

MOBILITY AS A SERVICE-HYPE OR THE FUTURE OF TRANSPORTATION?

Master's Thesis
Julia Romanyuk
Aalto University School of Business
Strategy Programme
Spring 2018

Author Julia Romanyuk

Title of thesis Mobility as a service-hype or the future of transportation?

Degree Master of Science in Economics and Business Administration

Degree programme MSc Degree Programme in Strategy

Thesis advisor Nina Granqvist

Year of approval 2018**Number of pages** 124**Language** English

Abstract

While digitalization reshapes the traditional transportation industry boundaries, it is important to understand how technologies and different industry players begin to interact and where and how the new opportunities emerge. In this study, I examine Mobility as a Service (MaaS) – a current phenomenon and an emerging business model in the Finnish transportation industry that has gained significant interest on the global transportation markets. The overarching empirical purpose of this work is to understand the ongoing development process in Finland - especially in the Helsinki metropolitan area where the concept of MaaS is most developed. To address the research problem, the following research question is asked: *How is the new business model, Mobility as a Service, developed in Finland?*

In order to answer the identified research question, I used the case study methodology and collected empirical data through nine semi-structured interviews and recently-published media articles about MaaS. Thematic coding was used as the central data analysis method as it helped me identify the common patterns in my data and group them under the bigger themes. For the purpose of primary research, literature on business models, networked business models and business model development were examined and integrated to the empirical findings of this study.

My research concludes that MaaS is not a traditional emerging business model but rather a networked business model that is co-created in a network of actors. It emerges at the intersection of several concepts and ideas, multiple business models and technologies. Its core characteristics are: customization and personalization, an all in one mobility market platform, resource sharing and replacement of the private car.

The development process of a networked business model is continuous and iterative by nature. The process begins with tens of independent firm specific business models evolving to the networked business model. Moreover, this research proposes that before becoming a fully functioning networked business model, the emerging model takes form of an opportunistic business model, during which introduction and testing of the emerging service happens. In addition to continuous iteration, involvement of new business network participants facilitates learning and identification of shared opportunities. Thus, this research proposes that the number of business model iterations and continuous involvements of new network participants are the core drivers of development.

Keywords Business models, networked business models, emerging business models, business model development process, Mobility as a Service, MaaS

Tekijä Julia Romanyuk

Työn nimi Mobility as a service-hype or the future of transportation?

Tutkinto Kauppatieteiden maisteri

Koulutusohjelma MSc Degree Programme in Strategy

Työn ohjaaja(t) Nina Granqvist

Hyväksymisvuosi 2018

Sivumäärä 124

Kieli englanti

Tiivistelmä

Samanaikaisesti kun digitalisaatio muokkaa perinteisiä liikennealan toimialarajoja, on tärkeää oppia ymmärtämään miten erilaiset teknologiat ja eri toimijat vuorovaikuttavat keskenään, ja miten uusia kaupallisia mahdollisuuksia sekä liiketoimintamalleja syntyy. Tässä tutkimuksessa tarkastelen suomalaista liikennealan ilmiötä, Mobility as a Service (suomeksi: liikenne palveluna ja lyhenne MaaS), ja sen kehittyvää liiketoimintamallia, joka on herättänyt kiinnostusta paitsi Suomessa myös ulkomailla. Työn empiirinen tarkoitus on kuvailla Suomessa meneillä olevaa kehitysprosessia ja erityisesti perehtyä pääkaupunkiseudun kehityksen tilaan. Lähestyn tutkimusongelmaa seuraavan tutkimuskysymyksen kautta: *Miten uutta liiketoimintamallia, liikenne palveluna, kehitetään Suomessa?*

Tutkimuksen empiirinen osuus toteutettiin tapaustutkimuksena. Empiirinen aineisto kerättiin yhdeksän puolistrukturoidun haastattelun avulla ja tarkastamalla liikenne palveluna aiheeseen liittyviä mediajulkaisuja. Temaattinen koodaus toimi keskeisenä aineiston analysointimetodologiana ja luokittelun kautta se johti synteisiin. Tutkimuksen primäärinen aineisto kerättiin katsastamalla seuraavaa kirjallisuutta: liiketoimintamallit, verkottuneet liiketoimintamallit ja liiketoimintamallien kehitys prosessit.

Tutkimustulokset osoittavat, että liikenne palveluna ei ole tavallinen liiketoimintamalli vain verkottunut liiketoimintamalli, joka kehittyy yhteistyössä monen toimijan kanssa. Liikenne palveluna syntyy useamman konseptin, idean, teknologian ja liiketoimintamallin risteämiskohdassa. Liikenne palveluna-liiketoimintamallin ydinominaisuuksia ovat: räätälöinti ja personointi, kaiken kattava liikenne alusta, resurssien jakaminen ja yksityisen auton korvaaminen.

Verkottuneen liiketoimintamallin kehitysprosessi on luonteeltaan jatkuva ja iteratiivinen. Prosessi alkaa useista itsenäisistä liiketoimintamalleista ja kehkeytyy verkottuneeksi liiketoimintamalliksi. Lisäksi tutkimustulokset viittaavat siihen, että ennen uuden verkottuneen liiketoimintamallin muodostumista kehittyvä malli muodostuu opportunistiseksi liiketoimintamalliksi, jonka aikana muotoutuvan palvelun käyttöönotto ja testaus tapahtuu. Jatkuvien iteraatioiden lisäksi uusien toimijoiden liittyminen liiketoimintaverkkoon nopeuttaa oppimista ja yhteisten mahdollisuuksien tunnistamista. Siten tässä tutkimuksessa ehdotetaan, että liiketoimintamallien iteroitien määrä ja uusien toimijoiden jatkuva liittyminen ovat keskeisiä kehitysprosessin mahdollistajia.

Avainsanat Liiketoimintamallit, verkottuneet liiketoimintamallit, kehittyvät liiketoimintamallit, liiketoimintamallien kehittämisprosessi, Mobility as a Service, MaaS, liikenne palveluna

ACKNOWLEDGEMENTS

I would first like to thank my thesis adviser, Dr. Nina Granqvist, for her aspiring guidance, invaluable constructive criticism and friendly advice during the thesis project. She always allowed this paper to be my own work, but steered me in the right direction, especially at the beginning of the research process.

I would also like to thank Affe Tavasti, Antti Korsisaari, Juha Pentikäinen, Krista Huhtala-Jenks, Mari Flink, Nicholas Zaeske, Pekka Möttö, Petro Tamminen, Sampo Hietanen and Sonja Heikkilä, who were kind enough to donate their valuable time and knowledge for the interviews.

Moreover, I would like to express my gratitude to my employer, Accenture Finland - especially Jyri Koskela, Anna Kesti, Anna-Maria Rönqvist, Sami Naalisvaara and Kaj Mäkelä for opening up the exciting world of Mobility as a Service to me.

I am also grateful for the Aalto University School of Business, particularly its Mikkeli Campus for the high-quality teaching, inclusive study environment and support in career advancement. My five years of studies have been intensive, international and intellectually stimulating. Most importantly, I have gained life-long friends and colorful experiences that I will cherish for the rest of my life.

Lastly but certainly not least, I would like to thank my family and friends for their unfailing support and encouragement throughout my years of study, especially during the process of writing this thesis. These, along with many other accomplishments in my life, would not have been possible without them. Thank you.

