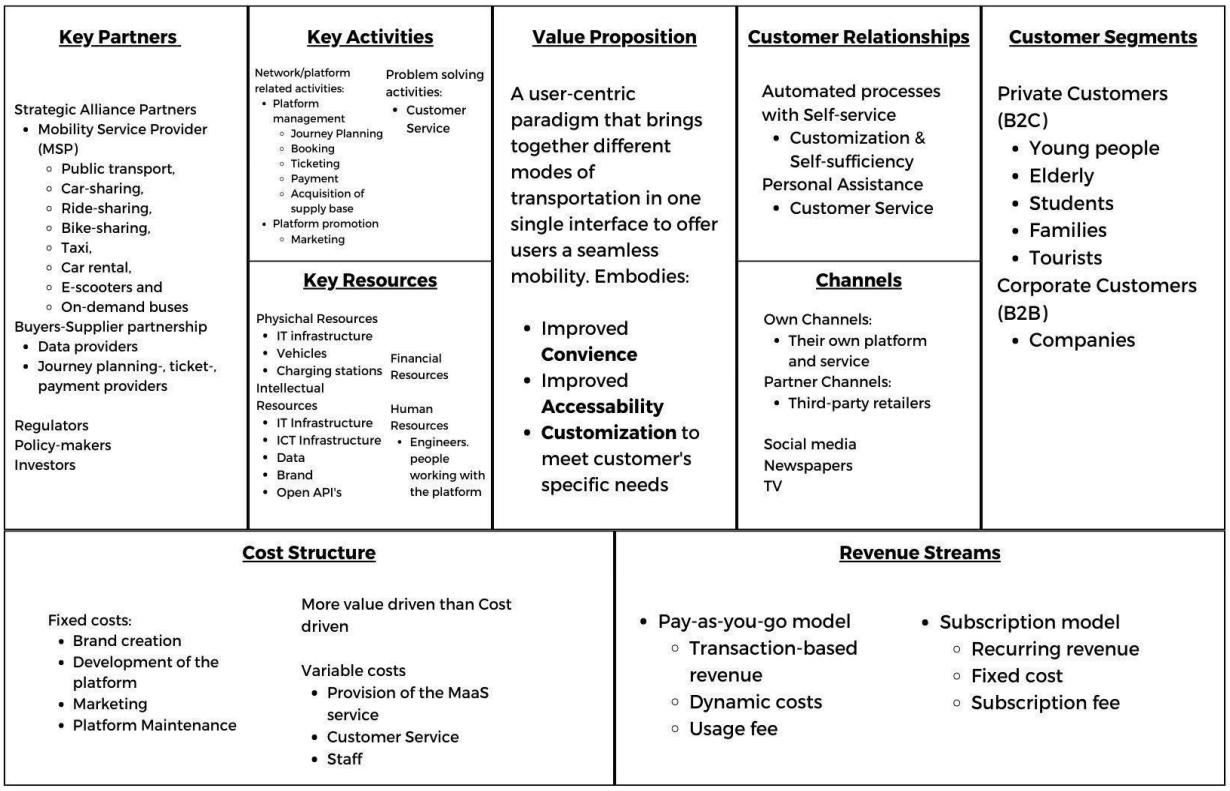

***Figure 3**: Preliminary framework of Business Models for MaaS (developed by researchers)*

3. Methodology

The following section will describe the methodology chosen for this thesis. Initially, the motivation why a certain research approach and design was chosen will be included. This will be followed by the case selection where a description of the case and sampling strategy is provided. The process of collecting the data will thereafter be provided, followed by how the data was analyzed. A discussion regarding the quality of the study is thereafter conducted, in terms of validity and reliability. Lastly, the ethical considerations for this study are provided.

3.1. Research Approach and Design

Within this study, a qualitative research approach was adopted alongside an abductive way of working (Bell, Bryman & Harley, 2022; Creswell & Creswell, 2023). A deductive approach is characterized by beginning with a chosen theory and verifying it, while an inductive approach entails starting with empirical observations and thereafter searching for emerging general themes and theories (Creswell & Creswell, 2023). Due to an already initially established theoretical framework prior to finding empirical data, a deductive way of working was adopted (Saunders, Lewis & Thornhill, 2006). However, adaptations to the theoretical framework with regards to what patterns and themes have been detected and shown in our data have been made, thus applying an inductive approach as well (Creswell & Creswell, 2023; Saunders, Lewis & Thornhill, 2006). In doing so, an abductive approach has been used, which can prove beneficial and allow for a more free and open analysis where the authors can become surprised by what the data shows, rather than confirming (Bell, Bryman and Harley, 2022; Saunders, Lewis & Thornhill, 2006). This way of working, using both an inductive and deductive logic, is furthermore in accordance with a qualitative research approach, according to Creswell and Creswell (2023).

In order to gain deeper insights into how business models for MaaS services can be designed and configured, a qualitative research approach was chosen in accordance with the purpose of the thesis (Creswell & Creswell, 2023). Creswell and Creswell (2023) describe how a qualitative approach ought to be chosen when a research problem is best understood by the exploration of a specific phenomena. Our research problem, with regards to how business models for MaaS services can be designed and configured, can be interpreted as exploratory

and is in two ways in line with a qualitative research problem. Firstly, one of the main characteristics of our research problem is the need to describe and explore business models for MaaS services, as well as further development of business model theory. Following this, our research problem is not suited to quantitative measures since the aim is to gain deeper insights into a specific problem (Creswell & Creswell, 2023). Hence a qualitative research approach was chosen due to the purpose of this study and the authors were provided a greater understanding of the problem at hand.

The qualitative research approach consists of numerous different forms of research designs and for this thesis, a single case study was chosen and conducted (Creswell & Creswell, 2023). Case studies are described as in-depth analysis of a specific case, which can be either an event, program or a group of individuals (Creswell & Creswell, 2023). Yin (2014) illustrates how the need and relevance for using a case study design depends on the research question(s). If the aim of the research questions are to seek explanations as to "how" and "why" a certain contemporary phenomena has occurred, as well as achieving a deep understanding and description of the specific circumstance, then a case study strategy will prove relevant (Saunders, Lewis & Thornhill, 2006; Yin, 2014). As our thesis seeks to provide an in-depth description and understanding as to "how" business models for a contemporary phenomena such as MaaS can be designed and configured, a case study approach deemed suitable. Moreover, the aspect of context when conducting a case study is further highlighted by both Yin (2014) and Saunders, Lewis and Thornhill (2006), in terms of how the boundary between the actual phenomena and the context it operates in, can become unclear. Using a case study will therefore enable an understanding of a real-world case where the contextual conditions will play a role (Yin, 2014). This is in line with the purpose of this study, where the aim is to gain deep insights into how business models for a real-life MaaS service can be designed and configured based on real events, thus taking the involvement of the context into account.

Thus, a case study with a focus on qualitative, in-depth and multifaceted data based on one or multiple cases was chosen, rather than a survey method where the focus lies on quantitative data that is based on a large number of samples (Larsson, 1993). However, Larsson (1993) describes how a survey method can prove beneficial for many reasons due to its ability to examine cross-sectional patterns and generate more general conclusions. Moreover, a case survey is advantageous due to its broad inclusion where multiple case studies can be included

that deems relevant to the research question, thus removing the element of excluding certain cases based on judgment and convenience (Larsson, 1993). However, limitations exist due to the method's inability to capture complex phenomena, such as MaaS services in this instance. Larsson (1993) describes how the coding of a survey method can generate a simplified picture, thus resulting in information loss. Therefore, due to the complex nature of a MaaS system, adopting a qualitative research approach with a case study design, proved beneficial because of its ability to capture complex situations (Creswell & Creswell, 2023).

According to Yin (2014) different research designs for case studies exist as well, and in order to make the case study stronger as well as easier to conduct, it may be beneficial to choose a formal design. Whether a multiple or single case study was to be conducted was therefore considered, and a single case study was ultimately chosen due to the purpose of this thesis. It is highlighted by Larsson (1993) how a trade-off relationship between single case studies and multiple case studies exist. A study that researches one single case is deprived of the opportunity of comparing patterns from different cases, thus making it difficult to reach general conclusions and generate theory (Larsson, 1993). Multiple case studies are, similar to surveys, able to achieve this, however, according to Larsson (1993), due to the considerable amount of resources and research required for this to happen, more limited and smaller case sets are created. The standardization allows for a larger number of cases to be studied, however the depth of the data is sacrificed (Larsson, 1993). Thus, due to the aim of this study of exploring how complex MaaS business models can be developed and configured, a single case study was chosen. In such, a more in-depth and multifaceted analysis can be achieved.

3.2 Case Selection

3.2.1 Case Subject

The single case study chosen for this thesis is MaaS Global and their MaaS service "Whim". The reason for this choice can be traced back to Yin (2014) and the proposed five rationales as to why a single case study should be conducted. It is described by the author how if a case is either *critical, unusual, common, revelatory,* or *longitudinal,* then a single case deems appropriate. In such, Whim can be defined as having the characteristics of an unusual, and longitudinal case.

Whim is a MaaS service that was created in Finland by the start up company and MaaS provider “MaaS Global” in 2016 (Whim, n.d.a). They are considered “pioneers” within the MaaS area due to being one of the first commercial MaaS Providers, alongside UbiGo in Sweden, and their founder, Sampo Hietanen, has claimed to be the father of the concept (Arias-Molinares & García-Palomares, 2020b; Smith, Sochor & Sarasini, 2018; Whim, n.d.b). Whim has managed to stay alive despite being one of the first commercial operators to the market, while the other pioneer UbiGo in Sweden, has disappeared due to a lack of funding (Karlsson, Sochor & Strömberg, 2016). Thus, an interest for Whim as a single case study was piqued due to the unusual nature of the case with them being one of the first to market and still alive. Moreover, MaaS Global was established in 2015 (Whim, n.d.a) and because of their long history compared to other MaaS Providers, an opportunity to study and follow a developmental course in terms of how the configurations in their business model has changed is provided (Yin, 2014).

3.2.2 Sampling Strategy

In accordance with Creswell and Creswell (2023) and Yin (2015), a purposeful sampling was employed and chosen during this thesis. This is furthermore described by Yin (2015) as the most common approach to sampling in qualitative research. The strategy entails selecting, in a deliberate manner, each of the respondents for the interviews based on who will potentially provide the most relevant data for the study (Yin, 2015). Consequently, the respondents for this thesis were chosen deliberately based on who the authors believed would provide beneficial data regarding the design of Whim’s business model.

According to Yin (2015) the design of the purposeful sampling could differ due to the nature of the study. If the purpose of the study calls for the selection of an extreme or deviant case, such as Whim, then the design of the sample may vary. However, the ultimate goal is always to have information-rich sources (Yin, 2015). Hence, due to the purpose of this thesis and being able to answer the research question, individuals with knowledge regarding MaaS services and Whim were of great interest. People who were currently working or had previous experience within the transport and mobility sector were therefore deemed suitable in order to help us understand the complexity of MaaS and thus Whim. Furthermore, the authors aimed at including stakeholders within the Whim ecosystem, who had great knowledge about how its business model was designed and configured. A criteria where *all*

of the participants had a clear connection to our case study Whim was however not formulated in order to receive multiple perspectives on the topic. In other words, the authors wanted to gain knowledge about Whim from both an inside and outside perspective, in order to not obtain a biased view of their business model (Yin, 2015).

The inside perspective of Whim was partly provided by Sampo Hietanen, the founder and CEO of Whim, who can be described as an information-rich source due to having great insights and knowledge into his own company. One can however argue that his role as the founder and CEO of the company results in bias, due to his personal involvement and interest in the company (Yin, 2014). Moreover, two out of six participants were actual stakeholders within the Whim ecosystem, which can be described as relatively low due to the purpose of this study. However, one can also argue for how the founder and CEO of Whim is the one who can provide the most information-rich knowledge and data about this specific case. Two interviews were furthermore conducted with Sampo Hietanen in order to gain a deep understanding of Whim. After conducting eight interviews, we felt assured that we had gained adequate insight to fulfill the purpose of the study. Thus, we reached a saturation level that seemed adequate for the scope of this thesis (Creswell & Creswell, 2023). Whilst worth mentioning the fact that more interviews could have generated added insights, the authors prioritized allocating enough time to analyze and present the data in order to achieve the purpose of this study.

Furthermore, in order to fully understand Whim and their business model, multiple perspectives and views should be taken into account. Therefore, an outside perspective from people who had no personal interest in the company but still possessed great knowledge about the topic, was deemed necessary and thus included. Moreover, including both researchers within academia and practitioners was an intentional choice in order to obtain relevant data and different perspectives on Whim's business model, both in theoretical and practical terms.

During the selection of the different participants for this study, different ways of approaching and recruiting the participants were employed. Emails were sent out to the participants whose email addresses were provided online, while Linkedin messages were sent out when these could not be found. In accordance with Creswell and Creswell (2023), incentives for the individuals to participate were used. This is, for example, illustrated by how even though the

emails and linkedin messages were phrased in a similar manner, minor adjustments were made based on the recipients' profile. A thorough introduction to the topic and purpose of the thesis was also written, since this increases the likelihood of participation (Bell, Bryman & Harley, 2022). Furthermore, in the introduction, emphasis was given on the research project the thesis is partaking in, as well as its partner, in order to attract more interest and participation.

3.3 Data Collection

This section refers to how information was collected through multiple forms of data. For this thesis, the data collection consisted of semi-structured interviews as well as secondary desk research. Why these two forms of data were collected and chosen will be explained and motivated in the following paragraphs, as well as the process.

3.3.1 Qualitative Semi-Structured Interviews

According to Creswell and Creswell (2023), qualitative interviews are one of the main ways of collecting data in qualitative studies. Qualitative interviews are usually fairly unstructured to their nature and Creswell and Creswell (2023) describes how they are done with the aim of finding out the participants' views on a certain phenomena. Compared to structured interviews, qualitative interviews tend to be more flexible where the researchers are able to adjust the questions and deep-dive into specific themes depending on what the interviewee speaks about (Bell, Bryman & Harley, 2022). As the purpose of this thesis is to, by studying how stakeholder and experts view the case of Whim, gain a deeper understanding of how business models for MaaS services are to be designed and configured, qualitative interviews were deemed suitable. There are two different forms of qualitative interviews, unstructured and semi-structured, and for this thesis qualitative semi-structured interviews were chosen and conducted (Bell, Bryman & Harley, 2022).

Bryman, Bell and Harley (2022) describe how semi-structured interviews are characterized by having an interview guide, which consists of a list of questions that aims to cover moderately specific topics, in order to be able to answer the research question. However, the semi-structured nature of the interview allows for flexibility in terms of how questions may be added or changed depending on the replies from the interviewees (Bell, Bryman & Harley, 2022). An interview guide was thus created by the authors with the aim of formulating

questions based on relatively specific topics, see appendix A. The topics the authors aimed to cover with the interview guide were partly based on Whim's Business Model Canvas and its components, and partly the time frame and how Whim's BMC had developed. The authors tried to formulate open questions that were not of a leading nature, allowing the interviewees to speak more freely and conveying what they believe is of great importance (Bell, Bryman & Harley, 2022; Creswell & Creswell, 2023). The semi-structured interviews proved beneficial for this study since it allowed for follow-up questions, which were frequently asked in order to achieve more detailed answers.