Julia Romanyuk

Helsinki 1.2.2017

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	1
DEFINITIONS	4
1. INTRODUCTION	6
2. LITERATURE REVIEW	11
2.1 Business models and their function	11
2.2 The business model frameworks.....	13
2.2.1 Johnson, Christensen and Kagermann’s business model elements	13
2.2.2 Chesbrough and Rosenbloom’s business model functions.....	14
2.2.3 Osterwalder and Pigneur’s business model canvas.....	16
2.2.4 Kaplan’s business model story elements	19
2.2.5 Comparison and conclusion on business model frameworks	20
2.3 The networked business models	21
2.4 The process of business model development	23
2.4.1 The idealised business model development process	23
2.4.2 Different development phases	28
2.4.3 The framework of networked business model development	29
2.4.4 Conclusion on the networked business model development	32
2.5 Theoretical framework	34
3 RESEARCH CONTEXT	37
3.1 Definition of MaaS and business ecosystem description	37
3.2 Influencing travellers’ motives to adopt new mobility services	41
3.3 Business Models of MaaS.....	42
4 RESEARCH METHODS AND DESIGN.....	47
4.1 Research approach.....	47
4.2 Data collection.....	49
4.3 Data analysis	51
4.4 Research evaluation	53
5 FINDINGS AND ANALYSIS	56
5.1 Core characteristics of Mobility as a Service	56
5.1.1. Customization and personalization	56
5.1.2 An all in one mobility market platform.....	57
5.1.3 Resource sharing.....	58
5.1.4 Replacement of private cars	58
5.2 MaaS business model elements and their implication on business model development	60
5.2.1 The Product Pillar of MaaS	60
5.2.2 The Interface Pillar of MaaS	62
5.2.3 The Interface Management Pillar of MaaS.....	65
5.2.4 The Financial Aspects Pillar of MaaS.....	68
5.3 The networked business model development	71
5.3.1 Early attempts	72
5.3.2 The current state	73
5.3.3 The future vision.....	77
5.3.4 Factors restricting MaaS development	79
5.3.5 Factors enabling MaaS development	82
5.4 Summary of findings.....	86

6.DISCUSSION	88
6.1 Mobility as a service – The marketplace for smart mobility	88
6.2 Development process of MaaS	92
6.3 Revised theoretical framework	94
7. CONCLUSION	97
7.1 Main findings	97
7.2 Practical implications	100
7.3 Limitations and suggestions for further research	102
REFERENCES	104
APPENDICES	113
APPENDIX 1: INTERVIEW GUIDE IN FINNISH	113
APPENDIX 2: INTERVIEW GUIDE IN ENGLISH	114
APPENDIX 3: EXAMPLES OF CURRENT MaaS SERVICES IN FINLAND	116
MaaS Global and Whim app	116
Tuup Kyyti and Kyyti app	117
Case Valmet Automotive	118
OP Mobility Services and OP Transit app	118

TABLE OF TABLES

Table 1. The elements of Business Model Canvas (Osterwalder and Pigneur, 2010)....	17
Table 2. Comparison of reviewed business model frameworks	20
Table 3. Business models of MaaS	43
Table 4. The MaaS networked business model development restraining factors as based on interviews.....	79
Table 5. The MaaS networked business model development enablers as based on interviews.....	82
Table 6. Megatrends and social trends supporting the future of the MaaS networked business model	86

TABLE OF FIGURES

Figure 1. Elements of networked business model development, adopted from Palo and Tähtinen 2013	30
Figure 2. The phases of networked business model development, adopted from Palo and Tähtinen (2013).....	32
Figure 3. The theoretical framework	36
Figure 4. The structure of MaaS Business Ecosystem, adopted from Aapaoja, A., Sochor, J., König, D. and Eckhardt, J. (2016).	38
Figure 5. Research context	39
Figure 6. The business model canvas of MaaS (König et al., 2016)	46
Figure 7. Revised MaaS business model canvas	89
Figure 8. Revised theoretical framework	96

DEFINITIONS

- Mobility as a Service* Mobility as a Service (MaaS) is a holistic way of thinking about transportation. The end user of MaaS might be anyone in need to move from place A to B. In addition to the journey itself, MaaS offers other complementary services, such as journey planning, reservation, and payments, through a single user interface (Hietanen, 2014). MaaS is a door to door travel chain that links intermodal transportation services not only on a national level, but also internationally, resulting in a wider variety of transportation modes and services that together aim to provide service level comparable or even greater than a private car. Instead of one size fits all, MaaS is about customization, automation and robotization of transportation services.
- Transportation or mobility service provider* Transportation service provider is any person, party or carrier that provides passenger or freight transportation services to the end user. In this thesis transportation service or mobility service provider is mainly used to refer to passenger transportation, including travel agents, airlines, train companies and travel management organizations (Transportation Service Provider (TSP) Law and Legal Definition, n.d.).
- MaaS operator* A MaaS operator is an intermediary between transport operators and users. It buys capacity from the former and sells it to the latter. The end-users can customize the service and buy a bundle of intermodal services and make informed decisions about which one to use for each of their trips. Moreover, the MaaS operator may suggest the optimal journey by knowing the real time transportation network conditions (supply side) and combining them to the user preferences (demand side). “In other words, the MaaS operator can optimize the supply and the demand” (Maas4eu.eu, 2017).
- Business model* In this thesis, business model refers to a set of assumptions and hypothesis about how business runs and makes money. These include for example value proposition, key resources and activities and revenue formula. It should not be confused with business strategy which explains how you will do better than your rivals and compete on the market (Ovans, 2015).
- Business model canvas* The business model canvas is a widely used tool for business model development and is used in this study for research purposes. The model presented by Osterwalder and Pigneur (2010) consists of nine elements of the business model framework: value proposition, customer relationships, customer segments, channels, key activities, key resources, key partners, cost structure and revenue streams.

- *Value proposition or value creation*
 - *Value delivery*
 - *Value capture or profit formula*
- Value creation or value proposition explains what and to whom a company offers value, value delivery mechanisms such as key activities, key resources and channels clarify how the value is delivered, and value capture or profit formula describes the financial in and outflows of a company (Kaplan, 2012)

Networked business model

A networked business model is a specific type of business model where multiple actors are working toward one or more common goal using their interconnected network and value-producing assets. Networked business model is a dynamic method for creation and planning business in a net of actors, rather than a static method for a single firm (Palo and Tähtinen, 2013; Storbacka and Nenonen, 2011).

1. INTRODUCTION

According to United Nations, the global population will hit 8.4 billion in 2030 and 60.2% of global inhabitants will live in cities – compared to less than 50% in the beginning of this century (United Nations, Department of Economic and Social Affairs, Population Division, 2015). Over the same period, more than two billion people are likely to enter the middle class and could express the desire to buy a car, which that has long been a symbol of freedom (Bouton et al., 2015). This development trend poses serious pressure to authorities planning urban transportation as current urban infrastructures cannot sustain such increase of vehicles on the road, congestion and pollution (Bouton et al., 2015).

Nonetheless, this is not an impossible challenge to overcome. Mobility as a Service (MaaS), an emerging business model studied in this research, has potential to revolutionize mobility and, along with other technologies, help make urbanization sustainable (Bouton et al., 2015). As MaaS is still a developing concept, there is no universally shared definition of it (e.g. Giesecke, Surakka and Hakonen, 2016; Holmberg et al, 2016). Therefore, I present a short alternative definition and expand on it in the research context chapter. Typically, MaaS refers to a personalized mobility service that allows the use of different transportation means, journey planning, booking and payment through a single user interface. Ultimately, MaaS aims to provide a mobility service that is comparable or even better than a personal car (e.g. Kamargianni et al., 2016; Giesecke, Surakka and Hakonen, 2016; Holmberg et al., 2016; Hietanen, 2017). To get you on board, let's imagine the following user journey.

Alice is exhausted. It is 7 o'clock in the evening on Thursday, and she has been at her desk for 11 hours. She grabs her phone and skims the options that her mobility app suggests. Subway or bus? Too many changes. A car pool vehicle? She still has to make a couple of private calls, so she chooses her own autonomous on-demand taxi. A few minutes later the small electric vehicle, with no driver, arrives just in time. Tchaikovsky music is playing in the background, as that's Alice's favourite. She settles in, makes the calls and pre-orders all ingredients for a dinner.

On the way, the mobility app suggests sharing the rest of the ride with the family living nearby. Alice accepts the car-sharing invitation and a full-loaded car continues its journey. Before arriving, the car curves to pick up the pre-ordered groceries and the cost of the whole trip is shared and instantly charged from Alice's account. Alice saved more than an hour and still has time and energy for the family before going to the bed.

A journey like Alice's could be reality in 5-10 years, if all actors in the complex MaaS ecosystem will find common business interests and enable the development of differentiated business models around mobility. The emergence and development of new business models does not only happen in the transportation industry, but also across different industries and is largely driven by the latest wave of the digitalization (Gartner, 2017). Yet, despite its relevance for both academia and business, the development process of new emerging business models is an underresearched area and most of the current literature focuses on describing the idealized business model development process and tools for the development (Kolehmainen, 2017).

Moreover, the function and structure of business models itself remains open for debate (Ovans, 2015; Coombes and Nicholson, 2013; Shafer, Smith and Linder, 2005) and the literature on it has largely been developed in silos (Zott, Amit and Massa, 2011). Several authors agree that business models enclose the business logic (Ovans, 2015; Baden-Fuller and Mangematin, 2015) and may be used to describe the way a business operates and makes profit. In addition, business models seem to have shared elements that define the source of value to the customers, describe the relationship between a firm and its operating environment, and determine how value is captured (Ovans, 2015; Coombes and Nicholson, 2013).

More specifically, several authors have identified value creation, value delivery and value capture as shared elements of business models (Kaplan, 2012; Johnson, Christensen and Kagermann, 2008; Chesbrough and Rosenbloom, 2002; Osterwalder and Pigneur, 2010). Value creation, sometimes referred to as value proposition, explains what and to whom a company offers value; value delivery clarifies how the value is delivered; and value capture describes the financial in and outflows of a company (Kaplan, 2012). Finally,

Chesbrough (2010) summarizes that accurately designed business models are important strategic tools as they exhibit cause-and-effect relationships and ensure the consistency of strategic choices and actions of a company.

Today, the world's most valuable companies are platform businesses (Reponen, 2017), which, unlike traditional business models, benefit from knowledge and expertise of a network of actors (Reponen, 2017; Parker and Van Alstyne, 2008; (Parker, Van Alstyne and Choudary, 2016). Furthermore, they represent an ecosystem in which value is co-created in an open network rather than in-house. Consequently, it is important to understand how these business models function in a network of actors and gain knowledge about the development process of such networked business models.

In Finland, Mobility as a Service is not a traditional emerging business model but rather a market-based platform (Ovaska, 2017) and a networked business model that emerges at the intersection of several concepts and ideas, multiple business models and technologies. Thus, representing an interesting area for research. Palo and Tähtinen, 2013; Lundgren, 1995; Möller et al., 2005 note that the successful development of technology-based services, like MaaS, requires a wide network or ecosystem of commercial and non-commercial actors that provide both resources and activities needed for the value creation to the end customer. Nevertheless, the knowledge on these topics is rather limited and business model literature is currently mainly restricted to the firm level and lacks research on dynamic development of the networked business model (Palo and Tähtinen 2013).

In my research, I focus on discovering how Mobility as a Service is developed in the metropolitan area of Finland. Specifically, this thesis aims to shed light on what Mobility as a Service means in the Finnish context, who the key players are, what interdependencies there are, how the development happens and what the restricting and enabling factors are of a new networked business model development process. To address the research problem, the following research question was asked:

How is the new business model, Mobility as a Service, developed in Finland?

The research question is empirically important, as the concept of Mobility as a Service is novel and significantly underresearched despite its widespread interest both in Finland and internationally. For example, Deloitte (2017) and The Guardian (2014) have recognized Helsinki's plans for developing innovative mobility services and referred the city as the "poster-child" of MaaS. Thus, new research is needed to understand the dynamics in the business model development process. Also, this research carries a degree of societal importance as a description of the current situation in the Helsinki metropolitan area might help other cities aiming to develop their transportation services. For example, also Stockholm, Vienna and London are actively pursuing development of MaaS (Maas4eu.eu, 2017).

To address the identified research question, I used the case study methodology (e.g. Eisenhardt, 1989; Yin, 2003) because it is an appropriate research strategy when examining complex and unstructured business issues, which is difficult with quantitative methodologies (Ghauri and Grønhaug, 2005; Easton, 2010). Furthermore, I collected empirical data through nine semi-structured interviews and recently-published media articles about MaaS. Thematic coding was used as a central data analysis method as it helped me identify the common patterns in my data and group them under the bigger themes that served as a guiding structure of my findings chapter. For the purpose of primary research, literature on business models, networked business models and business model development were examined and integrated to the empirical findings of this study.

As a result, the theoretical framework describing development process of an emerging networked business model and the four critical factors enabling that process was developed. Firstly, as the networked business model is dynamic and evolving in its nature, business model iterations through the process of trial and error are the prerequisite for overall development. Secondly, development requires growth and expansion of the network itself, which happens when new actors join the network. Thirdly, it was discovered that emergence and advancement of enabling technologies serves as a central reinforcing factor for networked business model development. Lastly, the research indicated that legislation related to the emerging business model creates a supportive legal

environment for doing business and ensures that the emerging model is not at a legislative disadvantage compared to the established models within the given industry.

Finally, in addition to the four central factors, the findings of this research provide practical knowledge about the current development state, MaaS services existing in the Helsinki region and a summary on MaaS related literature. Furthermore, this study maps the factors relevant specifically for the development process of MaaS and lastly identifies limitations and the potential avenues for further research.

2. LITERATURE REVIEW

In this chapter I present the overview of the most relevant theoretical literature for this thesis. In the first part I discuss the concept of business model, its definition and structure, while in the second I focus on the business model development process starting from the idealised perspective and continuing with the networked business model perspective. Lastly, the findings of both literature streams are summarized to the theoretical framework.

2.1 Business models and their function

Digitalization and a rapidly changing world around us has increased the amount of attention paid to business models not only in the business world, but also academia. New innovative platform-based business models such as Netflix, Uber, Airbnb and Spotify have changed the competition rules in their respective industries. Nevertheless, the definition of business models is anything but clear (Casadesus-Masanell and Ricart, 2011; Gay, 2014; Coombes and Nicholson, 2013; Chesbrough and Rosenbloom, 2002), and the literature is developing largely in silos, depending on researchers' personal interest in the phenomena (Zott, Amit and Massa, 2011). The business model is described at least from the "what do they do" (Teece, 2010; Amit and Zott, 2012) perspective and "what they consist of" perspective (Casadesus-Masanell and Ricart, 2011; Johnson, Christensen and Kagermann, 2008; Kaplan, 2012; Shafer, Smith and Linder, 2005; Chesbrough and Rosenbloom, 2003). To identify the common ground, I will next discuss the later perspective in more detail.

The review of existing academic literature reveals that several authors argue that the business model should consist of at least following four elements: customer value proposition, profit formula, key resources and key process (Johnson, Christensen and Kagermann, 2008; Casadesus-Masanell and Ricart, 2011). While, Chesbrough and Rosenbloom (2002) and Osterwalder (2004) propose that a business model should consist of value proposition, positioning of value network, key processes, customer segments, profit formula customer relationship definition and competitive strategy. In fact, these

characteristics of business models go in hand with the structure of the “Business Model Canvas” (Osterwalder and Pigneur, 2010) that has been lately widely adopted in the business world.

Looking more broadly, commonalities in literature can be identified. Several authors notice the importance of value and refer to it as value proposition, value delivery and value creation. Value is connected to the broader value network and revenue and cost features, sometimes referred to as value capture or profit formula (Baden-Fuller and Mangematin, 2013; Bohnsack, Pinkse and Kolk, 2014; Chesbrough, 2010; Chesbrough and Rosenbloom, 2002; Gay, 2014; Osterwalder, 2013; Rumble and Mangematin, 2015; Shafer, Smith and Linder, 2005). Therefore, we can say that there are some core characteristics as well as secondary aspects related to the business models. These similarities are summarized later on in this thesis.