Ultimately, eight semi-structured interviews were conducted with six different participants during the time period 13th of April to the 9th of May. The duration for the interviews differed slightly between the participants, see table 1, with a length of approximately forty five to sixty minutes. Moreover, both of the researchers were present at all of the interviews, thus enabling one researcher to observe while one asked the questions.

Seven out of eight interviews were furthermore conducted through virtual means, specifically Zoom, due the physical distance between the respondents and interviewers, see table 1. A majority of the participants were either based in Finland or Gothenburg, thus making a physical interview difficult to conduct. However, one of the interviews was conducted physically since both the researchers and interviewee were located in Lund. Using technological tools was extremely important for the researchers since it made it possible to collect data from individuals within the Whim ecosystem who were located in Helsinki (Bell, Bryman & Harley, 2022) In accordance with Bryman, Bell and Harley (2022), conducting interviews through virtual means has several advantages due to its ability of overcoming geographical difficulties, providing flexibility, as well as convenience thich may encourage people to participate. However, researchers have argued for how non-face-to-face interviews may harm the relationship between the interviewer and participant, compared to physically conducted interviews (Bell, Bryman & Harley, 2022). Although, these forms of technological aids have increased enormously in use and are very common today. In such, the effects on the quality of this study can therefore be considered limited (Bell, Bryman & Harley, 2022).

Furthermore, all of the interviews conducted through Zoom were audio and video recorded with permission from the participants (Yin, 2015). The physical interview was audio recorded on the researcher's phones. A recording of the interviews were made since it enables the

researchers to be more present and responsive during the interviews (Bell, Bryman & Harley, 2022). This is furthermore considered especially important when the interviews are not following a strict set of questions (Bell, Bryman & Harley, 2022). However, it is mentioned by Yin (2015) how the recordings should be handled with care. Following Yin's (2015) recommendations, the authors made sure to test and become familiar with Zoom before the interview began, in order to avoid any confusion, interruptions or mistakes where the recording did not work. Recordings of the Zoom interviews were made on the researcher's phones and notes were taken during the interviews as potential back-ups (Creswell & Creswell, 2023).

In accordance with Yin (2015), the authors of this study tried to employ an inquiring mind during the data collection process. Trying to ask good questions and continuously reviewing the evidence during the data collection resulted in the need for additional information (Yin, 2015). Hence, follow-up interviews with two of our participants were conducted in order to gather additional evidence. These two participants were, according to the researchers, able to provide information-rich data deemed valuable for the purpose of this study. However, the follow-up interviews required a new interview guide. This time, the questions followed the components of the Business Model Canvas more closely and the development of Whim's BMC was more of a focal point. In such, the follow-up interviews allowed for topics and questions that had arisen during the data collection to be answered.

For this thesis, the authors decided to conduct all of the interviews in english. The reason for this was twofold, one due to the essay being written in English and the other to avoid translation. It is mentioned by Creswell and Creswell (2022) how a disadvantage of qualitative interview can be that not all people are equally articulate and perceptive. An aspect to take into account is therefore that the interviews were conducted in English, i.e. not the participants' mother tongue. This could thus have resulted, in accordance with Creswell and Creswell (2023), in that some of the participants were less articulate with their words, thus providing less thorough responses. However, if conducted in Swedish, the researchers would have had to actively translate the respondent's words, which may have resulted in an interpretation not accurate to the respondent's original point. Thus, in order to make sure that the respondents' views were correctly understood, a decision was made to conduct all of the interviews in English.

Name	Company	Role	Date	Time	Place	Recorded	Transcribed pages
Hans Arby	RISE - Research Institutes of Sweden	Senior Researcher & Founder of UbiGo	13th of April	72 min	Online	Yes	17
Sampo Hietanen	MaaS Global	Founder & CEO	14th of April	59 min	Online	Yes	14
Steven Sarasini	RISE - Research Institutes of Sweden	Senior Researcher	24th of April	64 min	Online	Yes	16
Sampo Hietanen - Follow-up interview	MaaS Global	Founder & CEO	2nd of May	48 min	Online	Yes	14
Laura Lassila	Ministry of Transport and Communications & Traficom	Senior specialist	4th of May	53 min	Online	Yes	11
Henrik Johannesson	Skånetrafiken	Mobility Strategist	4th of May	61 min	Online	Yes	12
John Hultén	K2 - The Swedish Knowledge Centre for Public Transport	Director	5th of May	41 min	Physical	Yes	16
Steven Sarasini - Follow-up Interview	RISE - Research Institutes of Sweden	Senior Researcher	9th of May	68 min	Online	Yes	17

***Table 1**: List of Participants*

3.3.2 Secondary Desk Research

In addition to conducting interviews, secondary desk research was collected in the form of qualitative documents. According to Creswell and Creswell (2023) this is, together with qualitative interviews, one of the main ways of collecting data in qualitative research. The secondary desk research consisted of background information of MaaS Global and Whim, which was provided from published reports. One specific document that was used throughout the study was a qualitative document about MaaS Global's history, written by MaaS Global themselves. This data was collected prior to conducting the interviews in order to streamline the interviews and rather ask questions that were needed in accordance with the purpose of

the thesis. Furthemore, the documentation was mainly used in verifying different names and organizations that were mentioned in the interviews (Yin, 2014).

3.4 Data Analysis

Yin (2014) states how the analysis for case study evidence is one of the least researched aspects of conducting a case study. According to Creswell and Creswell (2023), the data analysis phase refers to the ability to make sense and understand the data that has been collected. Analyzing data involves different phases and steps in order to be able to deconstruct the data and in turn reassemble it again (Creswell & Creswell, 2023).

In accordance with Creswell and Creswell (2023) and Yin (2015), an informal analysis of the data collected was done simultaneously as the interviews were conducted. Thereafter, the process began with compiling, sorting and preparing the data collection for analysis (Creswell & Creswell, 2023; Yin, 2015). This was done by transcribing the interviews on Word online (Creswell and Creswell, 2023). Through Word online, the audio of the interviews could be uploaded and thereafter transcribed by the software program. This made the processes of transcribing substantially easier and more efficient. However, even though the interviews were described, a thorough listening and reading of the material was done in order to make sure that the transcription represented an accurate picture. Moreover, the preparation involved sorting and organizing the different materials, depending on the different sources (Creswell & Creswell, 2023). A compilation of the data collection was made (Yin, 2015), and different files depending on the different sources were created. Thereafter, all of the interviews and data were thoroughly read through to achieve a full understanding of the collected material (Creswell & Creswell (2023).

The coding of the data was done in accordance with Yin (2015), where the researchers chose to dissemble their data without coding, as this potentially provides more thoughtful and insightful results. Since the purpose of this study was to gain deep knowledge about how business models for MaaS providers are to be configured, this method was considered suitable. As stated by Yin (2015), this was a long process since the authors had to continuously return to the transcriptions for additional information and to ensure accuracy. However, the employed method facilitated a more efficient progression of creative ideas, which was needed for this thesis (Yin, 2015).

When it came to analyzing the material, the authors adhered to Yin's (2014) recommendation of using pattern matching. Pattern matching is, according to Yin (2014), a logic that involves comparing an already predicted pattern to an empirically based pattern. In other words, within this thesis the authors compared the empirically based patterns, from their case study findings, to the preliminary framework of how business models for MaaS providers are predicted to look like. If it turns out that there are similarities between the predicted pattern and empirically based pattern, then the internal validity of the study can be strengthened (Yin, 2014). Thus, with the basis of our preliminary framework, we searched for patterns that would fit into the configurations which in turn resulted in the final developed framework.

3.5 Validity and Reliability

In accordance with Bryman, Bell and Harley (2022), incorporating validity and reliability as criterias for establishing and assessing the quality of the study, is important. Concepts relating to how a case study should be conducted, in terms of reliability and validity, will thus be explored due to the nature of this thesis. Yin (2014) describes how there are different ways of measuring the quality of a case study, and they include construct validity, external validity, and reliability.

Construct validity refers to the degree to which your operational measures actually measure its intended purpose (Yin, 2014). It is further described by Yin (2014) how case studies are criticized for using "subjective judgements" to collect data. In our abductive approach, it is not so much quantitative measures that are in focus, but rather conceptual clarity. To ensure construct validity, business model theory, which is a well established theory, and its related concepts were thoroughly introduced and explained. During the data collection, triangulation was used in order to incorporate multiple sources of evidence and ensure construct validity (Yin, 2014). As it is a major strength with case study research to use multiple sources of evidence (Yin, 2014), this approach was applied. The data triangulation consisted of different forms of evidence, semi-structured interviews and documents, thus providing multiple measures to the same phenomenon.

External validity refers to how analytically generalizable and usable a case studie's findings are (Yin, 2014). It is described how single case studies and qualitative research can be

criticized for the lack of analytical generalization that can be derived from it, compared to quantitative research where statistical generalizations can be made (Yin, 2014; Yin, 2015). However, in accordance with Yin (2015), the aim of this study is not to consider the single case study of Whim as a sample of a larger population. It is described how the notion of "sampling units" needs to be entirely set aside (Yin, 2015). Rather, the authors aim to use the case to find and highlight certain patterns and processes, and through analytical generalization, different insights can be reached from the case study (Yin, 2015). In turn these insights may be possible to apply to other cases. It is further mentioned by Yin (2014) how a research question that begins with either "how" or "why" may be beneficial in order to arrive at an analytical generalization (Yin, 2014). The authors adhered to this recommendation and the research question, or purpose of this study, has the starting point of *how* business models for MaaS services can be designed and configured, which can increase the study's external validity.

Reliability is described as to which degree the same results would have been found if the study was repeated (Yin, 2014). For this to be achieved, the process should be well documented in order for future researchers to be able to look back and follow the same procedures (Yin, 2015). For this research, the researchers tried to be as transparent and open about the process as possible and different files have been created during the process. These files include recruitment letters, notes of case study documents, scientific articles, and transcriptions. Furthemore, a thorough methodology section provides further understanding and insight into the process. Thus, the reliability of the study is strengthened by showing the author's process and procedures (Yin, 2014). Moreover, a continuous checking of the transcription in order to make sure that no mistakes had been made by the software program, was done, which in turn can increase the reliability of the study (Creswell and Creswell, 2023).

3.6 Ethical Considerations

Ethical issues have furthermore been considered in relation to this thesis. It is described by Creswell and Creswell (2023) how the purpose of research and how data is collected based on people's views and perception, leads to ethical issues. It is therefore important to be able to acknowledge these issues and address them.

Prior to beginning the research, a single case study was chosen in the form of MaaS Global's MaaS service Whim. In accordance with Creswell and Creswell (2023), the choice of case was not based on any form of interest in what the outcomes, but rather due to the uniqueness of the case. Moreover, in the beginning of the study, a purpose was established that was clearly communicated with the participants, both via email and orally before the interview started. This was done in order to avoid any misunderstandings, between the researchers and participants, regarding the purpose of the study (Creswell & Creswell, 2023). Collecting the data was done by conducting video interviews and it is highlighted by Bell, Bryan and Harley (2022) how certain ethical issues can come with this. Because of this and in order to keep confidentiality and not be overheard, the interviews were either conducted at the researchers home or in booked group rooms with no else around (Bell, Bryman & Harley, 2022). Furthermore, if these aspects are taken into consideration, conducting interviews via video can serve as a great tool for qualitative interviewing (Bell, Bryman & Harley, 2022).

Moreover, when analyzing the data, the researchers avoid taking sides and only presenting results that would be in accordance with the presented themes (Creswell & Creswell, 2023). This was achieved by highlighting how different aspects must be considered when it comes to Whim's development, even though they may be contradictory. Furthermore, when it comes to the raw data and other materials, this will be kept for a reasonable amount of time in accordance with Creswell and Creswell (2023), to ensure that the data is accessible.

4. Empirical findings

This section will describe and illustrate the results from the interviews conducted with six different respondents. This will be achieved by dividing the chapter into seven different sections based on the Business Model Canvas, where a developmental course of how the components of Whim's business model has changed over time will be provided. Due to the high interdependencies between the different components, some of them have been merged in order to provide a complex and true picture of the case. Following Whim's evolution provides a clear picture of how their business model has changed, and the key points of transitioning from a B2C to a B2B MaaS provider are distinguished.

4.1 The Business Model of Whim

4.1.1 Customer Segment and Value Proposition

The starting point as to why the Whim app was founded can, according to several respondents, be traced back to the user. Data shows how Whim's business model was originally considered a business-to-consumer (B2C) model since the services moved directly from the business to the end-user. According to respondent Steven, the customers of Whim were private individuals within the general public, which consisted of different groups:

"So originally I mean they were in the B2C segment, so private individuals (...) and that's basically everyone, you know, the general public, (...) So in Helsinki they were looking at, you know, the general and that's everyone from commuters to like tourists to occasional travelers to old people and, you know your next door neighbor and things like that, but they're in urban areas (...)" (Respondent Steven)

It is therefore mentioned how private people such as commuters, tourists, occasional travelers, older people, as well as *"your next door neighbor",* within the urban areas were initially the customers of Whim, thus making it a B2C MaaS. Whim's customer segment is also addressed by respondent Sampo who, by referring to figure 4, showcases how the initial customers were different private customers such as families, elderly, and business people etc. As expected, young people who were able and thinking about purchasing a car, but do not actually desire it, were described as one of Whim's main customers. When Sampo was asked

about if and how they consider people that are prone to using their car, such as a father using his car for both work and everyday life, he reasons that they are not their main targets.

"Why should we care about them at all? I mean, think of it this way. (...) I don't need your dad for this. I need 5% of the population and I'm already making more money than X is making. So I should be fine with just a smaller segment. (...) Normally, the young professionals that have already kind of graduated or are graduating, that are contemplating on buying a car, but don't really want it, they have enough money for it. We even pinpointed in Helsinki that the actual ones come from only 10 post codes, so you can really pinpoint where you need to be and make sure that you have service provision in those postcodes." (Respondent Sampo)

It can thus be interpreted that the Whim serves a segmented market, where each customer segment has slightly different needs that needs to be served. Furthermore, as expected, an extra focus was placed on targeting young people who are more prone to using alternative modes of transport. Moreover, Picture 1 shows how each customer segment is offered different subscription-packages. This is illustrated by how a family is offered a family package, which aims to cover all of their mobility needs by providing home delivery and safe trips for the children, compared to businesspeople who are offered a package that includes 5 minutes pickup instead. In other words, the offerings become different depending on who the offer is for. As Whim's customer segment was originally segmented, it can be seen how they are slightly adjusting their offering in order to meet their customers' slightly different needs. Furthermore, picture 1 is according to Sampo as current now as it was ten years ago, thus illustrating that these private customers are still customers of Whim in 2023.