The business model can be also looked at from the functional perspective. Amit and Zott (2012) describe the business model as “an activity system conducted to satisfy the perceived needs of the market and source of innovation”, while Chesbrough and Rosenbloom (2002) talk about turning technology into real value, and Coombes and Nicholson (2013) see the business model as a way to consolidate the industry best practices. To continue, Baden-Fuller and Mangematin (2013) talk about the business model’s ability to categorize the business world and Sabatier *et al.* (2010) put emphasis on their ability to connect internal capabilities with the external demand. Finally, there are numerous authors that use business model purely as a conceptual model that enables simulation and understanding of different business areas, their interdependencies and consistency with each other (Baden-Fuller and Mangematin, 2013; Casadesus-Masanell and Ricart, 2011; Chesbrough, 2010; Osterwalder, 2013). The common factor in the different literature is the description of business models as a way to achieve something: it might be a tool of reasoning and analysis (Baden-Fuller and Mangematin, 2013; Furnari, 2015; Rumble and Mangematin, 2015), an instrument to gather support for a specific issue (Baden-Fuller and Mangematin, 2015), or define and describe the business logic (Johnson, Christensen and Kagermann, 2008; Palo and Tähtinen, 2011).

Regardless of the variety of functions, Chesbrough (2010) summarizes that accurately designed business models are important strategic tools. They not only crystallize cause-and-effect relationships, but also ensure the consistency of strategic choices and actions of a company. In the next section selected meta-models are examined in detail in order to provide understanding how to efficiently use them.

2.2 The business model frameworks

In the previous section the wide scale of business model definitions and purposes was presented. However, using the concept of business model for a strategic purpose requires understanding the structural and practical differences of different meta-models. The goal of this section is to examine different business model frameworks and provide a comprehensive summary of categorization of business model elements, therefore establishing the missing link between different authors. In addition, the aim is to present the underlying logic of the models and discuss their relation to the business context.

In total, four different meta-models are discussed. First, I present the business model elements by Johnson, Christensen and Kagermann (2008). Second, the work of Chesbrough and Rosenbloom (2002) is discussed. Thirdly, the business model canvas developed by Osterwalder and Pigneur (2010) is elaborated and lastly the work of Kaplan (2012) is used to unify the characteristics of all four meta-models. These models were picked based on their centrality for the business model research. The centrality was measured as the amount of references appeared in the Google Scholar search, which for the first three articles exceeded several thousand references. The work of Kaplan (2012) has not been as widely recognized but was relevant due to its overreaching and unifying characteristic.

2.2.1 Johnson, Christensen and Kagermann's business model elements

In their study, Johnson, Christensen and Kagermann (2008) note that understanding the prevailing business model of a company and its various linkages is crucial when deciding whether to innovate or modify it. Hence, frameworks for understanding business models

play an important role, as they enclose the business logic (Ovans, 2015; Baden-Fuller and Mangematin, 2015) and may be used to describe the way a business operates and makes profit.

To generate the blueprint of a business model a company needs to analyse four different elements: 1) Customer value proposition, 2) Profit formula, 3) Key resources and 4) Key capabilities (Johnson, Christensen and Kagermann, 2008). What is more, Johnson, Christensen and Kagermann (2008) define that pursuing the new business model which is not disruptive to the industry and market is not worth the effort. From MaaS perspective we can see that earlier trials to adopt MaaS-like system into Finnish market have failed, since the true demand and need from customer side did not exist. Now, as experience and sharing economy oriented millennials grow up and ITS systems are ready the opportunity has emerged (Hietanen, 2017). Similarly to Chesbrough and Rosenbloom (2002), Johnson, Christensen and Kagermann (2008) propose that ultimately, the success comes not from detecting new technology but from enveloping it in an appropriate, powerful business model.

2.2.2 Chesbrough and Rosenbloom's business model functions

The failure of established companies to manage effectively in the face of technological disruption can be seen as a difficulty managing innovations that fall outside of their previous expertise, processes and principles. Technological management literature shows that incumbent companies struggle to perceive and then enact new business models that the disruption requires. In their study Chesbrough and Rosenbloom (2002) focused on analyzing how Xerox Corporation successfully captured the potential of new technology through a new business model. This research is relevant for my study as the concept of MaaS is possible due to the technological advancements and digitalization. However, if established companies fail to act on this opportunity, the development of the entire Mobility as a Service network might be negatively affected.

Chesbrough and Rosenbloom (2002) argue that in order to commercialize the opportunity that new disrupting technologies bring, management needs to understand the cognitive

role of the business model. They describe the business model as a coherent framework and a mechanism that “takes the technological characteristics and potentials as inputs, and converts them through customers and markets into economic outputs”, therefore creating logic that bridges technical prospective with the realization of business revenues. In addition, they argue that despite the value unlocking nature of the business model, it puts constrain on the future search for new and alternative models when the next disruption comes.

The six attributes that Chesbrough and Rosenbloom (2002) use to describe the business model functions are: 1) Articulation of the value proposition, 2) Identification of a market segment, 3) Definition of the structure of a value chain, 4) Estimation of the cost structure and profit potential, 5) Description of the position within the value network of suppliers and competitors and 6) Formulation of the competitive strategy. Altogether, these functions help understand and justify the capital needed and outline the way to scale up the business. In many ways, the six attributes are the sum of attributes presented by Johnson, Christensen and Kagermann (2008), who talk about four first ones, and Casadesus-Masanell (2011), who focuses especially on the competitive and value network attributes in his work.

Chesbrough and Rosenbloom (2002) propose that as a concept business model intervenes between technological and economic domains, as it transfers technological inputs to economic domain of outputs. Nevertheless, while faced with the technological and market disruptions, management is cognitively trapped and finds it difficult to link technology to the economic domain using the new business model. Instead, during the face of business discontinuity organizations specialize employees to focus within each domain, therefore missing the opening opportunity (Chesbrough and Rosenbloom, 2002).

In early 70's Xerox Corporation developed a new copying machine model, 914, which was technologically advanced but at the same time came with the high initial cost. Market experts and consultants said that the machine lacks the relevant market and therefore has no business value. Despite the expert judgements Xerox decided to experiment and launched new business model that was based on leasing. The machine was a huge market

success and therefore witnessed that “technologies that make little or no business sense in a traditional business model may gain great value when brought to market with a different model” (Chesbrough and Rosenbloom, 2002). This new business model became the dominant business logic for Xerox for many years, but at the same time it caused the cognitive biases for the management (Chesbrough and Rosenbloom, 2002). Thus, findings of the research suggest that managers of established incumbent companies may feel little incentive to search for alternatives outside the dominant successful business model, while managers of start-up companies behave in an opposite way.

2.2.3 Osterwalder and Pigneur’s business model canvas

Osterwalder and Pigneur (2010) present nine elements of the business model framework in their book “Business Model Generation”. The book provides user with the canvas that is nowadays a widely used tool for business model development. The elements of the canvas were first presented in Osterwalder’s (2004) doctorate thesis, where he focused on synthesizing the previous business model research. Therefore, all elements incorporated in the business model canvas have been mentioned at least twice by some other author in the preceding literature and further developed to an easy to use structure of the business model canvas. The nine elements of the model can be divided into four pillars: A) Product, B) Customer interface, C) Infrastructure management and D) Financial aspects. The table 1 below summarizes the framework.

Table 1. The elements of Business Model Canvas (Osterwalder and Pigneur, 2010)

Pillar		Business canvas element		Description
A	Product	1	Value Proposition	Provides a holistic overview of a company's bundle of service/products that are of value to the customer
B	Interface	2	Customer Segments	Target group of customers to who value is offered
		3	Channels	Ways of getting in touch with customer
		4	Customer Relationships	The description of link that a firm establishes with the customers
C	Infrastructure management	5	Key Resources	The arrangement of assets required to create value to the customer, resources are the inputs in the value-creation process and sources of capabilities
		6	Key Activities	Actions a company performs to conduct business and archive its goals
		7	Key Partners	Voluntary initiated co-operation agreements for outsourcing and acquiring resources outside the company
D	Financial Aspects	8	Revenue Streams	The logic of the revenue streams resulting from the successful value delivery to the customers
		9	Cost Structure	The representation in money of all the means employed in the business model elements

A. Product pillar

The product pillar of the business model canvas answer the “what” question. It defines what product a company offers and also the value proposition of it to the market. According to Osterwalder and Pigneur (2010) **value proposition (1)**, provides an overview of the package of products and services that the company offers and that create value to the end customer. The value proposition also specifies the customer segment to which it delivers value to fulfill their needs. Lastly, the value proposition defines how a company differentiates itself from its rivals.

B. Customer interface pillar

The customer interface pillar focuses on answering the “who” questions related to the business model. The pillar defines who are the target customers, how the product or service is delivered to them and how it formulates a strong relationship with them.

To define the **customer segments (2)** for which value is delivered, a firm segments the potential customers according to different demographical or psychological aspects. Then a company chooses the **channels (3)** that allow it to get in touch with the target customers. Thus, channels can be seen as links between the value proposition and the end user. Channels are different means of communication, distribution and sales channels. Finally, **customer relationship (4)** defines the type and strength of links that a company creates between itself and the customers. The relationship comes with cost, therefore the key customers and the types of relationship with them should be carefully considered (Osterwalder and Pigneur, 2010; Osterwalder, 2004).

C. Infrastructure management pillar

The infrastructure management pillar describes “how” a company creates value. More specifically, it explains the infrastructural and logistical side of the business and often also defines the network of enterprises that help the company to create and deliver value. In a nutshell, it indicates the resources, capabilities, executors and their relationships with each other.

Key resources (5) are the central assets required for customer value creation. They are the inputs on the left side of the business model that are combined and transformed to the economic outputs. The resources can be for example financial, human capital, intellectual, physical and technological. **Key activities (6)** are the key actions performed by the company, they make the business model work. Osterwalder and Pigneur (2010) advise to define the central internal and external activities using the value chain, value network and value shop logics.

Finally, **key partnerships (7)** describe the network of business partners and suppliers essential for the business. The idea is to encourage a company to critically evaluate which

activities should be performed in house and which should be outsourced or acquired from outside the company (Osterwalder and Pigneur, 2010; Osterwalder, 2004).

D. Financial aspects pillar

Cost structure and the revenue model of the new business model are defined in the financial aspects pillar. Ultimately it aims to assess the financial sustainability of the developed model.

Revenue streams (8) are the different revenue flows that result from successful value delivery to the customer. The pricing model chosen by the company is the key defining factor when it comes to revenues. **Cost structure (9)** then again is the description of cost related to running the business, marketing and delivering the value promised. It can be said that cost structure states the price tag for each element of the business model (Osterwalder and Pigneur, 2010; Osterwalder, 2004).

2.2.4 Kaplan's business model story elements

In his book Kaplan (2012) talks about the three different business model story elements: 1) Value creation, 2) Value delivery and 3) Value capture. In line with other authors, Kaplan states that the purpose of value creation story is to outline the story about how the company creates value to the end customer and what type of customer experience it intends to offer. The operational model of a business is described in the value delivery story. And lastly, the value capture story focuses on the financial aspects of the model.

Story elements that Kaplan (2012) presents can be seen as the unifying ones among all different frameworks presented in this thesis. Therefore, in the following conclusion chapter, I will use the concepts of value creation, value delivery and value capture to compare the meta-models to each other and discuss the main findings regarding business models.

2.2.5 Comparison and conclusion on business model frameworks

To compare the frameworks presented earlier I use the overarching framework presented by Kaplan (2012). Table 2 shows that all frameworks use similar terminology and ideas to describe the business model, but present and categorize them differently.

Table 2. Comparison of reviewed business model frameworks

Kaplan (2012)	Johnson, Christensen and Kagermann (2008)	Chesbrough and Rosenbloom (2002)	Osterwalder and Pigneur (2010); Osterwalder (2004)
Value creation	Customer value proposition	Value proposition	Value proposition
		Market segment & revenue generation	Customer segments
		Value network	Customer relationship
Value delivery	Key resources		Key partners
	Key capabilities	Value chain	Key resources
		Channels	
		Key activities	
Value capture	Profit formula	Market segment & revenue generation	Revenue streams
		Cost structure & profit potential	Cost structure
		Competitive strategy	

Overall, the reviewed business model literature can be categorised into the three groupings that were also noted by (Zott, Amit and Massa, 2011). The first group focuses on creating the typologies and taxonomies of business model and view it as a way to create, capture and deliver value to the end customer. The second focuses on describing the business models as a way to access firm's performance, by linking business model to the corporate strategy and wider business network. Lastly, the third stream brings up the innovation nature of business models, viewing the business model as a mechanism for innovation as well as a subject of innovation (Zott, Amit and Massa, 2011).

It can be argued that Osterwalder's (2004) research about business models and their development is the base line for the modern business model research as it summarizes the previous research literature on the topic and therefore provides the validating model for business model development. The business model canvas of Osterwalder and Pigneur (2010) is the most comprehensive and well defined of all reviewed frameworks, due to the strong theoretical background, and research done by Osterwalder (2004). Furthermore, the business model canvas is a tool suitable not only for services but also for traditional products. Therefore, in this research, the business model canvas is the part of methodology used due to its superiority and comprehensiveness over other frameworks.

Casadesus-Masanell (2011) states that the different descriptions of business models and detailed names like value proposition, profit formula and key resources inevitably help c-level executives to evaluate business models, but at the same time this type of categorization may become a constraint for developing radically different models as definitions impose preconceptions about what they should look like (Casadesus-Masanell, 2011). Casadesus-Masanell's viewpoint is partly shared by Chesbrough and Rosenbloom (2002), who found that incumbent companies many times fail to change the business model when new opportunity comes, due to the cognitive biases of management.

Finally, the previously reviewed frameworks do not deliberate the concept of value co-creation (Palo and Tähtinen, 2013; Grönroos, 2008), a dynamic and networked aspect of business model development which is relevant for the research at hand. Therefore, I will next introduce the concept of networked business models and then move on to the business model development process.

2.3 The networked business models

Due to the networked nature of transportation industry, in designing and developing a business model like MaaS, managers must not only understand internal resources, capabilities, products and services but also the networked market context the company is operating in (Todnem By, 2005). Palo and Tähtinen (2013) point out that developing the

cooperation networks is crucial especially when the final value proposition of a service is still to be shaped, and the position of a firm in the value chain to be determined. This means that the business model can help a company to indicate the profitable business opportunities by identifying the fit between internal firm specific competencies and resources, and those of potential companions, and the market demands.

To continue, Palo and Tähtinen (2013) note that research on networked business models, that is a specific type of business model where multiple actors are working toward one or more common goal, is extremely scarce despite the importance of network especially to the emerging business models that are based on new technology, innovations and evolving market trends. They view business model as a dynamic method for creation and planning business in a net of actors, rather than a static method for a single firm. The term “actors” is used to refer both to the companies and non-commercial organizations participating in the business network.

Also, for example, Lundgren (1995); Möller, Rajala and Svahn (2005) have recognized that successful development of technology-based services requires a wide network or ecosystem of commercial and non-commercial actors that provide both resources and activities needed for value creation to the end customer. As the first part of this literature review showed, the business model framework can be applied even to the complex business processes and logics and illustrate the value created and shared. In addition, a business model can be seen as an intelligent collective device (Doganova and Eyquem-Renault, 2009) that demonstrates the feasibility of a business opportunity and services as a facilitation platform for the network to exploit it.