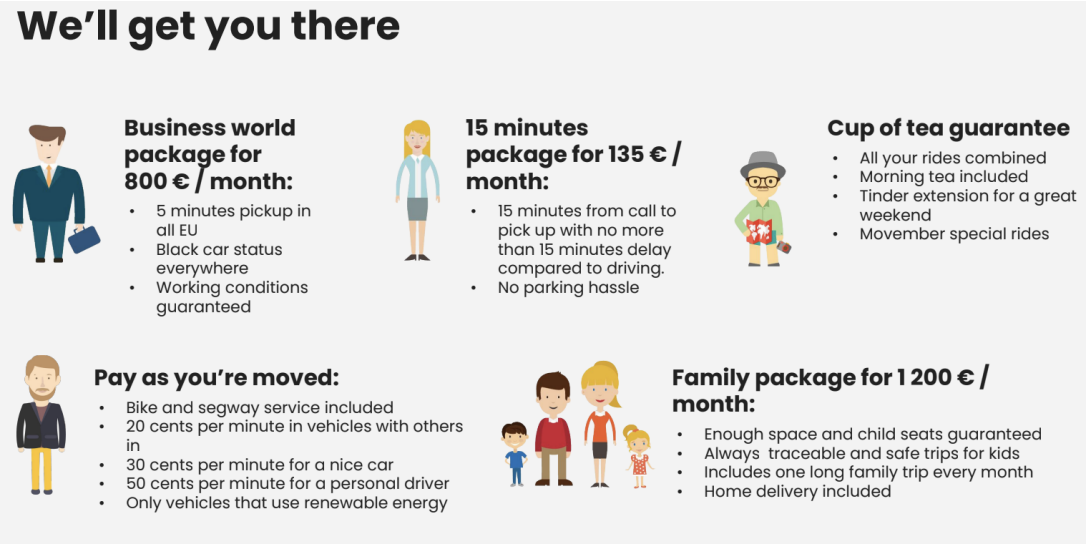

***Figure 4**: Whim's different packages for different private customers (MaaS Global, 2023)*

In order to address these private customers, who are the same today as in its initial phase, it is highlighted by multiple respondents how the service aims to simplify mobility for the private customer, by providing one single service with everything in it. According to respondent Sampo, the selling-point of Whim lies in its ability to offer a simple and unified service where multiple applications for mobility are integrated, thus providing users full access. This is illustrated by Sampo's pitch:

"How many apps do you have on your phone for mobility? Would you actually like to have access to everything from just one simple app that actually gives you everything in it? Would you actually like to have it so that you just pay a flat rate and everything opens to you? And that's it. You'll never have to do anything." (Respondent Sampo)

Moreover, the idea was to be able to provide the customer a subscription-based form of mobility where the customer would have a certain amount of access, depending on the package, for a certain fee. The user-centricity of Whim is therefore highlighted, in terms of how the purpose is to provide a more simple mobility solution for the customer where they can choose how they want to travel. Respondent Steven describes Whim as a service that aims to provide customization and seamless mobility to the customers. Whim is illustrated as a subscription-based smörgåsbord who, with the help of the actors within the ecosystem, can provide customized travels. However, MaaS services face competition from the car, a product that has a rich history of innovation spanning over a century. This is illustrated by respondent Laura:

“So basically, the private private car is the enemy #1 because when you have a private car then, you don't feel the need to use other services.” (Respondent Laura)

Competing with the private car can therefore be interpreted as quite difficult and this is furthermore illustrated in the case of Whim. It is described by respondent Sampo how he realizes that the private car works as a form of *“freedom insurance”* and it is therefore important for Whim to be able to convey to customers how they are able to compete. The idea of providing subscriptions for mobility is therefore of great importance since this is what provides the “idea” of the car, where customers have access and freedom to use whatever mode of transport they desire. Respondent Sampo describes how a service promise, which can be interpreted as a value proposition, is made by saying “we will guarantee that you get there”, thus offering the same freedom insurance that is associated with the car. This indicates a new type of value proposition, "getting the job done", since it helps customers focus on their every day life without having to consider how to move between the errands of everyday life. Delivering this value proposition is thereafter achieved by providing travelers a subscription-based, simplified, personalized and seamless way of moving by offering various forms of transport within a single application. Therefore, as expected, the value proposition can also be interpreted as embodying the idea of providing a customized service, as well as increased accessibility and convenience where every mobility application is gained access to within one service.

Throughout the years, Whim’s B2C model has remained, however only in Helsinki. In addition to their B2C, a B2B model has been employed where, among others, an Italian insurance company has licensed Whim’s technology, and one can therefore interpret them as a customer. The B2B model is described as the new direction for the company and the italian insurance company, Unipol, is one of these corporate customers. Unexpectedly, a new direction is taken by Whim, in which corporate clients become a new form of customer where access to the local markets is provided. According to Sampo, this move was necessary for the company’s survival, since the covid-19 pandemic resulted in a dead market with no new investments. The company’s customer segment has thus changed to becoming diversified, with Whim serving customer segments with entirely different needs. Due to a new customer segment, the value proportion and whole business model has changed accordingly. The data shows how “we will get you there” is still the employed value proposition for the B2C model

in Helsinki, see figure 4, however another value proposition can be interpreted for the B2B model. It is described by respondent Sampo that Whim has the necessary knowledge and technology that the Italian insurance company needs to go into the mobility market. Thus, Whim can deliver value to the Italian insurance company by delivering their technology and expertise. This can be seen as the new value proposition of the B2B model.

4.1.1.1 Summary

The evolution of Whim's customer segment and value proposition illustrates a change in what customers their service is for and what value is offered. The empirical findings highlight how Whim's customer segment has moved from serving a segmented market of private customers with slightly different needs, to a diversified customer segment where both private and corporate customers are included. Whim's value proposition to their private customer embodies improved convenience, accessibility and customization. Unexpectedly, the approach of thinking like a car provided a value proposition of "we will get you there" as well. Moreover, their current value proposition to their corporate customers highlights an unexpected new partner, where the expertise and knowledge Whim is able to provide is brought to light. The reasons for them employing the new direction with B2B customers, and how it affects other components of the business model, will follow in the coming sections.

4.1.2 Channels

It is further described how Whim uses channels to reach their customer segment with their value proposition. The biggest "go-to-market" campaign that was conducted by Whim, was in Helsinki around the end of 2017 to the beginning of 2018. The campaign was in other words conducted in the beginning of Whim's development and for this campaign, digital marketing was used. Due to the novelty of Whim and subscription-based mobility, another campaign was done later on which required a relatively big amount of financial resources. This was required in order to make Whim "into a phenomenon".

"But since it's a completely new phenomenon. Uh, you have to kind of make it make it a phenomenon, which means that at some point then we took a relatively big chunk of money and made this kind of visible advertisement. Getting from buses to stops to everywhere, so that for a few weeks we were really visible everywhere within the city and that actually

jumped the curve quite high quite fast. So within a few weeks we got into more than 10% of the population in the Helsinki region quite fast and then you can start going back to the more operative. So this is the strategic marketing and then you can go back to the more operative ways of utilizing the digital channels (...)" (Respondent Sampo)

The importance of Whim communicating their value proposition to their private customers, because of how new the concept was for people, is highlighted. In other words, creating awareness and educating the customer about Whim's value proposition is, according to our data, crucial. As expected, the usage of digital channels such as social media as well as visual advertisements, such as being on buses and bus stops, is used by Whim to create awareness about their value proposition to their customers. The usage of television, newspaper and third-party retailers as channels to reach out to their customers, is however not mentioned in the data. Respondent Steven further mentions how Whim has used channels such as social media and being on buses, in order to reach their customer segment. In addition to this, he describes how the actual application itself is one of the main ways Whim communicates their value proposition to their customer segments. In such, using their own application can be interpreted as using their own channels to reach customers.

"But yeah, I would say that the app is probably the main interface for actual use for marketing." (Respondent Steven)

It is mentioned how the covid-19 pandemic put a stop to visual advertisements, and communicating their value proposition to their customer was no longer done, and their brand completely deteriorated. However, it can be interpreted from the data that a lack of communication had been done to their customers previously as well. This is illustrated by respondent Sampo who mentions how confusion existed among their customers about what kind of service Whim was actually providing. It is stated how the phenomena of subscription-based mobility was hard to understand since it was so new. For their customers, it was just another mobility app that could take them from A to B and some used it to book public transport, some taxi and some micro mobility, however no understanding was reached regarding how *all* of these modes of transports were integrated into the app. The concept of being provided subscription-based mobility, where everything is available for you in one service, was unheard of and apparently not communicated and marketed enough. This is illustrated by respondent Sampo:

"The problem is that since it's a phenomenon that does not exist in people's minds. You kind of have to go with an angle, or a mold. And we realized at some point that especially after COVID because in COVID time subscriptions were virtually impossible to sell, that some of them thought of us as a public transport app. Some of them thought that we are a taxi app, a great one. Some of them thought we were a great micro mobility app, but not many of them saw that actually, hey these guys, actually do have everything." (Respondent Sampo)

Consequently, what value the customers were receiving from using Whim's services, was not understood. One can interpret this as Whim not communicating their value proposition to their customer segment enough, which led to confusion about the whole service. Thus, Whim's value proposition, of offering a subscription-based service that could serve as a competitor to the car, was not communicated enough through their channels in relation to how new the concept was.

In contrast, two respondents highlight how the main focus for Whim has been to communicate their value proposition, however not to their customers. According to our data, Whim has focused more on selling the actual company, rather than selling the service to the customers. In other words, emphasis has been placed on communicating and creating awareness about Whim's value proposition to venture capitalists, rather than to their private customers. This is further illustrated by respondent Steven, who describes how the venture capitalists can even be viewed as "customers" of Whim.

"(...) But then it should not be forgotten that one of their main customers has been venture capitalists. So they marketed to them in a very.. I would say that's as competent, if not more experted way that they've done that. So basically they've been to pretty much every conference that I've been to, based on MaaS. Not everyone, but like at least everyone with at least partly industry audience. So maybe not some of the more academic ones (...)" (Respondent Steven)

Whim has, according to respondent Steven and Hans, treated venture capitalists as one of their main "customers", and it is mentioned how the founder of Whim has attended almost every MaaS conference when the audience was mainly practitioners from the industry. These conferences can thus be seen as Whim using partner channels to reach their "customers",

venture capitalists. Based on these respondents, Whim's value proposition was communicated mainly directed to investors and venture capitalists, which are not the ones who are actually going to use and purchase the service in the end. The data therefore illustrates two different stories in terms of how Whim has communicated their value proposition to their customer segment. The outside perspective highlights how Whim has been selling their company more than the actual service, which in turn can be interpreted as a reason for the confusion among their customers. On the other hand, the inside perspective indicates that the confusion was due to not communicating the concept of subscription-based mobility enough in general, in relation to its novelty. The common denominator is however the lack of communication conducted by Whim to their private customers, and the data there shows how this can be a reason as to why Whim had to change direction to a B2B model.

The process of Whim not realizing their own customer's limited understanding of their services, until the point where their subscription-based idea was impossible to sell after Covid-19, can be interpreted as weak dynamic capabilities. It can be seen how Whim did not sense their environment for opportunities and barriers until it was absolutely necessary. One can view this as a lack of dynamic capabilities where Whim did not realize and make sure that value was created for their private customers. In such, Whim was not able to seize and allocate resources and capabilities accordingly, resulting in the customer staying unaware of the value of their services.

As previously mentioned, Whm's B2C model remains in Helsinki and it is described how the marketing to gain user acquisition came to a complete stop last summer in 2022. But since the travelers within Helsinki, the original city of Whim, had actually learned how to use the service and realized the convenience of it, it had become a routine in their lives, resulting in a relatively minimal drop of users. It can therefore be interpreted that the value proposition was communicated in Helsinki, making the customer understand the value of Whim and their subscription-based services. Thus showing the importance of actually delivering and spreading the value proposition in order to educate customers and create awareness.

4.1.2.1 Summary

In conclusion, one can see how different forms of channels have been used by Whim to communicate their value proposition, both their own channels as well as social media and visual advertisements. However, it is highlighted how confusion existed among their private

customers regarding the actual value of Whim, which could be traced back to the novelty of the concept. A lack of communicating and marketing the value proposition of subscription-based mobility emerges as a common theme, and the role of marketing can, unexpectedly, be seen as crucial for a MaaS Provider.

4.1.3 Customer Relationships

Due to the interdependencies between the different components of the BMC, one can see how Whim's transition towards employing both a B2C and B2B model had an effect on their entire business model. In such, customer relationships and what form of relationship Whim had with their customer segments was affected.

In the beginning when Whim was only a B2C MaaS provider, it can be seen how, in accordance with the core characteristics of Whim and their offering, that their customer relationship was based on providing a customized travel experience by the use of data. It is mentioned how this form of solution of utilizing data can offer a much more individual service, compared to public transport that has a long history of serving the collective. This is illustrated by respondent John:

"Showing how you can use the digital tools to integrate things, how you can use data to make it more individual. Individualized services that are personalized to my needs because public transport in tradition has been very much collective. Everything is about, you know, everyone is doing the same. Here you get a more personalized type of solution, because we are all different and we all have different needs. So I think they, they and other companies really contribute to that." (Respondent John)

In such, Whim could become completely accustomed to every traveler's own personal preferences. Respondent Steven further mentions how Whim works as a form of "one-stop-shop" for all of the travelers mobility needs and states that key aspects are flexibility and customization. Data further shows how customers register with their phone numbers in order to get access to the service. Moreover, it is mentioned by respondent Sampo how Whim is a highly integrated service where one could book different modes of transportation with just one single payment. As expected, it can be interpreted that Whim's

customer relationship is a combination of automotive processes with customer self-service. In such, Whim is able to provide a customized experience, through an online profile, based on the travelers own preferences and everything is provided in order for them to become self-sufficient in terms of different mobility modes and payment. As expected, customer care has been highlighted as an important problem-solving activity.

The process of Whim transitioning towards a B2B model allows for an illustration of how the customer relationship has changed. In Helsinki, the B2C model remains and the customer relationship may therefore still be a combination of automotive processes with customer self-service. However, when it comes to their B2B model, a new form of customer relationship can be seen. According to respondent Sampo, this relationship benefits both of the parties where Whim can provide knowledge and the technology, while the customers/partners provide the brand and their large customer base, thus providing a way to the end-users. One can therefore see how this customer relationship is driven by customer acquisition, where Whim gets access to the end-user through the established brand and customers of, for example, Unipol. How this customer relationship looks is not disclosed by the data however, due to their value proposition of providing knowledge, it could be interpreted that it leans towards a more personal form of relationship.

4.1.3.1 Summary

As assumed, the customer relationship between Whim and its customers highlights self-sufficiency. A combination of automated processes and self-service is derived from the empirical findings, where Whim is able to provide a unified service with multiple modes of transport as well as a customized service by tracking previous travel history.