Palo and Tähtinen (2013) bring up that networked business models alter from the traditional understanding of business models as they focus on the shared benefits for all within the business network. By leading and shaping actions not only within but also between companies, networked business models facilitate win-win arrangements which represent prerequisites for successful cooperation (Palo and Tähtinen, 2013; Storbacka and Nenonen, 2011). The concept of networked business models brings up an additional factor relevant to the development process of a business model: the model developed must

not only work for the organization itself but also be appealing to the other network or business ecosystem participants (Van der Valk et al., 2010; Gay 2014). The same authors crystallize that networked business models are based on the shared benefits in the contexts where companies take advantages of the capabilities, resources, innovations and products of each other.

Once the importance of the business network is understood, a question occurs: “How relevant networks are identified and entered to?”. McCarthy et al. (2007) propose that one way to get started is to use the personal networks of a company’s employees, organizational contacts and contacts of private individuals within the target industry. Also, e.g. Das and Teng (1998) and Ahuja (2000) note that personal social networks are a crucial part of the business and a way to reduce risk associated with collaboration. The reduced risk then again results in time and money savings that can be reinvested into business. However, right networks might not exist or the development of relationships might be held up by earlier business relationships. Thus, the question on identifying and entering relevant networks is incorporated into following discussion about different phases of business model development.

2.4 The process of business model development

The previous section concentrated on defining the concept of business model and discussing the purpose of it. It also briefly introduced the idea of networked business models that is relevant for the Mobility as a Service concept studied in this thesis. This section first discusses the ideal business model development process, after which it introduces relevant but limited literature related to business model development stages and their challenges. Finally, the process of networked business model development is discussed.

2.4.1 The idealised business model development process

In her thesis Kolehmainen (2017) notes that most of the academic literature seems to focus on generating idealised models and tools for business model development. Nevertheless, little attention has been given to the actual process of business model

development. This section aims to describe the current views on idealised business model development process before moving on to discussion on the networked business model development process relevant for the Mobility as a Service case.

Generally, processes are described either as linear or iterative and cyclical (Kolehmainen, 2017). However, the interrelated nature of business model makes it difficult to fit it into these common conceptualizations. To provide clarity and structure, some authors, such as Johnson, Christensen and Kagermann (2008) propose a simplified step-by-step approach.

According Johnson, Christensen and Kagermann (2008) the process of business model development has three steps: 1) identification of customer need to be satisfied, 2) generating a blueprint of how a company can fulfil that gap at a profit and 3) comparing new model to existing business model. They also claim that successful new business models are revised four times or so, and therefore patience is key. Johnson, Christensen and Kagermann (2008) advise to stay patient for growth, but hungry for profit as profit is the ultimate indicator of working business model, while Chesbrough (2010) talks about 1) determining the key areas for decision making, 2) identifying the available options and 3) making the decisions. Both processes described seem simple, but provide little guidance on for example how decision-making areas should be picked, and the amount of choices limited.

Dmitriev et al (2014), propose that the decision on where to start business model development may be determined based on the order in which emerging markets are explored and new innovations developed. The market pull exists, if a market gap is found before any product is filling it, in this situation the first step in the process would be identifying the market segments. Well done segmentation allows detailed customer need identification and development of relevant product or service. On the contrary, if service or product innovation happens before the market needs are understood, the case can be categorized as technology push and the first step should be the development of value proposition (Dmitriev et al, 2014). The logic here is reverse compared to the market push

situation where first the selling points of a service or a product are identified and then the relevant segments determined.

Even if Dmitriev et al. (2014) offer some guidance on how to get started with business model development, the problem regarding the overall process remains unsolved as there are many decisions to make and each of them affects multiple areas in the model. To continue, even in the situation of technology push the needs and requirements of the final customers must be acknowledged and taken into account when the value proposition is developed, otherwise the product or service will never fly on the market.

When it comes to value proposition development, the existing literature offers some advice. Johnson, Christensen and Kagermann (2008) suggest that to create the precise value proposition it is important to think about four common barriers that keep persons away from getting things done: wealth, time, skills and access. By tackling these issues new service providers can create real value to customer. Bettencourt and Ulwick (2008) propose job mapping as an alternative way for the value proposition development. This starts from breaking the customers jobs or tasks to be done into small, concrete steps, and then searching and finding means to make them simpler, quicker or completely redundant.

While developing the value proposition, understanding of the customer need has to happen not only on a superficial level but also at the level of hidden and subconscious needs and the value networks of customers (Witell et al., 2011). This is critical, since customers are well-informed about the products and services they consume and the alternative options available on the market. Thus, a firm should not only be aware about its own business model and offering but also understand the competitive standing and the overall trends driving the consumption habits on the market (Witell et al., 2011; Casadesus-Masanell, 2011).

Moreover, Casadesus-Masanell (2011) notes that despite the fact that companies have acknowledged the power of new business models, most of existing companies have not grasped how to compete through business models. Furthermore, in the development process managers should put effort on analysing how the new model interacts with other

models in the industry, as developing the business model in isolation leads to wrongful assessments of strengths and weaknesses thus leading to bad decision making.

A carefully developed business model creates a virtuous cycle, which over time results in competitive advantage (Casadesus-Masanell, 2011). To develop that cycle it is essential to acknowledge the dynamic elements of business models. Casadesus-Masanell simplifies that “a business model consists of a set of managerial choices and the consequences of those choices” (p. 103). Furthermore, according to him there are three types of choices: policy choices, asset choices and governance choices, which result in consequences that can be either flexible or rigid. Flexible consequences happen fast, for example decision to lower the price is likely to increase volumes immediately. Rigid consequences happen slow, for example a company culture that encourages to recycle, turn lights off and minimize printing at the office, is not likely to change immediately even if company’s executives make a choice towards a change. Therefore, rigid consequences are harder to imitate as those are typically build over time and substitution requires a lot of effort.

To continue, the choices made should be aligned with the overall organizational goals, so that they allow value creation and value capturing. Choices should be self-reinforcing and ultimately leading to the virtuous cycle and sustainable competitive advantage. For example, a fast-food company cannot offer food comparable to the restaurants as it would reduce the speed of delivery and act against the low-cost high-efficiency structure of a typical fast food chain. Lastly, Casadesus-Masanell (2011) points out that the third important characteristic of the business model is its robustness – an ability to be sustained and renewed over time. The robustness of a model is an important defending factor, as it prevents imitation, holdup possibilities of customers and suppliers, slack of organizational complacency and substitution.

In addition to mastering the basis of the business model competition, segmentation is an important step in the business model development process, as it allows a company to understand who are the customers worth pursuing (Yankelovich and Meer, 2006). When the target group is picked, the firm may evaluate the group’s perception of value and determine their willingness to pay. Furthermore, segmentation affects the firm’s resource

allocation (Freytag and Clarke, 2011; Osterwalder 2004), with the most relevant and potential group usually receiving most of the resources available.

Traditionally, segmentation has been based on psychographics, geography and demographics (Yankelovich and Meer, 2006). However, this segmentation is seldom applicable in the B2B markets and in her thesis Kolehmainen (2017) concludes that in general, available segmentation techniques provide little or no value when it comes to identifying the most lucrative markets. The problem of many segmentation techniques is that they require that initial segmentation of customers has been done and some data is available. Based on that data available the “re-segmentation” can be conducted. However, this approach may be unachievable for new business opportunities like MaaS.

A report by Boston Consulting Group (2008) suggests an alternative approach for segmentation, which focuses on the category involvement and is strongly linked to the value proposition that the company offers. Category involvement is a multidimensional segmentation measure that takes into account 1) the degree to which a consumer perceives the category important 2) emotional makeup, 3) values and 4) interests. Furthermore, this multimodal approach examines the time customers spend thinking about the product or service, reading, learning and finding information about it. Also amount of money used for discussing the product and shopping for it is measured or evaluated (Boston Consulting Group, 2008). Due to its holistic nature, this multidimensional approach has potential to reveal more accurate customer segments compared to the traditional approaches noted by Yankelovich and Meer (2006).

Finally, Freytag and Clarke (2001) submit that the segmentation alternatives offered are useful, but the exercise itself is highly context and firm-specific. Therefore, it can be concluded that current literature does not offer any self-explanatory framework for market segmentation in practice.

As soon as the value proposition and target customer group have been selected, the company must ensure that it is able to retain some portion of the revenue. This is referred to as value capture (Teece, 2010; Kaplan, 2012), which includes identification and estimation of cost, revenue and profit streams. Other areas of a business model that

require decision making are structure and positioning of the value network, key activities, customer relationship and engagement management, and competitive strategy (Chesbrough and Rosenbloom, 2002; Osterwalder and Pigneur, 2010), all of which are intrinsically interdependent on value proposition and segmentation picked. When the decisions on all areas have been made, managers should ensure that they represent a coherent whole that creates the virtuous cycle and reinforces the business model at the same time ensuring the continuity and competitive advantage of the business (Casadesus-Masanell, 2011; Teece, 2010). Finally, Johnson, Christensen and Kagermann (2008) propose that rules, KPIs and metrics are the last elements to emerge in the business model development process. This is due to the cyclical nature of the development process in which the new business model is typically refined four times or so.

2.4.2 Different development phases

Several studies have aimed to understand the phases of business model development. Morris, Schindehutte and Allen (2005) talk about specification, refinement, adaptation, revision, and reformulation; Kijl et al., (2005) about R&D, roll-out, and market phases. Moreover, Morris, Schindehutte and Allen (2005) propose that in the beginning, the business model is informal and implicit, nevertheless the process of trial and error transforms and limits the future direction of it.

Accordingly, Doganova and Eyquem-Renaul (2009) propose that the process of business model development usually originates from a trending market opportunity which offers multiple possibilities, but not many practical solutions to satisfy the customer need or apply new technology. By picking the path and limiting options, the actors set the development direction of a model and actual transition from the model to the business happens as a series of try-outs in the market. During those try-outs, also the potential partners are met, and the network of cooperation established (Doganova and Eyquem-Renaul, 2009).

2.4.3 The framework of networked business model development

Most of the previously examined studies consider business models to be focused on a single actor and also study the network of partners through that single “focal” actor. Kijl et al. (2005) admit the importance of a “focal” or a hub company to the development of the business model. Several leading companies indeed have opportunity to shape the development process of new business, but not necessary explicate the roles of other business network actors. The process of establishing the network or even an ecosystem is not easy, as all participants should be willing to establish a lasting relationship both with the central company and with each other (Möller, Rajala and Svahn, 2005; Håkansson and Olsen, 2012). Depending on the development phase, the roles of actors might change and evolve (Möller, Rajala and Svahn, 2005).

To simplify the complex multilayer structure of networked business models and their development, Palo and Tähtinen (2013) developed a framework that distinguishes two different levels of business models. The inner level is the firm specific level, on which the actors interact according to the rules specified in the elements of their own business model. The second layer is the “net or network” level where participants play and do business according to the collective business model. Palo and Tähtinen (2013) propose that a networked business model determines how a network of commercial and non-commercial organizations develops a joint understanding of market opportunities and exploit them together. The figure 1 crystallizes the main idea.

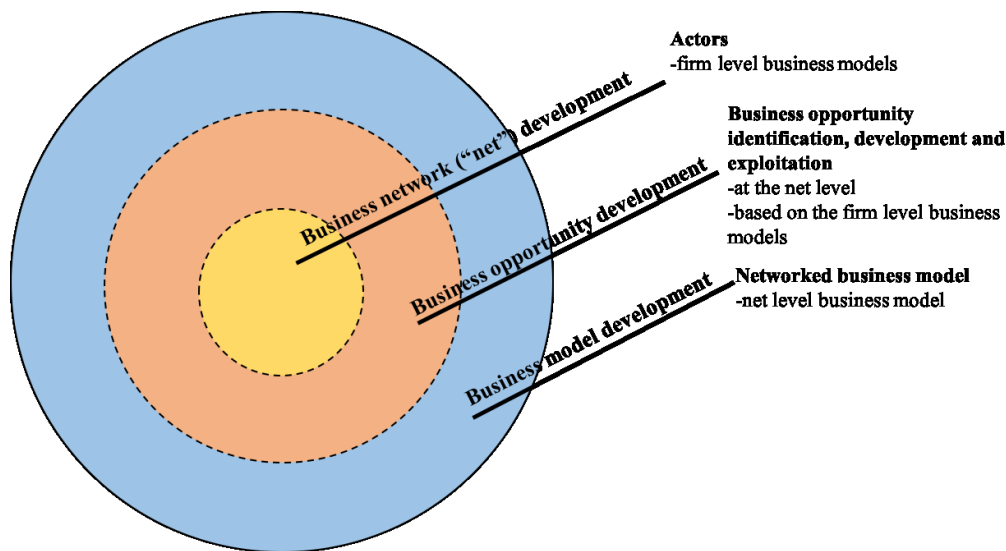


Figure 1. Elements of networked business model development, adopted from Palo and Tähtinen 2013

The networked business model development process is continuous in its nature, as various business model elements influence each other through learning and involvement of participants (Chandra, Styles and Wilkinson, 2012). The future actions and the development of a networked business model are shaped by past failures, current successes and future opportunities, thus all time dimensions co-exist in networked business model development (Chandra, Styles and Wilkinson, 2012).

Service development phase

The development begins from service development phase. During the service development phase both services and technology are developed in close collaboration between network participants. The business model of the future is being developed already in this stage, which helps the network or business ecosystem participants to find their place in the emerging business. At this stage, the business opportunities are mainly seen through the “what is technologically possible” perspective (Palo and Tähtinen, 2013).

Pilot Phase

Service development phase is followed by the pilot phase during which the end user testing takes place. In addition, during this phase business opportunities are iterated and written down, but they still might be at an abstract level. This happens because, identification and development of opportunities is largely dependent on the network

participants' current business models and opportunities (Palo and Tähtinen, 2013). In other words, the participants might be cognitively bounded and biased. Therefore, Palo and Tähtinen propose that a networked business model needs "an entrepreneurial actor" who cultivates the innovation and entrepreneurial spirit and develops the network. However, since their study is a single case study, they admit that the need of entrepreneurial actor or actors cannot yet be confirmed, but it seems to be important and beneficial.

To continue, networked business model is great model for exploiting the market and achieving the first-mover advantage. Christensen et al. (2005) note that despite that the first-mover advantages are stronger in disruptive technologies, established companies rarely act on them as the size of an emerging market rarely matches the size of larger, and can meet the short-term growth and meeting profit requirements that incumbent seek. This proposition is known as an innovator's dilemma. The dilemma provides space for new emerging businesses to enter the untapped market before the established companies have enough courage to come. For that purpose, the networked business model is an efficient way, as it allows sharing resources and capabilities between the net participants (Palo and Tähtinen, 2013).

Market Phase

The last development phase described by Palo and Tähtinen (2013) is the market phase. During the market phase the service is commercially used and roles of network participants defined. Nevertheless, researchers emphasize the importance of the central or "focal" actor during the market phase. The central actor shapes the common understanding about the shared business model and is important for the future success (Palo and Tähtinen, 2013). At the market phase opportunities that are exploited are mainly related to the network architecture, technology and the market offering (Mason and Spring, 2011) and responsibility for finding these opportunities is distributed among the network participants.

2.4.4 Conclusion on the networked business model development

The phases presented by Palo and Tähtinen (2013) facilitate the understanding of idealized networked business model development process, which is relevant for a networked business model like Mobility as a Service. Nevertheless, in reality, the individual phases are hard to separate, and instead they overlap and are iterative in their nature. The central point of the research by Palo and Tähtinen (2013) can be summarized into three propositions, which are summarized in figure 2 below.