4.1.4 Revenue Stream

The vision of Whim and what they became known for was their idea of offering subscriptions for mobility. The idea was to be able to provide customers with “Netflix for mobility” where everything you would need, in order to move within the urban areas, was included in one single interface. Their packaging is acknowledged by respondent Henrik, who describes how the idea can be attractive for customers. Consequently, the purpose of providing customers a subscription for mobility is to serve as a major competitor against car ownership. It is

mentioned by respondent Laura that Whim had a packaged model, with monthly subscriptions. As expected, the subscription-model that Whim employs provides recurring revenues, where payments are received monthly and a subscription fee is paid for an agreed amount of access to Whim's services, depending on the package. Moreover, according to the data, the services are provided for a flat rate, which can be interpreted as a fixed pricing mechanism. However, even though the idea of Whim was to provide a Netflix for mobility, a pay-as-you-go model was adopted as well.

Respondent Steven mentions how Whim has experimented with different payment models, ranging from monthly payment to pay as you go. The pay-as-you-go model is, according to respondent Sampo, characterized by a commission type of logic where Whim is provided a commission when their services are used. The data therefore shows how a transaction-based revenue stream is adopted, in the form of one-time payments. Furthermore, a usage fee is applied where Whim charges the traveler for the number of trips, as well different prices depending on the chosen mode of transport. Consequently, respondent Sampo describes how this incentivizes a MaaS provider, such as Whim, to make travelers choose the most expensive alternative since this generates the highest commision for them.

"Because the incentive for a mass operator in this kind of pay as you go type of pricing and commission type of logic, is that you try to get people in those that you get best commissions out of, which means that it would be in our interest to put you in a high class taxi or premium car. Because our cut is best out of those. And only when it's really, really necessary would we give you public transport and the last thing we'd want you to do is to walk because there's no money in it for us whatsoever." (Respondent Sampo)

Respondent Sampo describes how this is the reason why subscription-based is preferred since it allows for a mimicking of the car, where travelers can use any form of transport available in accordance with their preferences and mood. However, according to respondent John, the pay-as-you-go model may be preferable for customers and he illustrates how a MaaS service may seem more attractive if people are able to pay for what they use.

"I'm not sure that's how people want to do it. Maybe people rather pay for what they use, which you could also do in a mobility as a service concept. It doesn't mean that you have to

have a subscription. I think maybe or I mean well, I think the timing was not right for that." (Respondent John)

In contrast, multiple respondents highlight how the pay-as-you model is not profitable enough for a MaaS provider to survive. This is highlighted by respondent Sampo who highlights how a subscription-based model is when Whim can actually become profitable. Calculations have been made by the company that showcases how subscriptions, where people are provided an all-inclusive to the world of mobility, becomes much more profitable compared to commissions. However, despite subscriptions generating higher profits, a pay-as-you-go model was also employed by Whim in order to increase awareness about the novel concept of mobility subscriptions. It is described how the pay-as-you-go model was adopted in order for people to adapt and become aware of the phenomena of Whim and when this had been achieved, the customers would transition into subscriptions and all-inclusive mobility. In other words, the key lies in transitioning customers from pay-as-you-go to subscriptions, but this is a difficult task. Whim's value proposition of being able to provide the "idea" of the car to the customers with the subscriptions comes into play, and is described to be able to aid the journey from pay-as-you-go to all-inclusivity.

However, it is mentioned by respondent Hans how the employment of pay-as-you-go became an issue for Whim. By employing pay-as-you-go, Whim became more of an Expedia app for local trips, and gaining percentages from such low amounts that local trips provide, is not a profitable business. The difficulty of scaling this became apparent and it became a flaw in their business model.

"Also, packaging and so on, but in the end more as a pay as you go, more like an Expedia but for local trips. Which still I mean Expedia if you are, if you book a hotel and an airline ticket for a total of 10,000 crowns and you get 10% off of that, that's an OK business. But if you sell something for 500 crowns and get 3%. No, it's not. So you can't really scale that to locals. And so that is such a flaw in the business model, based on how much value you create for the customer." (Respondent Hans)

It is described by respondent Hans how the pay-as-you-go model had difficulties with providing value for the customer. This is further acknowledged by Sampo who have realized how they fell into the trap of employing and really pushing for the pay-as-you-go model,

even though their value proposition was based on subscriptions. The "trap" showcased how Whim should have put emphasis on how they were able to offer something different compared to others, in other words different forms of subscriptions, however this was lost in translation due to the pay-as-you-go model. The reason for this can thus be traced back to the lack of communication and awareness that was done by Whim to deliver their value proposition to their private customer. Based on the data, this communication was a necessity due to the novelty of mobility subscriptions. However, this led to Whim's offering becoming too vague.

"First of all, I would have used more of our resources. We also fell into the trap that, hey, let's sell a lot of this pay as you go and then move into the subscriptions. But just having the pay as you go is too vague for the consumers. They don't really get that. Is this kind of like a Google or is it public transport? Is it a taxi app? What is it? What is it? I don't get it. So we should have put much more emphasis on being different. And not offering the pay as you go. But it was kind of, you know, grow. So it seemed like an easy solution to just go with that one where we should have put more effort into creating cool kinds of cool different subscriptions. Which is a big mistake in such, that we probably should have toned down." (Respondent Sampo)

Once again, the difficulties regarding how customers did not understand what value Whim was able to bring them, become apparent. One can see how the idea of making Whim into a phenomena by providing pay-as-you-go, only confused the customers more, and the essence of providing the "idea" of the car, through a subscription and full freedom to a smörgåsbord of mobility, was not understood. This further indicates how there was a lack of communication and deliverance of their value proposition to their customer segments. The private customers were unaware of Whim's offering, and their value proposition of being as good as a car by providing subscriptions, got completely lost.

Currently, Whim employs a B2B model, which has affected their revenue stream. Whim has made a licensing deal with different companies that have permission to use their technology for a licensing fee. It is stated that their profits are substantially lower now than before, however so is their risk, since the end-user's money no longer comes to them. Unexpectedly, a new form of revenue stream can be seen where Whim is able to generate revenues without having to commercialize their service to the end-users anymore. This is mentioned by

respondent Sampo, who highlights how the customer acquisition has moved to the companies and does not lie with Whim anymore. However, their B2C market in Helsinki still exists where either pay-as-you-go with one time payments or subscription-based model is used and revenues are generated from the end-users in the form of either usage- or subscription fees.

A lack in sensing the environment for potential threats or opportunities can thus be interpreted. The process of how Whim's revenue streams have changed allows for an illustration of how Whim was unable to see how their usage of the pay-as-you-go model led to confusion, and consequently, their value proposition was unable to reach the customer segment. Additional research and sensing should thus have been done to adopt dynamic capabilities and be able to allocate resources and change their business model accordingly. The underlying logic of how an adoption of the pay-as-you-go model was needed in order for their customer to become aware of the subscription-based concept, proved unsuccessful. Consequently, due to a lack of dynamic capabilities adopted by Whim, they followed this logic too strictly and missed valuable business opportunities.

4.1.4.1 Summary

Whim aimed to provide mobility subscriptions, in order to offer the idea of the car to customers and gain profit on it. However, the parallel adoption of the pay-as-you-go model, employed to make customers aware about this new concept and gradually transition into subscriptions, harmed the deliverance of their value proposition of the idea of the car and thus also the adoption of subscriptions. Thus, Whim transitioned into a B2B model, in which a new licensing fee revenue stream was created.

4.1.5 Key Resources and Key Activities

Data show that during the initial three years after Whim's launch, the company's main focus was to integrate mobility service providers' interfaces into the Whim platform and develop its IT and ICT infrastructure. Based on the data one can see that Whim conducted activities, such as the integration of journey planning, booking and payment, to become a comprehensive alternative to car ownership and become a level 3 MaaS Provider. The technical integration of different services can in turn be interpreted as platform/network related activities, since it involves platform management. Another network related activity that took considerable time and effort was the negotiating and contracting activities Whim

conducted with each respective MSP. As these were required to enable the integrations because no standardized contracts existed yet, indicates another activity Whim had to do because the concept was new and they were one of the first MaaS Providers.

As expected, the respondents highlight the importance of obtaining access to mobility services providers' data and vehicles to be critical for a MaaS Provider, as it per definition is what their offer consists of. The data did not show charging stations or human resources to be key resources of Whim. The data and physical vehicles can be seen as key intellectual respective physical resources of Whim, which they obtained through MSPs. Furthermore, developing and attaining these key resources are to be seen as key activities of Whim's initial 3-year period. Whim's chase after MSP's to develop its supply base of resources is illustrated by Sampo:

"For the first three years we were running after supply. Because we realized we're not going to be a taxi company or a car share company or public transport company as such. So our product is based on partners' provision of transportation. And I can tell you that the ecosystem was not ready to be integrated into anything. So it took us a lot of development, a lot of showing, a lot of discussion to have API's open, to have contracts with the different TSP. So transportation service providers. That was up until roughly 2019, so three plus years and we were kind of only running against that because until then we can really try it out (...)"
(Respondent Sampo)

The data showed an immaturity of the ecosystem to be why Whim faced resistance to make the integrations necessary to try out their business model. As the integration of these service providers was stated to be critical for Whim to try if their concept worked, they took on the task to adapt MSP's API's themselves. Sampo describes this to be "one of the most valuable stuff we've [they've] done", because it enabled all modes to be "fully integrated".

Moreover, the data shows that Whim was successful in securing investments. Several respondents outside of the Whim organization highlight this to be a remarkable and exceptional thing about Whim. Respondent Hans, who speaks from own experience of trying to secure investments for his company Ubigo, states fundraising to be a very difficult activity. This is because the complexity of the business model tends to make the offer to investors unattractive. This is illustrated by Hans:

"We say that we will start integrated. It's going to be cars and so on. We will be heavily reliant on the supplier and it's a very costly marketing. That's hard to sell to get investments as well." (Respondent Hans)

Interestingly, our data shows that Whim had been very successful in securing investments during its initial years, although all these factors have shown to be included in Whim's business model too. The authors of this study became hence interested in understanding what activities Whim conducted to secure these investments. As previously mentioned, our data showed that Whim was present at many industry fairs etc., to create awareness about their brand. This can be seen as a marketing and brand promotion activity to recruit investors, thus a network related activity. Moreover, Hans praises Whim, and its founder Sampo, in its ability to secure investments. He also reasons that Whim had a tilted focus on selling the company to potential investors, rather than to customers.

"And he was much, much better in raising money, (...). So what Sampo… he's really been selling, he's been selling his company more than selling the service to customers in a way. So he's been very good at fundraising." (Respondent Hans)

An important indication given by Hans, which also other data points to, is that Whim had put more focus in promoting its brand towards potential investors, rather than promoting it to customers. In such, it managed to secure investments because it had promoted its brand to industry actors and investors. However, combined with the data described in previous sections which indicated that Whim did not fully succeed in creating customer understanding of their service, this gives interesting indications. Network-related activities related to brand promotion towards investors may therefore have been given more priority than the network-related activities to create brand promotion towards customers. And with data showing that Whim insufficiently managed to get their message across about their brand to end-users, this point to that this activity should have been given more priority.

Hence, it becomes interesting to look at what activities the financial resources gained from investments were allocated to. Our data shows that 70-80 % of all financial investments Whim managed to acquire, went into developing the technology and the platform. Thus, a major part of Whim's financial resources during its initial years was allocated to

network-related activities to acquire physical resources (vehicles, digital platform) and the technological aspects of the intellectual resources (IT infrastructure) necessary to become a Level 3 MaaS service. However, the activities conducted, and the resources allocated, to develop another intellectual resource - the brand, lacks strong priority in our data.

As mentioned in the distribution channel section, Whim conducted strategic marketing campaigns during its initial years to create attention to its brand and concept. Furthermore they conducted operational marketing activities, in which digital channels were used to target customers. These types of marketing activities are to be seen as platform/network related activities, as activities to create awareness of the new concept and gain users to the platform is a form of platform promotion. This is stated by several respondents to be a very costly activity. Respondent Henrik furthermore problematized the many activities the resources of a MaaS Provider has to be sufficient for. He explains his experience from a MaaS pilot being made in Skåne by Skånetrafiken:

"So we didn't have the opportunity, or time, or resources to work with the physical solutions and marketing and branding and getting users of this pilot project. All our power was pushed into resolving this technical." (Respondent Henrik)

What can be interpreted from Henrik is that the technological aspect tends to be given priority, both in terms of activities and resources, on expense of other important activities of a MaaS Provider. Our data shows this to be the case for Whim as well. Although Whim managed to secure big investments, a major proportion of these went into developing the technology. To do the necessary marketing actions to make this into a new phenomena, it would have needed more money. This is described by respondent Sampo:

"We have been fortunate enough to raise quite a lot of money, about 70-80% of that has actually gone into the tech and product. It's about 70 plus million in euros that we have raised. Sadly, we have not been able to raise enough money to really show this in real markets, so this is still yet to be seen for the whole concept is that somebody goes out there with an actual user acquisition approach, which is you know whether it's from, from the right hail or micromobility, you need enough money to really make it into a phenomenon first somewhere. (...) It does take a lot of money." (Respondent Sampo)

The implications from this is that the predominant share of money that was allocated to tech resulted in insufficient financial resources for other important activities. The predominant proportion of investments being spent on technological development can be interpreted as ill-considered resource allocation. What all this can be interpreted as is that Whim underestimated the amount of activities and resources they needed to place on becoming different, but more importantly on conveying to customers that they are different. Moreover, it showcases that Whim did not recognize this potential threat of people not understanding what their service was about before it became apparent. Moreover, this signals not having made their analysis right of what it would take to go-to-market. Additionally, the time it took for Whim to realize this signals an inadequate ability of scanning the environment for potential threats to their business, which hindered them from fastly redirecting resources to change accordingly. This indicates weak dynamic capabilities. Furthermore, when Whim realized they had not managed to differentiate themselves enough and would need to acquire more investments to-go-to market, the market was dead and no new investment could be secured.

The interpretations that can be made from this is that Whim underestimated the amount of activities and financial resources that was needed to make this into a whole new phenomena, and thus made an unbalanced resource allocation accordingly. They were able to recognize that a key resource is the physical and intellectual resource that technical integration of MSP's contstitued for. However, Whim failed to recognize the importance of another intellectual resource - the brand. Thus, their resources and associated activities were tilted towards the platform and its technology, rather than the brand and user acquisition.

Since Whim could not secure any new investments, they needed a new way to go-to-market. What our data shows is that this new direction became B2B. This entailed changed activities for Whim. One such was the decreased need for marketing activities towards end-users, because of the partner now being the distribution channel that conducts marketing and delivers the service to end-users. Accordingly, this decreased the urgency to secure new financial resources that had to be allocated to customer acquisition. Moreover, with the new direction being B2B comes a new type of marketing activity for Whim. This is the one being done towards new potential partners. These are network-related activities with the aim of securing new strategic partnerships. An added activity with this new direction is also increased partner management activities. In addition to the partner management related

activities towards MSP's and other partners that had been the case during Whim's initial phase, the network related activities had now become extended to also include new partners.

4.1.5.1 Summary

Whim initially focused on integrating MSP's and developing their IT infrastructure, which in turn secured investments by promoting their brand to investors rather than to customers. Most funds went into technology development, with less emphasis on marketing. Eventually, this lack of go-to-market approach resulted in Whim shifting to B2B partnerships, to gain access to valuable resources and reduce the risk and costs related to marketing towards end-users.

4.1.6 Key Partnerships

As expected, Whim operates within an ecosystem and its business model is heavily reliant on partners' supply of resources and activities. Moreover, partners that are not directly involved in its operations, but take the form of more informal partnerships, have also shown to have a critical role in its implementation and continuous operations. Some partners, like the providers of ticketing, journey planning, payment and data, did our data not highlight as key partners of Whim, although these are integrated in Whim's service. Interestingly however, have new sorts of partnerships emerged that extend Whim's capabilities and enable it to continue delivering and capturing value. The key partnership of Whim, and how they relate to Whim's business model in terms of enabling it to create, deliver and capture value, will be explained below.

MSP's are key partners of Whim, that both were a key factor in enabling its business to be implemented, and that has remained essential for their business model to function throughout the years. The data collected show the importance for Whim to have a sufficient supply base to be able to deliver its value propositions. Since Whim do not offer any own mobility services, but their product is based on other transport providers' provision of services, these partnerships are essential for Whim to obtain necessary resources. MSPs conducts the activities of moving customers from A to B, which is a key activity of Whim's business model. In such, this strategic alliance is vital to deliver the value proposition "we get you there".

Moreover, data shows that regulators and policy makers enabled Whim's business model to function. A key component of Whim's business model was the integration of MSP's into the Whim platform. In such, Whim was heavily dependent on a deregulated and open market for the logic of their business model to work. The Finnish Act on Transport Service, prepared by the Ministry of Transport and Communication, came into force in 2018. This deregulatory act opened up the ability to get access to other actors' API's. Thus, regulators and policymakers played an important role in enabling Whim's integration of MSP's. However, despite the act, the integration of other MSPs still demanded a lot of activities and resources from Whim. Respondent Laura explains this to be due to the content of the act, which did not state *how* the actors should collaborate. This resulted in a state where it was very much up to Whim, and their ability to negotiate with MSPs, if they would succeed in integrating MSP's into the platform and secure the supply necessary to deliver its value proposition. The practical implications of the act is described by Laura Lassila:

"Our legislation is very like enabling legislation. So it's not regulating very detailed on how the party should act. It's more like setting the minimum obligations that you have to share certain data. You have to credit access to those ticketing and payment interfaces, but it leaves quite a lot to the market and the operators to decide like the functions and the business models and so on. So it's not regulating at all that commercial side and also it's not regulating the technical solution, so it's really neutral on what kind of technical solutions operators want to use or what kind of services they want to provide or what kind of contracts they want to do." (Respondent Laura)

In such, building up a partnership with MSP's and making them want to collaborate with them became critical for Whim. One informal partner of Whim that aided this collaboration was The Finnish Transport and Communications Agency 'Traficom'. Traficom's role was to explain to MSP's about what the law obligated them to do, such as opening up data. Whim thus used this partnership to gain external resources, knowledge about the regulations, that could support them in collaborating with MSP's. Our data shows that, after a lot of negotiation, contracting and development of MSP's API's, did Whim manage to get the MSP's onboard. The MSP partners included taxi companies, car rental companies, public transport providers, and micro mobility providers like city bikes and e-scooters, but our data did not highlight partners within car-sharing, ride-sharing, and on-demand buses. Partnering

with the MSP's was essential since the service provision is the whole essence of Whim's business model.

Another type of actors that has been shown to have significant importance for Whim is investors. Our data show that Whim's ability to develop their technology and do all the necessary integrations is largely due the investments they managed to gain. As this is described to have been very costly, and 70-80 % of investments went into this, there is reason to believe that this would not have been achieved, without all these investments. In such, these partners played a critical role in acquiring the financial resources necessary to perform its technology and integration related activities, and cover the costs for it. The criticality of this actor for Whim's functioning and survival became apparent when the market was in an ill state and no investments could be secured, as previously discussed. With the risk of facing bankruptcy, MaaS Global needed to do something that could secure Whim's survival. The result, a changed direction towards B2B and strategic partnerships, included new partnerships for MaaS Global.

One such new partnership is Unipol, an Italian insurance company with an established brand and large customer base. This new partnership was formed due to MaaS Global's new business logic of going into markets with a strong local partner. This strategic alliance partnership allowed MaaS Global to reach out with their MaaS service to end-users, without having to perform the activities related to marketing and customer acquisition themselves. In return, the partners gain access to the technology and expertise of MaaS Global, expertise they did not obtain themselves, but that now enabled them them to deliver the MaaS service to users. The sharing of resources and activities to extend each other's capabilities, and gain mutual gain, make the partnership to be seen as a strategic alliance. More evidence for it being a strategic alliance is that the motive for forming the partnership was to reduce risks for both parties. Sampo explains this new business logic and the reasons for partnering with Unipol:

"OK, we will change the logic of go-to-market. We will not go with our own approach. We will always go with a strong local partner that has already the asset of having preferably millions and millions of users. And that they're keen on share the same vision of how the markets go and so on. And the first one was Unipol. Where they have millions and millions of of customers, but no understanding of how the mobility work, how the tech and such work. So

it's a nice match where they had been contemplating on getting into the markets and we have what it takes to actually get in there and the knowledge of what the consumers really want, what kind of designs need to be in place and so on." (Respondent Sampo)

What can be concluded from following MaaS Global's use of partners throughout the years is that new partnerships have been formed to fulfill a function previously performed by MaaS Global. These partnerships fulfilled a new role in relation to the business model, which was unexpected by the authors. Whim has during all its lifetime used partnerships with MSP's to provide Whim with resources and activities necessary for its supply provision part of the business model. However, partnerships to acquire resources and activities necessary for the marketing and user acquisition part of the business model, have not been arranged before. This indicates that a MaaS Provider does not have to perform all the functions that are included in their business model, but can to a larger extent use partnerships to extend its resources and capabilities. The new business logic of MaaS Global to go-to-market with strong partners, and simultaneously gain revenues from it by licensing their technology, emerged as a result of them realizing that their own user acquisition approach was not enough. This indicates a low degree of dynamic capabilities, as they did not identify and acted on this opportunity before it became the only option to survive. As the operation of being a MaaS Provider includes a wide range of activities, resources and costs, dynamic capabilities can be used to assess what activities and resources makes sense to develop inhouse, and what makes more sense to be acquired from partners.

4.1.6.1 Summary

Whim relies on partnerships for its business model, including MSPs for service provision, regulators for open data standards, and investors for financial investments. These partnerships have enabled the technological aspect of Whim's business model. Interestingly, new strategic alliances have emerged as a response to go-to-market difficulties, to reduce risk and costs. This indicates that partnerships can be formed to serve new purposes of the MaaS business model, in which external resources are used to extend a MaaS Providers' capabilities.

4.1.7 Cost Structure

Due to the new business logic in which Whim delivers its service to end-users through the partners, the cost structure looks different from when it was solely B2B. During Whim's

initial years, business development was an initial fixed cost. This refers to the costs for creating the standardized contracts with MSP's that allowed Whim to buy their tickets. Another major cost was the development of the Whim technology and its related integrations and systems. This is explained to include costs for both back-end technology and front-end technology, where the former refers to the technological integrations of other services into the platform that allows the platform to function, and the latter to the interface solutions that affects how users experience the app. All these costs, both relating to development of the contracts and the technology, can be seen as fixed costs, as these do not change with the number of customers being served. Rather, they were made to develop the technology necessary to make its platform deliver its service. Whilst all these development activities entailed big costs, these costs are stated to be scalable. This means that once they were developed, they could be used over and over again to deliver the service to customers, without leading to much more costs than the fixed maintenance cost. This is illustrated by Sampo when he describes the major costs of Whim:

"Of course, I mean for the end user just the back end tech for integrating, and of course that comes with a lot of business development, but let's say the back end tech is really big [cost]. The front end is really big [cost] because for the user you have to be Uber, you have to be Google. You have to be the public transport. You have to be the train app. You have to be micromobility. (...) You can imagine how much they put in their tech. And for this one, we have to be all of that. So it is a humongous cost altogether, but of course that's scalable. So it means that, you know the basic cost for having a factory is quite big, but then of course you can utilize it for as much as you want." (Respondent Sampo)

Furthermore, Whim had costs for buying supply of mobility services. These were the costs related to the contracts for acquiring MSP's tickets. Embedded in the contracts were the right for Whim to buy the tickets instead of solely acting as a middle hand for resales. This enabled Whim to put their own pricing on the service being provided to their customers, instead of having to adhere to the price mechanisms of the MSP's, something that would affect their profit. As the costs for supply increased in proportion to increased customer sales, these are to be seen as variable costs.

However, what our data shows is that the far biggest costs for a MaaS Provider is user marketing and user acquisition. Although the supply of tickets is a big cost, these are sold

further to customers and generate revenues. What the major proportion of the profit generated by the difference in purchased supply and sale of service should go to is marketing. This is stated by Hans when elaborating on the biggest costs for a MaaS Provider:

"I would say it's still customer acquisition (...) If you look at the total business. Of course it's the services, but then you're reselling them. But when you're looking how should you use that module you get for covering your own expensive technology and so on. I would still say that it's on the customer side." (Respondent Hans)

The data shows customer acquisition to be a major cost for Whim as well. These costs included both the fixed cost for strategic marketing, such as the go-to market campaigns Whim conducted during its initial years to create awareness about their brand and make this new service category into a new phenomenon, and the operational marketing in which Whim used digital channels to target potential customers based on their market analysis of who the likely adopters were. Furthermore, Sampo describes the costs related to gaining one subscription-customer to be high, due to subscriptions for mobility being something new to customers' minds. Sampo elaborates on the costs related to user acquisition:

"We've done our fair share of also the marketing and how to do it and where to do it. Who to point this marketing to and it has a big impact actually for the part of the go-to market, about 70% is the… 70% of the cost is actually the user acquisition. Which is marketing along with all the other user acquisition things that you do. So it's by far the biggest. This is especially in Europe, often not well enough understood, and since it's a high ARPU [average revenue per user] game, the user acquisition cost per user is quite high. You want it or not. But of course there are ways to make it more efficient. Like I don't know if I told you last time we found that the kind of best clients or the high rollers or those that are really into this state. We were able to spot them in only 10 post codes in Helsinki. So really you can pinpoint what are the hot areas in any given city." (Respondent Sampo)

As described before, subscriptions are the most profitable revenue stream for Whim. However, due to subscriptions of mobility being a completely new phenomenon that users are not used to, convincing them about the value and making them willing to pay a fixed monthly rate has shown to be very costly. As previously mentioned by Sampo, Whim were not able to raise enough money so that the financial resources were sufficient to also cover these major

user acquisition costs. This indicates a resource allocation process that gave priority to developing the technology, instead of marketing. What happened when covid hit was that no new investments could be attained to cover these big marketing costs and take on the user acquisition approach needed to succeed with sales of subscriptions. Moreover, Sampo reasoned that this would not even make sense to do, because with covid and people going back to their private cars, it was even harder to sell subscriptions than before. Thus, funding new money would not make sense, but they rather needed a new approach to go-to-market. This became the new B2B direction, in which partners take on the role of distributing the service to customers. This entailed changes to Whim's cost structure in terms of reduced costs for customer acquisition. The big fixed cost for developing the technology and making all the integrations that existed in the beginning has been largely reduced. This is because Whim has developed their technology so that most new integrations of new MSP's do not entail the big costs it did initially. The costs for Whim with this new partner direction were fixed costs related to platform and technology maintenance and improvements, to continue holding a good quality of its technology that now is their product that generates profits from partners. The costs related to the service provision in Helsinki have remained.

What can be concluded from above is that Whim had to allocate most of its financial resources gained from investments to cover its major costs for developing the technology, whilst a major cost that data shows also need to be covered is marketing. This can be seen as a faulty resource allocation process. However, there are two sides to every story. Whim did not spend so much money on the technology because it was fun, but because of the major activities they had to conduct because it was a new concept. Laying more of their internal resources on marketing might have resulted in faulty technology instead. Another approach, which the new strategic partnership direction shows, is that rather than trying to stretch all their internal resources to do all activities in house, they could have looked at what resources and activities it could acquire from external partnerships.

4.1.7.1 Summary

The major cost of Whim was to develop the technology, at the expense of marketing.

5. Analysis

The following section aims to show and discuss how the findings from the empirical data are to be seen in the context of how previous literature has described business models for MaaS services. This chapter will discuss the logic of how MaaS Providers can offer the "idea" of the car through subscription-based mobility, employ prioritization as a key activity, as well as the emergence of a new business logic for MaaS Providers. The following section will thus answer the purpose of this study in terms of gaining deeper insights into how business models for MaaS can be designed and configured.

5.1 Offering the "idea" of the car

In accordance with Kamargianni and Matyas (2017), can one see how Whim employs both a B2C and B2B model, meaning that their customers are both private and corporate. The B2C model includes private customers such as tourists, commuters, elderly, young people, families etc, where different packages are offered for different customers due to their slightly differing needs. This empirical finding can thus be connected to Arias-Molinares and Garcia-Palomares (2020b) and Polydoropoulou et al. (2020) who describes how a MaaS provider serves a segmented market where different packages are provided to meet specific customer needs. As mentioned by Kamargianni (2015), Kamargianni and Polydoropoulou (2013) and Klein and Smart (2017), young people are highlighted as a key customer in the empirical findings.

In order to address these customers, a value proposition must be offered. The value proposition found in the empirical findings, is in accordance with previous literature, and it offers improved convenience, accessibility and customization (Arias-Molinares and García-Palomares, 2020b; Hoveskog et al. 2022; Jittrapirom et al. 2017; Maas, 2022). However, insights into a new form of value proposition can be found in the empirical findings, where the importance of "thinking like a car" emerges. Previous literature mainly highlights the core characteristics of a MaaS provider, in terms of how it is an alternative to car ownership by providing a convenient (Hoveskog et al. 2022), customized (Jittrapirom et al. 2017) and accessible (Kamargianni & Matyas, 2017) form of mobility. The idea of adopting the thinking of the competitor emerges, in which the automobile industry's underlying logic of providing freedom insurance is integrated into the MaaS Provider's

business model. In turn, this provides, in accordance with Osterwalder and Pigneut (2010) a form of "getting the job done" value proposition, where the MaaS provider handles everything for you.

The customer relationship a MaaS Provider has with its customer can be seen as, in accordance with literature (Jittrapirom et al. 2017), a combination of automated processes with self-service. As stated by literature, it is shown how the MaaS service provides a customized travel experience, through an online profile, based on previous travels (Jittrapirom et al. 2017). As expected, a form of self-sufficiency is illustrated by the empirical findings, where the MaaS provider is able to offer everything, e.g. multiple modes of transport, in a single interface. Personal assistance in the form of customer care is further highlighted by the empirical findings, which is in line with previous theory on MaaS (Polydoropoulou et al. 2020). By offering the value proposition "getting the job done", the self-sufficiency is even further highlighted compared to previous literature (Hoveskog et al. 2022). This is due to how the freedom connected to the logic of the car is offered, thus implying that the user has everything they should need at all times.

However, in order to offer the "idea" of the car, the empirical findings illustrate the importance of employing a subscription-based model. Jittrapirom et al. (2017) highlights how there are two different forms of revenue stream for a MaaS provider, subscription or/and pay-as-you-go, and both of these can be found in the empirical findings. The pay-as-you-go model that is adopted by Whim is aligned with previous literature, in terms of how the MaaS provider receives transaction-based revenues, which are one-time payments, with a dynamic cost structure and a usage fee, referring to how the cost increases during usage (Jittrapirom et al. 2017). The characteristics of a Whim's subscription based model is, in accordance with Jittrapirom et al. (2017) and Polydoropoulou et al. (2020), a recurring revenue with a fixed cost structure for a subscription fee that grants an agreed amount of access, depending on the package. The subscription-based model is recognized by literature (Sochor et al. 2018) as the model that can potentially provide profits for a MaaS provider. This is further mentioned in the empirical findings, where respondents highlight how the key lies in making people move from pay-as-you-go to subscription. The provided access (Jittrapirom et al. 2017; Polydoropoulou et al. 2020) and possible profitability (Sochor et al. 2018) with adopting a subscription-based model is addressed by previous literature, however the aspect of how the price model actually adopts the thinking of the automobile, and allows for a mimicking of the

car by the customers, is limited. Thus, what this section aims to show is how, rather than offering value in terms of being a comprehensive alternative to the car (Sochor et al. 2018), a MaaS scheme can bring value by *being* the car. It is apparent that a new way of thinking, and thus contribution into how a MaaS provider can provide value to their customers, is brought to light.

5.2 Prioritization as a key activity

The empirical findings recognized that embedded in Whim's business model are various activities of different kinds, with the major ones being marketing and the development of the technology. To what extent these activities tend to absorb major resources, to be able to create, deliver and capture value to their customers, is however not emphasized by previous literature. The insight derived from the empirical findings is that a well-considered priority has to be made, based on what activities are of utmost importance to be able to create, deliver and capture value. Moreover, this insight also states that the resource allocation has to follow this priority, to ensure that the activities of utmost importance are being conducted. The empirical findings that derived this insight will thus be elaborated on below.

Unsurprisingly, the empirical findings show that Whim integrates journey planning, booking, ticketing and payment and delivers these in a single service to customers through their platform. Moreover, they conduct customer care to improve customers' experience of the service and ensure it fulfills their mobility needs. As Whim's value proposition is "we get you there", meaning that they guarantee that they will be a service that takes care of customer's all mobility needs, to replace the need of a private car, these activities were and are essential to be able to deliver their value proposition. The insights derived from this is the importance for a MaaS Provider to conduct these platform/network related activities, as well as the problem-solving activities of customer care, to fulfill customers' mobility needs and create value for them. This unsurprisingly confirms previous literature, which explains this to be activities conducted by a MaaS Provider in order to integrate the service offer (Sochor et al. 2018), become a "one-stop-shop" for all mobility needs (Hoveskog et al. 2022) and provide travelers a seamless and comprehensive mobility solution that takes care of the customer's entire mobility needs (Arias-Molinares & García-Palomares, 2020b; Jittrapirom et al. 2017; Maas, 2022; Matyas, 2020; Mitropoulos et al. 2023) and eliminate the dependency on private cars (Kamargianni & Matyas (2017).

Moreover, as expected from previous literature, did the integration of an adequate supply base of MSP's show to be essential for a MaaS Provider to have a service offer to deliver. This was shown by the way Whim were able to offer seamless mobility, and guarantee to serve customers' all mobility needs, when they had acquired the service supply. This is in line with Sochor et al. (2018), who highlights the activity of finding suppliers for a MaaS Provider with an integrated service offer. Furthermore was the technical and contractual difficulties Whim faced with the integrations also expected, as technical complexity and the criticality of standardized open data formats, API's, and contracts, is highlighted by previous literature (Kamargianni & Matyas, 2017; Polydoropoulou et al. 2020; Sochor et al. 2018).

Whilst the technical integrations were expected to be a key activity, it was unexpected that this technical platform/network activities, platform management, tend to be given priority at the expense of platform promotion. As expected, did Whim conduct activities related to platform promotion, which refers to all marketing and branding activities that are to be considered a key activity according to Polydoropoulou et al. (2020). However, the empirical findings show that although Whim did conduct platform promotion, they did not manage to reach out to customers. The insight given was that this was because of an inadequate marketing approach, in which insufficient resources and activities were allocated to the platform promotion related activity of educating customers. Whilst it is not surprising that marketing entailed a major cost for Whim, as the novelty of the concept is expected to result in high marketing costs (Jittrapirom et al. 2017), our findings show an ill-considered prioritization of resources to be the cause of Whim's inadequate marketing approach, and not just limited resources. This insight is derived from the fact that Whim managed to finance the technology, which also entailed high cost due to its technical and contractual complexity, at the expense of marketing. This points to favored priority to the technological aspect of the intellectual resources, the technology, at the expense of another intellectual resource - the brand. Whilst the empirical findings confirm the vitality of both the technical and promotional aspects of the platform/network related activities highlighted by previous literature, previous literature neglects to define prioritization as a key activity of a MaaS Provider. With the insight derived from the empirical findings in mind, that both platform management and platform promotion are key activities to acquire the intellectual resources of both brand and technology, and that a MaaS Provider can risk its survival if well-prioritized resource allocation process is not conducted, the author of this study suggests prioritization to

be considered a key activity of a MaaS business model. As this is not highlighted by literature, the author of the study here makes a contribution.

5.3 Adopting a new go-to-market logic

As previously mentioned, the empirical findings illustrated how the B2C model concurred with existing literature. Significant insights are however provided when it comes to the empirical findings regarding the newly adopted B2B model. Firstly, these empirical findings give interesting insights in terms of a new customer segment. Whim's shift from B2C to B2C resulted in a diversified customer segment. This is expected to be a result when a MaaS Provider decides to serve a customer segment with very contrasting attributes compared to the other segments, in accordance with Osterwalder and Pigneur (2010). However, what was significant with this shift was the attributes of the corporate customers. Whilst previous literature have stated corporate clients to be potential customers of a MaaS Provider (Polydoropoulou et al. 2020; Sochor et al. 2018), these have highlighted employers that can deliver the MaaS service to its employees. The empirical findings show another type of customer, served with another value proposition - their technology. The derived insight is thus that a new B2B direction can entail changes to MaaS business models in terms of new licensing fee revenues streams. This is in alliance with Osterwalder and Pigneur (2010), who recognize licensing fees to be a form of revenue stream that allow firms to commercialize its service, by licensing its technology, whilst generating revenues from the licensing fees.

Secondly, the empirical findings showed difficulties for a MaaS Provider to go-to-market, since it demands taking on a real customer acquisition approach and conducting the necessary activities of educating customers about the new product, to commercialize its product. The insight derived from Whim's new direction of B2B, is that MaaS Providers can adopt a new go-to-market logic to reduce risk and costs related to commercializing its technology. Interestingly, this is enabled by forming strategic alliances with actors that possess necessary resources for the-go-market approach. Previous literature has highlighted several partnerships necessary to acquire resources and activities embedded in its business model. MSP's to acquire the necessary service supply resources (Arias-Molinares & García-Palomares, 2020b; Kamargianni & Matyas, 2017; Polydoropoulou et al. 2020). Regulators and policy makers to acquire beneficial regulations of open data (Kamargianni & Matyas, 2017; Polydoropoulou et al. 2020). Data providers, journey planning providers, ticketing and payment providers, to

supply data and analytics capabilities and enable the integration of journey planning, ticketing and booking (Kamargianni & Matyas, 2017). Investors, to acquire financial resources (Kamargianni & Matyas, 2017). Unsurprisingly, most of these show to be key partners of Whim, thus confirming previous literature. However, what all this previous literature recognizes is partners that supply physical, financial or the technical aspects of the intellectual resources that enable the technical development of the MaaS service. What lacks support within previous literature however, is that MaaS Providers can form partnerships to supply another type of intellectual resource - the brand. With the insights given from the empirical findings that the brand and marketing activities are essential to perform an adequate user acquisition approach, partnerships formed to supply the MaaS Provider with a well-recognized brand and large customer base enables a new way to go-to-market. Thus, this study makes a significant contribution by highlighting that a MaaS Provider can form strategic partnerships to serve new purposes that enable the user acquisition approach needed to commercialize MaaS and contribute to sustainable urban mobility.

5.4 Developed Framework

The finding of the analysis is concluded into a developed framework of how business models for MaaS schemes can be designed and configured. The findings are highlighted in red, in order to make it easier for the reader to see what has been added in comparison to the preliminary framework based on previous literature. The aspects of prioritization, offering the "idea" of the car, licensing fee, and go-to-market partners are new additions to the BMC that have not been previously highlighted. Moreover, both marketing and brand existed according to previous literature, however they have shifted to red in order to emphasize the importance of MaaS providers engaging in marketing as a key activity to build up their brand as a key resource. Additionally, corporate customers and investors have also turned red in order to illustrate their different characteristics compared to previous literature. The developed framework serves as the contribution of this thesis, where new insights and a deeper understanding into how business models for MaaS can be designed and configured, have been provided.

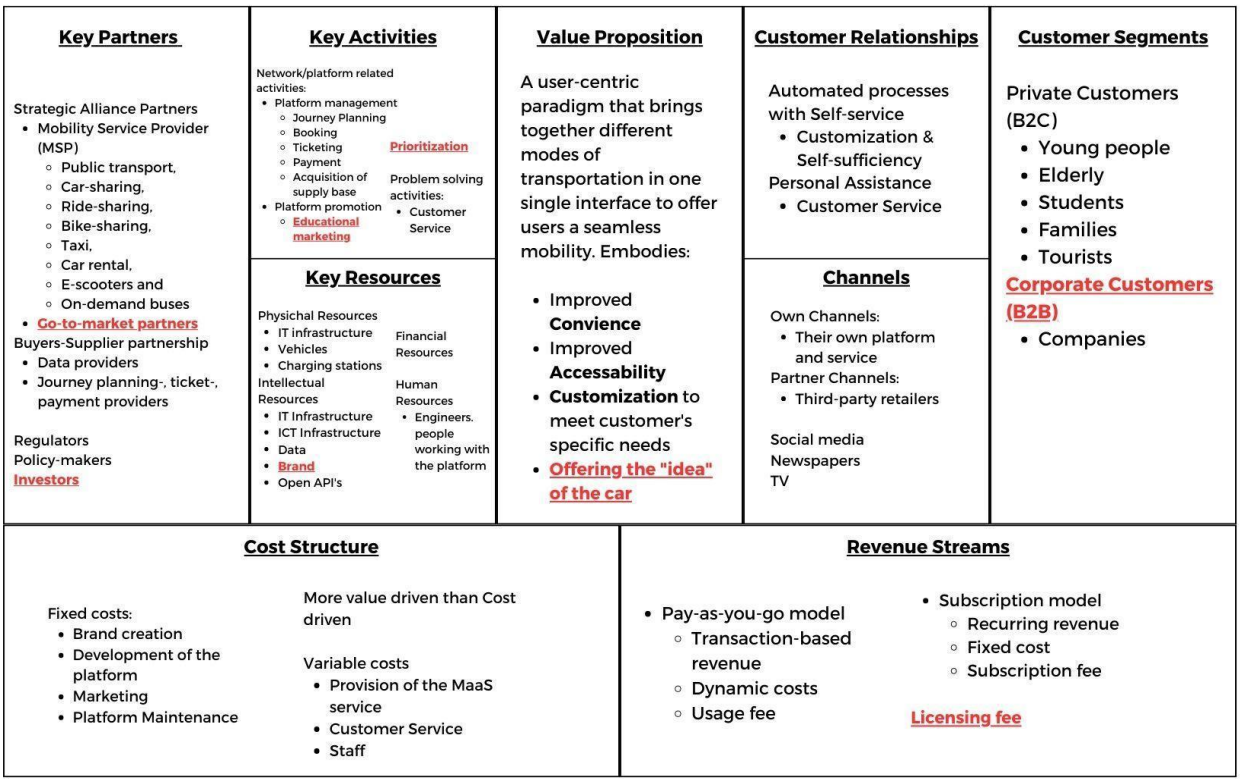

Figure 5: *Developed framework of Business Models for MaaS (developed by researchers)*

6. Conclusion

This study has achieved its purpose of providing a deeper understanding of how business models for Mobility as a service can be designed and configured to contribute to sustainable urban mobility. The empirical findings derived from the single-case study of the MaaS scheme Whim, align with previous literature on several aspects. It confirms that business models for MaaS utilize technology to create value for users, by delivering convenient, accessible and customized mobility in one single platform. Moreover, it confirms that MaaS business models are reliant on actors within its ecosystem, in which it forms partnerships to supply necessary resources and activities for its technology to function. This study also highlights new insights, which can be seen in Figure 5. Firstly, it provides a new value proposition, where the importance of "offering the idea of the car" emerges. This integrates the underlying logic of the automobile industry's freedom insurance into the MaaS business model, in which a MaaS scheme can offer the "idea"of the car through subscription-based mobility. Secondly, this study suggests prioritization as a key activity of a MaaS business model. This aids the resource allocation process to ensure both platform management and platform promotion are given emphasis, so that the MaaS business model can not only create, but also deliver, value to users. Lastly, this study highlights the opportunity of go-to-market partners. These new forms of partnerships can create new revenue streams in forms of licensing fees, extend capabilities, and reduce the risks and costs of the go-to-market. These contributions will now be discussed in terms of construct and external validity.

6.1 Construct Validity

Construct validity refers to the extent a measure accurately assesses what it's supposed to measure (Yin, 2014). Within this thesis, a preliminary framework was developed by the researchers based on the well established theory of Business Model Canvas by Osterwalder and Pigneur (2010). The Business Model Canvas, along with its theoretical concepts, was thereafter integrated and merged with existing MaaS literature. In such, an understanding and comprehensive view of how MaaS business models look like according to previous literature was achieved. Hence, as the study and the preliminary framework are based on a well-established theory, it can be argued that the construct validity of this study is high. The Business Model Canvas by Osterwalder and Pigneur (2010) has received criticism regarding how it can be perceived as static and messy due to its many different components. However,

the model is widely acknowledged as a frequent and useful tool when it comes to the development and design of business models. The preliminary framework was empirically tested, in which its ability to measure the intended theoretical concepts was illustrated. In other words, the preliminary framework measured what it was supposed to measure, thus showing its careful balance between MaaS literature and more generic business model literature.

6.2 External Validity

External validity refers to how generalizable and useful the findings of the study are for other situations. Thus, the practical implications and theoretical implications of the study will be discussed.

6.2.1 Practical Implications

In addition to theoretical findings, these research studies provide practical insights as well. Firstly, it provides important insights for practitioners in terms of understanding that the novelty of a subscription-based mobility entails major marketing activities. A MaaS service competes with an industry that puts major resources and activities into marketing. By adopting the underlying logic that the car industry does, MaaS managers can manage to tap into people's minds and unthink the reasonableness of paying fixed fees for the feeling of freedom. Moreover, the importance of prioritization and the understanding of how a Maas service must balance the technological aspects and marketing, may provide managerial relevance. Managers becoming aware of the importance of prioritizing these different resources and activities, despite a big technological focus within the MaaS industry, can therefore serve as an insight.

6.2.2. Theoretical Implications

Compared to previous MaaS literature, the developed framework within this thesis builds upon multiple studies from the Maas literature. Previous scholars within the MaaS literature have highlight different areas in terms of MaaS core characteristics (Jittrapriom et al. 2017), prototype business models for MaaS (Polydoropoulou et al. 2020) and conceptualized business models for MaaS as a relational multi-actor ecosystem (Hoveskog et al. 2022). Moreover, different aspects of MaaS have been discussed in terms of different levels of integration (Sochor et al. 2018) as well as the key actors within the Maas Ecosystem

(Kamargianni & Matyas, 2017). By building on these research streams and translating the findings as business model components, a preliminary framework for how business models for MaaS are to be designed and configured was achieved. In other words, this study was able to provide a comprehensive view when addressing the purpose of this study, since the framework was based on the integration of previous research. In turn, this comprehensive view resulted in additional findings not previously found.

Moreover, how generalizable the study is can further be discussed. The findings from this research can be applicable for other MaaS Providers and give important insights for them in terms of how they can create, capture and deliver value. Furthermore, it may be of importance for other key actors within the MaaS ecosystem, such as MSP's etc. to understand the business model of the MaaS provider.

6.3 Future Research

The purpose and scope of this study was to gain a deeper understanding of how business models for MaaS are to be designed and configured. In order to achieve this deeper understanding, a single case study design was adopted. Using a case as the study object entails contextual aspects and it can thus be argued that future research can study a case within a different context. The reason for this is twofold. Firstly, a different context may provide additional research and insights to MaaS business model theory, and secondly, it may provide a deeper understanding as to what extent contextual factors play a role regarding how MaaS business models should be designed and configured. Moreover, a quantitative approach can be adopted, rather than a qualitative one, where a statistical generalization for how MaaS business models can be designed and configured may be provided.

As highlighted by this study, MaaS can be seen as an ecosystem of key actors, where the wide network of stakeholders all influence how a MaaS provider is able to create and capture value. A suggestion for future research could therefore be to employ the theory of stakeholder management. In such, insights into stakeholder management in relation to MaaS can be provided, where one can see its effect on the value the MaaS provider creates and captures. Moreover, due to the findings of this thesis where marketing is identified as a key activity, previous literature can deepdive into what kind of marketing approach the MaaS provider should employ in order to reach out to their customers. Using theories related to adoption,

behavior and/or marketing, in order to find out the logic of making people pay for freedom insurance, may thus be necessary.

References

Achtenhagen, L., Melin, L., & Naldi, L. (2013). Dynamics of Business Models – Strategizing, Critical Capabilities and Activities for Sustained Value Creation, *Long Range Planning*, 46(6), pp. 427–442. Available online: https://www.sciencedirect.com/science/article/pii/S0024630113000198?via%3Dihub [Accessed 14 May 2023]

Ackermann, M. (2021). Mobility-as-a-Service: The Convergence of Automotive and Mobility Industries (e-book). Cham: Springer International Publishing (Management for Professionals). Available through: LUSEM University Library website http://www.lusem.lu.se/library [Accessed 15 April 2023]

Adriazola-Steil, C., & Colin, B. (2013). More urbanites, more cars: the challenge of urban road safety and health. *WRI*. Available online: https://www.wri.org/insights/more-urbanites-more-cars-challenge-urban-road-safety-and-health [Accessed 17 Mars 2023]

Amit, R., & Zott, C. (2001). Value Creation in E-Business, *Strategic Management Journal*, 22, pp. 493–520. Available online: https://onlinelibrary.wiley.com/doi/10.1002/smj.187 [Accessed 17 April 2023]

Amit, R., & Zott, C. (2015). Crafting Business Architecture: the Antecedents of Business Model Design, *Strategic Entrepreneurship Journal*, 9(4), pp. 331–350. Available online: https://onlinelibrary.wiley.com/doi/10.1002/sej.1200 [Accessed 20 April 2023]

Anable, J. (2005). “Complacent Car Addicts” or “Aspiring Environmentalists”? Identifying travel behaviour segments using attitude theory, *Transport Policy*, 12(1), pp. 65–78. Available online: https://www.sciencedirect.com/science/article/pii/S0967070X0400054X?via%3Dihub [Accessed 18 April 2023]

Arias-Molinares, D., & García-Palomares, J.C (2020a). Shared mobility development as key

for prompting mobility as a service (MaaS) in urban areas: The case of Madrid, *Case Studies on Transport Policy*, 8(3), pp. 846–859. Available online: https://www.sciencedirect.com/science/article/pii/S2213624X20300365?via%3Dihub [Accessed 24 April 2023]

Arias-Molinares, D. and García-Palomares, J.C. (2020b). The Ws of MaaS: Understanding mobility as a service from a literature review, *IATSS Research*, 44(3), pp. 253–263. Available online: https://www.sciencedirect.com/science/article/pii/S0386111220300455?via%3Dihub [Accessed 24 April 2023]

Banister, D. (2008). The sustainable mobility paradigm, *Transport Policy*, 15(2), pp. 73–80. Available online: https://www.sciencedirect.com/science/article/pii/S0967070X07000820?via%3Dihub [Accessed 22 April 2023]

Barreto, L., Amaral, A., & Baltazar, S. (2018). Urban Mobility Digitalization: Towards Mobility as a Service (MaaS), in *2018 International Conference on Intelligent Systems (IS)*. *2018 International Conference on Intelligent Systems (IS)*, pp. 850–855. Available online: https://ieeexplore.ieee.org/document/8710457 [Accessed 23 April 2023]

Bell, E., Bryman, A., & Harley, B. (2022). *Business research methods*. Sixth edition. Oxford: Oxford University Press.

Beutel, M. C., Samsel, C., Mensing, M., & Krempels, K. H. (2014). Business model framework to provide heterogeneous mobility services on virtual markets. In *2014 11th International Conference on e-Business (ICE-B)*, pp. 145-151. Available online: https://ieeexplore.ieee.org/document/7509068 [Accessed 19 Mars 2023]

Bernardo, V., Fageda, X., & Flores-Fillol, R. (2021). Pollution and congestion in urban areas: The effects of low emission zones, *Economics of Transportation,* 26, 10022. Available online: https://www.sciencedirect.com/science/article/pii/S2212012221000265 [Accessed 18 Mars 2023]

Betz, F. (2002). Strategic Business Models, *Engineering Management Journal*, 14(1), pp.

21–28. Available online: https://www.tandfonline.com/doi/abs/10.1080/10429247.2002.11415145 [Accessed 16 April 2023]

Bibri, S. E., & Krogstie, J. (2017). Smart sustainable cities of the future: An extensive interdisciplinary literature review, *Sustainable cities and society*, 31, pp. 183-212. Available online: https://www.sciencedirect.com/science/article/pii/S2210670716304073?via%3Dihub [Accessed 25 April 2023]

Bocken, N. M., & Short, S. W. (2016). Towards a sufficiency-driven business model: Experiences and opportunities, *Environmental innovation and societal transitions,* 18, 41-61, Available online: https://www.sciencedirect.com/science/article/pii/S2210422415300137 [Accessed 18 March 2023]

Brůhová Foltýnová, H., Vejchodská, E., Rybová, K., & Květoň, V. (2020). Sustainable urban mobility: One definition, different stakeholders' opinions, *Transportation Research Part D: Transport and Environment*, 87. Available online: https://www.sciencedirect.com/science/article/pii/S1361920920306520?via%3Dihub [Accessed 16 April 2023]

Chesbrough, H. (2007). Business Model Innovation: It's Not Just about Technology Anymore, *Strategy & Leadership*, 35, pp. 12–17. Available online: https://www.emerald.com/insight/content/doi/10.1108/10878570710833714/full/html [Accessed 14 April 2023]

Chesbrough, H. (2010). Business Model Innovation: Opportunities and Barriers, *Long Range Planning*, 43(2), pp. 354–363. Available online: https://www.sciencedirect.com/science/article/pii/S0024630109000569?via%3Dihub [Accessed 17 April 2023]

Chesbrough, H., & Rosenbloom, R.S. (2002). The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin‐off companies, *Industrial and Corporate Change*, 11(3), pp. 529–555. Available online: https://academic.oup.com/icc/article/11/3/529/1044102 [Accessed 17 April 2023]

Costa, P.B., Neto, G.C.M., & Bertolde, A.I. (2017). Urban Mobility Indexes: A Brief Review of the Literature, *Transportation Research Procedia*, 25, pp. 3645–3655. Available online: https://www.sciencedirect.com/science/article/pii/S2352146517306373?via%3Dihub [Accessed 18 April 2023]

Creswell, J.W., & Creswell, J.D. (2023). Research design: qualitative, quantitative, and mixed methods approaches. Sixth edition. Thousand Oaks, California: SAGE.

Demil, B., Lecocq, X., Ricart, J. E., & Zott, C. (2015). Introduction to the SEJ special issue on business models: business models within the domain of strategic entrepreneurship, *Strategic entrepreneurship journal,* 9(1), pp. 1-11. Available online: https://onlinelibrary.wiley.com/doi/full/10.1002/sej.1194 [Accessed 17 April 2023]

Demil, B., & Lecocq, X. (2010). Business Model Evolution: In Search of Dynamic Consistency, *Long Range Planning*, 43(2), pp. 227–246. Available online: https://www.sciencedirect.com/science/article/pii/S0024630110000105?via%3Dihub [Accessed 17 April 2023]

ERTICO - ITS Europe. (2019). Mobility as a service (MaaS) and sustainable urban mobility planning [pdf], Available at: https://www.eltis.org/sites/default/files/mobility_as_a_service_maas_and_sustainable_urban_mobility_planning.pdf [Accessed 20 April 2023]

European Commission. (1992). GREEN PAPER on the impact of Transport on the Environment - A Community strategy for sustainable mobility, Publications Office of the European Union. Available at: http://op.europa.eu/en/publication-detail/-/publication/98dc7e2c-6a66-483a-875e-87648c1d75c8/language-en [Accessed 18 April 2023]

European Commission. (n.d). Sustainable Urban Mobility Plans (SUMPs) and Cycling. Available at: https://transport.ec.europa.eu/transport-themes/clean-transport-urban-transport/cycling/guidance-cycling-projects-eu/policy-development-and-evaluation-tools/sustainable-urban-mobility

-plans-sumps-and-cycling_en [Accessed 18 April 2023]

Filippi, F. (2022). A Paradigm Shift for a Transition to Sustainable Urban Transport, *Sustainability*, 14(5), p. 2853. Available online: https://www.mdpi.com/2071-1050/14/5/2853 [Accessed 3 May 2023]

Frishammar, J., & Parida, V. (2019). Circular Business Model Transformation: A Roadmap for Incumbent Firms, *California Management Review*, 61(2), pp. 5–29. Available online: https://journals.sagepub.com/doi/10.1177/0008125618811926 [Accessed 12 May 2023]

Gallo, M., & Marinelli, M. (2020). Sustainable Mobility: A Review of Possible Actions and Policies, *Sustainability*, 12(18). Available online: https://www.mdpi.com/2071-1050/12/18/7499 [Accessed 26 April 2023]

Gilibert, M., & Ribas, I. (2019). Synergies between app-based car-related Shared Mobility Services for the development of more profitable business models, *Journal of Industrial Engineering and Management*, 12(3), pp. 405–420. Available online: http://www.jiem.org/index.php/jiem/article/view/2930 [Accessed 14 May 2023]

Hawkins, R. (2004). Looking beyond the dot com bubble: exploring the form and function of business models in the electronic marketplace, in B. Preissl, H. Bouwman., & C. Steinfield (eds) *E-Life after the Dot Com Bust*, Heidelberg: Physica-Verlag HD, pp. 65–81.

Heikkilä, S. (2014). Mobility as a Service - A Proposal for Action for the Public Administration, Case Helsinki. Available online: https://aaltodoc.aalto.fi:443/handle/123456789/13133 [Accessed 24 April 2023]

Hietanen, S. (2014). Mobility as a Service. The new transport model, 12(2), Available online: https://www.itscanada.ca/files/MaaS%20Canada%20by%20Sampo%20Hietanen%20and%20Sami%20Sahala.pdf [Accessed 26 April 2023]

Holden, E., Banister, D., Gössling, S., Gilpin, G., & Linnerud, K. (2020). Grand Narratives for sustainable mobility: A conceptual review, *Energy Research & Social Science*, 65, p. 101454. Available online:

https://www.sciencedirect.com/science/article/pii/S2214629620300311?via%3Dihub [Accessed 24 April 2023]

Holden, E., Gilpin, G., & Banister, D. (2019). Sustainable Mobility at Thirty, *Sustainability*, 11(7). Available online: https://www.mdpi.com/2071-1050/11/7/1965 [Accessed 20 April 2023]

Hoveskog, M., Bergquist, M., Esmaeilzadeh, A., & Blanco, H. (2022). Unpacking the complexities of MaaS business models – A relational approach, *Urban, Planning and Transport Research*, 10(1), pp. 433–450. Available online: https://www.tandfonline.com/doi/full/10.1080/21650020.2022.2107564 [Accessed 18 March 2023]

Hüging, H., Glensor, K., & Lah, O. (2014). Need for a holistic assessment of urban mobility measures–Review of existing methods and design of a simplified approach. *Transportation Research Procedia*, *4*, pp. 3-13. Available online: https://www.sciencedirect.com/science/article/pii/S2352146514002841 [Accessed 18 April 2023]

Janušová, L., & Čičmancová, S. (2016). Improving Safety of Transportation by Using Intelligent Transport Systems, *Procedia Engineering*, 134, pp. 14–22. Available online: https://www.sciencedirect.com/science/article/pii/S1877705816000345?via%3Dihub [Accessed 26 April 2023]

Jittrapirom, P., Ciati, V., Feneri, A., Ebrahimigharehbaghi, S., González, M., & Narayan, J. (2017). Mobility as a service: A critical review of definitions, assessments of schemes, and key challenges, *Urban Planning*, 2(2), pp. 13–25. Available online: https://www.cogitatiopress.com/urbanplanning/article/view/931 [Accessed 25 April 2023]

Jittrapirom, P., Marchau, V., van der Heijden, R., & Meurs, H. (2018). Dynamic adaptive policymaking for implementing Mobility-as-a Service (MaaS), *Research in Transportation Business & Management*, 27, pp. 46–55. Available online: https://www.sciencedirect.com/science/article/pii/S2210539518300488?via%3Dihub [Accessed 3 May 2023]

Kamargianni, M., & Matyas, M. (2017). The business ecosystem of mobility-as-a-service, *Transportation Research Board.* Available online: https://www.researchgate.net/publication/314760234_The_Business_Ecosystem_of_Mobility-as-a-Service [Accessed 26 April 2023]

Kamargianni, M., & Polydoropoulou, A. (2013). Hybrid choice model to investigate effects of teenagers' attitudes toward walking and cycling on mode choice behavior. Transportation research record, No. 2382(1), pp. 151-161. Available online: https://journals.sagepub.com/doi/pdf/10.3141/2382-17 [Accessed 25 April 2023]

Karlsson, I.C.M., Sochor, J., & Strömberg, H. (2016). Developing the "Service" in Mobility as a Service: Experiences from a Field Trial of an Innovative Travel Brokerage, *Transportation Research Procedia*, 14, pp. 3265–3273. Available online: https://www.sciencedirect.com/science/article/pii/S2352146516302794?via%3Dihub [Accessed 23 April 2023]

Khodaei, H., & Ortt, R. (2019). Capturing Dynamics in Business Model Frameworks, *Journal of Open Innovation: Technology, Market, and Complexity*, 5(1), p. 8. Available online: https://www.sciencedirect.com/science/article/pii/S2199853122003882?via%3Dihub [Accessed 19 April 2023]

Kim, S., Choo, S., Choi, S., & Lee, H. (2021). What Factors Affect Commuters' Utility of Choosing Mobility as a Service? An Empirical Evidence from Seoul, *Sustainability*, 13(16). Available online: https://www.mdpi.com/2071-1050/13/16/9324 [Accessed 18 April 2023]

Klein, N.J., & Smart, M.J. (2017). Millennials and car ownership: Less money, fewer cars, *Transport Policy*, 53, pp. 20–29. Available online: https://www.sciencedirect.com/science/article/pii/S0967070X16305571?via%3Dihub [Accessed 4 May 2023]

Larsson, R. (1993). Case Survey Methodology: Quantitative Analysis of Patterns across Case Studies, *The Academy of Management Journal*, 36(6), pp. 1515–1546. Available online: https://www.jstor.org/stable/256820 [Accessed 2 May 2023]

Lopez-Carreiro, I., Monzon, A., Lois, D., & Lopez-Lambas, M.E. (2021). Are travellers willing to adopt MaaS? Exploring attitudinal and personality factors in the case of Madrid, Spain, *Travel Behaviour and Society*, 25, pp. 246–261. Available online: https://www.sciencedirect.com/science/article/pii/S2214367X21000739?via%3Dihub [Accessed 25 April 2023]

Loubser, J., Marnewick, A.L., & Joseph, N. (2021). Framework for the potential userbase of mobility as a service, *Research in Transportation Business & Management*, 39. Available online: https://www.sciencedirect.com/science/article/pii/S2210539520301206?via%3Dihub [Accessed 2 May 2023]

Maas, B. (2022). Literature Review of Mobility as a Service, *Sustainability*, 14(14). Available online: https://www.mdpi.com/2071-1050/14/14/8962 [Accessed 26 April 2023]

Magretta, J. (2002). Why Business Models Matter, *Harvard Business Review*, 1 May. Available online: https://hbr.org/2002/05/why-business-models-matter [Accessed 19 April 2023]

Mangiaracina, R., Perego, A., Salvadori, G., & Tumino, A. (2017). A comprehensive view of intelligent transport systems for urban smart mobility, *International Journal of Logistics Research and Applications*, 20(1), pp. 39–52. Available online: https://www.tandfonline.com/doi/full/10.1080/13675567.2016.1241220 [Accessed 24 April 2023]

Matyas, M. (2020). Opportunities and barriers to multimodal cities: lessons learned from in-depth interviews about attitudes towards mobility as a service', *European Transport Research Review*, 12(1), p. 7. Available online: https://etrr.springeropen.com/articles/10.1186/s12544-020-0395-z [Accessed 25 April 2023]

Mitropoulos, L., Kortsari, A., Mizaras, V., & Ayfantopoulou, G. (2023). Mobility as a Service (MaaS) Planning and Implementation: Challenges and Lessons Learned, *Future Transportation*, 3(2), pp. 498–518. Available online: https://www.mdpi.com/2673-7590/3/2/29 [Accessed 26 April 2023]

Moore, J.F. (1993). Predators and Prey: A New Ecology of Competition, *Harvard Business Review*. Available online: https://hbr.org/1993/05/predators-and-prey-a-new-ecology-of-competition [Accessed 10 May 2023]

Mulley, C., Nelson, J. D., & Wright, S. (2018). Community transport meets mobility as a service: On the road to a new a flexible future, *Research in Transportation Economics*, 69, 583-591, Available online: https://www.sciencedirect.com/science/article/pii/S0739885917302421?casa_token=eCWFwp8tj4gAAAAA:q9_Px7v0_w_-cJ4baiJukhj_wQK1OvykUpbEVe7kodYodNtoQ5UQ8dT27MuWbtVbFybLaTEvKQY [Accessed 20 April 2023]

Narayanan, S., & Antoniou, C. (2023). Shared mobility services towards Mobility as a Service (MaaS): What, who and when?, *Transportation Research Part A: Policy and Practice*, 168. Available online: https://www.sciencedirect.com/science/article/pii/S0965856423000010?via%3Dihub [Accessed 3 May 2023]

Osterwalder, A., & Pigneur, Y. (2010). Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers, (e-book) Hoboken: John Wiley & Sons, Available through: LUSEM University Library website http://www.lusem.lu.se/library [Accessed 2 May 2023]

Polydoropoulou, A., Pagoni, I., Tsirampa, A., Roumboutsos, A., Kamargianni, M., & Tsouros, I. (2020). Prototype business models for Mobility-as-a-Service, *Transportation Research Part A: Policy and Practice*, 131, pp. 149–162. Available online: https://www.sciencedirect.com/science/article/pii/S096585641830973X?via%3Dihub [Accessed 27 April 2023]

Pritchard, J. (2022). MaaS to pull us out of a car-centric orbit: Principles for sustainable Mobility-as-a-Service in the context of unsustainable car dependency, *Case Studies on Transport Policy,* Available online:

https://www.sciencedirect.com/science/article/pii/S2213624X22001523#b0230 [Accessed 21 March 2023]

Puhe, M. (2014). Integrated Urban E-ticketing Schemes – Conflicting Objectives of Corresponding Stakeholders, *Transportation Research Procedia*, 4, pp. 494–504. Available online: https://www.sciencedirect.com/science/article/pii/S2352146514003214?via%3Dihub [Accessed 25 April 2023]

Reyes García, J.R., Lenz, G., Haveman, S.P., & Bonnema, G. (2020). State of the Art of Mobility as a Service (MaaS) Ecosystems and Architectures—An Overview of, and a Definition, Ecosystem and System Architecture for Electric Mobility as a Service (eMaaS), *World Electric Vehicle Journal*, 11(1), p. 7. Available online: https://www.mdpi.com/2032-6653/11/1/7 [Accessed 5 May 2023]

Sakai, K. (2019). MaaS trends and policy-level initiatives in the EU, *IATSS Research*, 43(4), pp. 207–209. Available online: https://www.sciencedirect.com/science/article/pii/S0386111219301499?via%3Dihub [Accessed 3 May 2023]

Sarasini, S., Sochor, J., & Arby, H. (2017). What characterises a sustainable MaaS business model. In *1st international conference on Mobility as a Service (ICOMaaS)*, pp. 1-15. Available online: https://www.researchgate.net/profile/Steven-Sarasini/publication/320100540_What_characterises_a_sustainable_MaaS_business_model/links/5a1ed8e9a6fdccc6b7f8be43/What-characterises-a-sustainable-MaaS-business-model.pdf [Accessed 20 April 2023]

Saunders, M., Lewis, P., & Thornhill, A. (2006). Research Methods for Business Students [e-book]. Pearson Education, Inc. Available through: LUSEM University Library website http://www.lusem.lu.se/library [Accessed 3 May 2023]

Shafer, S.M., Smith, H.J., & Linder, J.C. (2005). The power of business models, *Business Horizons*, 48(3), pp. 199–207. Available online: https://www.sciencedirect.com/science/article/pii/S0007681304001132?via%3Dihub [Accessed 19 April 2023]

Sinkovics, N., Sinkovics, R.R., & Yamin, M. (2014). The role of social value creation in business model formulation at the bottom of the pyramid – Implications for MNEs?, *International Business Review*, 23(4), pp. 692–707. Available online: https://www.sciencedirect.com/science/article/pii/S0969593113001637?via%3Dihub [Accessed 21 April 2023]

Smith, G., Sochor, J., & Sarasini, S. (2018). Mobility as a service: Comparing developments in Sweden and Finland, *Research in Transportation Business & Management*, 27, pp. 36–45. Available online: https://www.sciencedirect.com/science/article/pii/S2210539518300324?via%3Dihub [Accessed 15 April 2023]

Sochor, J., Arby, H., Karlsson, I.C.M., & Sarasini, S. (2018). A topological approach to Mobility as a Service: A proposed tool for understanding requirements and effects, and for aiding the integration of societal goals, *Research in Transportation Business & Management*, 27, pp. 3–14. Available online: https://www.sciencedirect.com/science/article/pii/S2210539518300476?via%3Dihub [Accessed 14 April 2023]

Strömberg, H., Karlsson, I.C.M., & Sochor, J. (2018). Inviting travelers to the smorgasbord of sustainable urban transport: evidence from a MaaS field trial, *Transportation*, 45(6), pp. 1655–1670. Available online: https://link.springer.com/article/10.1007/s11116-018-9946-8 [Accessed 23 April 2023]

Sumantran, V., Fine, C., & Gonsalvez, D. (2017). *Faster, smarter, greener: the future of the car and urban mobility*. MIT Press.

Sustainable Development Commission. (2011). Fairness in a Car-dependent Society [pdf], Available at: https://research-repository.st-andrews.ac.uk/bitstream/handle/10023/2290/sdc-2011-car-fairness.pdf?sequence=1&isAllowed=y [Accessed 21 March 2023]

Teece, D.J. (2007). Explicating dynamic capabilities: the nature and microfoundations of

(sustainable) enterprise performance, *Strategic Management Journal*, 28(13), pp. 1319–1350. Available online: https://onlinelibrary.wiley.com/doi/10.1002/smj.640 [Accessed 5 May 2023]

Teece, D.J. (2010). Business Models, Business Strategy and Innovation, *Long Range Planning*, 43(2), pp. 172–194. Available online: https://www.sciencedirect.com/science/article/pii/S002463010900051X?via%3Dihub [Accessed 5 May 2023]

Teece, D.J. (2018). Business models and dynamic capabilities, *Long Range Planning*, 51(1), pp. 40–49. Available online: https://www.sciencedirect.com/science/article/pii/S0024630117302868?via%3Dihub [Accessed 5 May 2023]

UN. Secretary-General & World Commission on Environment and Development (1987). Report of the World Commission on Environment and Development [pdf], Available at: https://digitallibrary.un.org/record/139811 [Accessed 20 April 2023]

Van Den Heuvel, C., Kao, P. J., & Matyas, M. (2020). Factors driving and hindering business model innovations for mobility sector start-ups, *Research in Transportation Business & Management*, 37, 100568, Available online: https://www.sciencedirect.com/science/article/pii/S2210539520301061?casa_token=mnGSNLyXayYAAAAA:k3UObfHX65TxW_VLgIxe75Z925tMiViAq9Agw_ZthrSEphGGZQkG-EagocEQOlm6hplCwJKrm5g [Accessed 18 March 2023]

Whim App. (n.d.a). MaaS Global - History of the company that started a revolution in the mobility industry, Available online: https://whimapp.com/wp-content/uploads/2022/05/MGhistory-short-version-04052022.pdf [Accessed 11 April 2023]

Whim App. (n.d.b). History of MaaS - How one man's idea started a revolution in the mobility industry, Available online: https://whimapp.com/wp-content/uploads/2022/01/MaaSGlobal_History.pdf [Accessed 11 April 2023]

Yi, Y., Chen, Y., & Li, D. (2022). Stakeholder ties, organizational learning, and business model innovation: A business ecosystem perspective, *Technovation*, 114, p. 102445. Available online: https://www.sciencedirect.com/science/article/pii/S0166497221002261?via%3Dihub [Accessed 4 May 2023]

Yin, R.K. (2014) Case study research: design and methods. London: SAGE.

Yin, R.K. (2015) Qualitative research from start to finish. New York: Guilford Press.

Yuan, C., Xue, D., & He, X. (2021). A balancing strategy for ambidextrous learning, dynamic capabilities, and business model design, the opposite moderating effects of environmental dynamism, *Technovation*, 103. Available online: https://www.sciencedirect.com/science/article/pii/S0166497221000067?via%3Dihub [Accessed 5 May 2023]

Zott, C., & Amit, R. (2013). The business model: A theoretically anchored robust construct for strategic analysis, *Strategic Organization*, 11(4), pp. 403–411. Available online: https://journals.sagepub.com/doi/10.1177/1476127013510466 [Accessed 18 April 2023]

Zott, C., Amit, R., & Massa, L. (2011). The Business Model: Recent Developments and Future Research, *Journal of Management*, 37(4), pp. 1019–1042. Available online: https://journals.sagepub.com/doi/10.1177/0149206311406265 [Accessed 19 April 2023]

Appendix A

Interview Guide

If we were a potential user that wanted to start using Whim for our travels, how would you sell it to us? Why should we start using it?

First of all, tell us about yourself, what is your background within mobility?

- How did your journey in Mobility as a service start?

What were the drivers in the development of a MaaS service in Finland?

Tell us about Whim and what the development looked like?

When designing a MaaS service such as Whim, what elements or factors need to be in place before implementation?

In the development of Whim, what were the key success factors?

During our mail correspondence with one of your colleagues at MaaS Global, it was said that Whim's vision is a bit different from other MaaS services, how so?

Can you describe to us Whim's business model?

- How are you creating value with your proposition?

What are currently Whim's key success factors?

- If it's possible, what is the most important one?

When designing a business model for MaaS Services, what is important to take into consideration?

- Why these elements?

When developing business models for MaaS services, what have you found to be the most challenging part? In what way? How? Why?

- What has been done to handle these issues and challenges with regards to the development of Whim?

We have seen that you have continuously managed to raise money, attract investors as well as suppliers, can you explain and describe how you have managed to do this?

What is your personal opinion regarding MaaS services, based on your knowledge and experience?

- Why?
- What needs to change? What does not have to change?

When looking back, would you have done anything differently when developing Whim?

- business model, customer segments..?

If we look futurewise, what does the future hold for MaaS services?

- Challenges
- Opportunities

What are the future challenges for Whim?

- How are these challenges supposed to be faced and solved?

Can you describe your API, what it means and what it does for your business?

- Is the API something all MaaS services adopt or are there different ways of integrating different service providers into the platform?
- What is the advantage of your specific API?

So, what are the distinct features of Whim´s business model compared to others that has enabled the service to stay alive for all these years?

As we mentioned in our last interview, Whim has a new partnership with an insurance company, how has this affected your business model and is corporate partnerships the new direction for the company?

Can you explain the reason for this transition, and how has this worked in your favor?

- Is changing one's business model something that is required in order to keep staying alive?