1. A focal company, and entrepreneurial actor(s) facilitate the evolvement of the business network. As the network evolves, the shift from one phase to another happens.
2. During the development process, identified market opportunities play a central role and shape the evolution of actors and their roles.
3. The firm-level business models guide the process of a networked business model development. Firm-level models facilitate the identification and evolvement of business opportunities and create the mutual understanding of opportunities to be exploited.

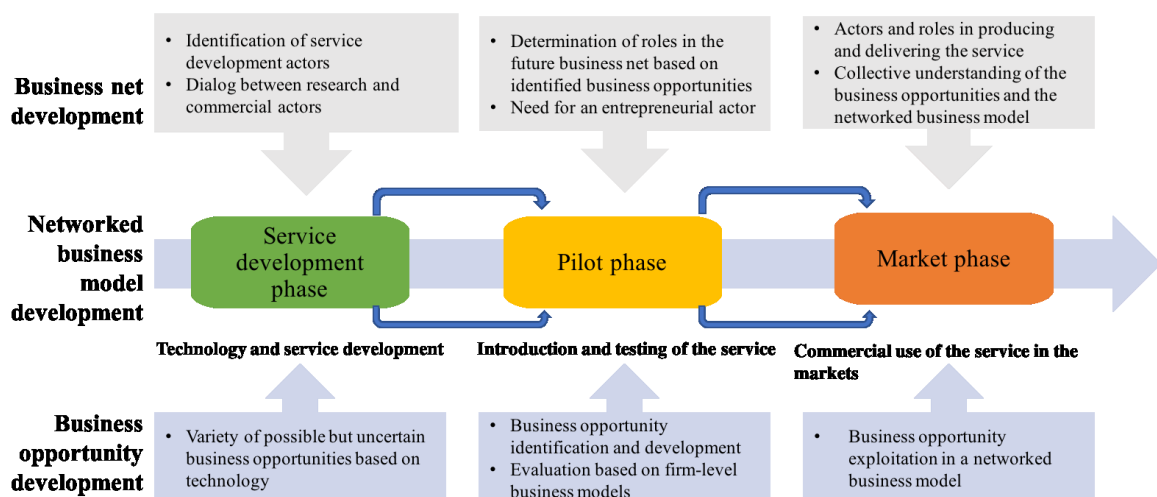


Figure 2. The phases of networked business model development, adopted from Palo and Tähtinen (2013)

While many authors have examined the business model development process (e.g. Teece, (2010); Chesbrough, 2010), Palo and Tähtinen (2013) focused on the networked business

model development and the business opportunities related to it. Their research shows that the formation of the business networked business model starts already in the service development phase (Palo and Tähtinen, 2013; Storbacka and Nenonen, 2011). Therefore, it can be argued, that a business model is an evolving concept rather than the final product of the development process (Palo and Tähtinen, 2013). Furthermore, the development process is iterative instead of linear, it happens not only on the firm and network levels, but also along two different development dimensions – the business net and the business opportunity, showed as the top and bottom boxes in the Figure 2.

Overall, a networked business model enables the creation of the service development net and supports the evolution of that net towards the real business net. During the process, the business model itself transforms through the interaction with the different actors (Doganova and Eyquem-Renault, 2009; Palo and Tähtinen, 2013). Moreover, it is important to understand that a business model exists not only at the firm level, but also at the net level. Through coordination and combination of actions of different actors, the net level business model enables development of a service that is based on emerging technologies and social trends.

To get started and attract the relevant actors, managers should identify the needed resources and capabilities in the service development stage. A networked business model has even power to open window of opportunity for entirely new actors. As the process gets forward, the actors can be added or removed based on the identified business opportunities. In addition to having the focal company that orchestrates the network, it is important to have actors with the entrepreneurial spirit. The managers of an orchestrating company should take care that the development of service happens simultaneously with the business opportunity development, otherwise the new service risks to be neglected by the market (Palo and Tähtinen, 2013).

Prior literature has emphasized the role of individuals in spotting and exploring business opportunities (e.g. Shane and Venkataraman, 2000). The study of Palo and Tähtinen (2013) suggests that entrepreneurial actions might be distributed among the company and the network. This point of view is also supported by Chandra, Styles and Wilkinson

(2012), who emphasize the importance of network when developing business opportunities.

Finally, developing the emerging business model is a cumbersome task for companies and managers, and therefore acknowledging the three development phases might help to make sense of the process. Moreover, prior to embarking to the collaboration with other business actors, managers should first understand their own business model inside out (Johnson, Christensen and Kagermann, 2008; Casadesus-Masanell, 2011; Palo and Tähtinen, 2013).

2.5 Theoretical framework

The goal of this study is to understand how a new business model, Mobility as a Service, is developed in Finland. In this section I present the main findings of the literature review and based on them propose a theoretical framework for the development of an emerging networked business model.

Value creation, value delivery and value capture are shared elements of several business model frameworks (Kaplan, 2012; Johnson, Christensen and Kagermann, 2008; Chesbrough and Rosenbloom, 2002; Osterwalder and Pigneur, 2010), and therefore used as overarching terms in my framework, which is presented in figure 3 below. Value creation explains what and to whom a company offers value, value delivery clarifies how the value is delivered, and value capture describes the financial in and outflows of a company (Kaplan, 2012). Furthermore, Palo and Tähtinen (2013) note that a networked business model is not static, but rather dynamic and evolving in its nature with its elements being iterated through the process of trial and error. This dynamic nature of business models is represented with the iteration cycles along the X-axis of my model.

Researchers have recognized that successful development of technology-based services, like MaaS, requires a wide network or ecosystem of commercial and non-commercial actors that provides both resources and activities needed for the value creation to the end customer (Palo and Tähtinen, 2013; Lundgren, 1995; Möller, Rajala and Svahn, 2005).

The Y-axis of my framework represents the increasing number of actors involved in the business model. Furthermore, as the number of actors increases, firm-level business models evolve towards the networked business model.

Doganova and Eyquem-Renaul (2009) propose that the process of business model development usually originates from a trending market opportunity which offers multiple possibilities, but not many practical solutions to satisfy the customer need or apply new technology. This condition holds true to Mobility as a Service, the case studied in this thesis. By picking the path and limiting options, the actors set the development direction of a model.

In the theoretical framework, the blue square represents the starting point of development. In the beginning, there are many firm level business models, that are independent of each other. Researchers propose that before embarking to the endeavour of developing a shared business model, managers should understand their own prevailing business models and their structural linkages inside out (Johnson, Christensen and Kagermann, 2008; Casadesus-Masanell, 2011; Palo and Tähtinen, 2013).

As the development process of a networked business model is continuous in its nature, various business model elements influence each other through learning and involvement of participants (Chandra, Styles and Wilkinson, 2012). This learning and involvement process facilitates identification of opportunities, their development and exploitation. In my framework, the yellow area represents the pilot phases of business model development where learning and involvement happens. In addition to learning, during that phase the roles of participants are tentatively defined and a focal company and entrepreneurial actor(s) chosen (Chandra, Styles and Wilkinson, 2012; Palo and Tähtinen, 2013; Casadesus-Masanell, 2011).

The actual transition from the model to the business happens as a series of try-outs in the market. During those try-outs, also the potential partners are met, and the network of cooperation established (Doganova and Eyquem-Renaul, 2009). In the theoretical framework, this market phase of development is portrayed in orange. In this phase, the

roles of actors become defined and new opportunities are explored through a shared networked business model (Palo and Tähtinen, 2013).

It is important to acknowledge that the future actions and the development of networked business model is shaped by past failures, current successes and future opportunities, and therefore all time dimensions co-exist in networked business model development (Chandra, Styles and Wilkinson, 2012). As the model reaches the networked business model stage, the development does not stop, but instead the iterations continue, and the model scales up to the next level. Therefore, I propose that the networked model is followed by the unknown business model phase, characteristics of which my empirical research might reveal.

Business model evolves from static firm level business model to dynamic network level business model through continuous iterations

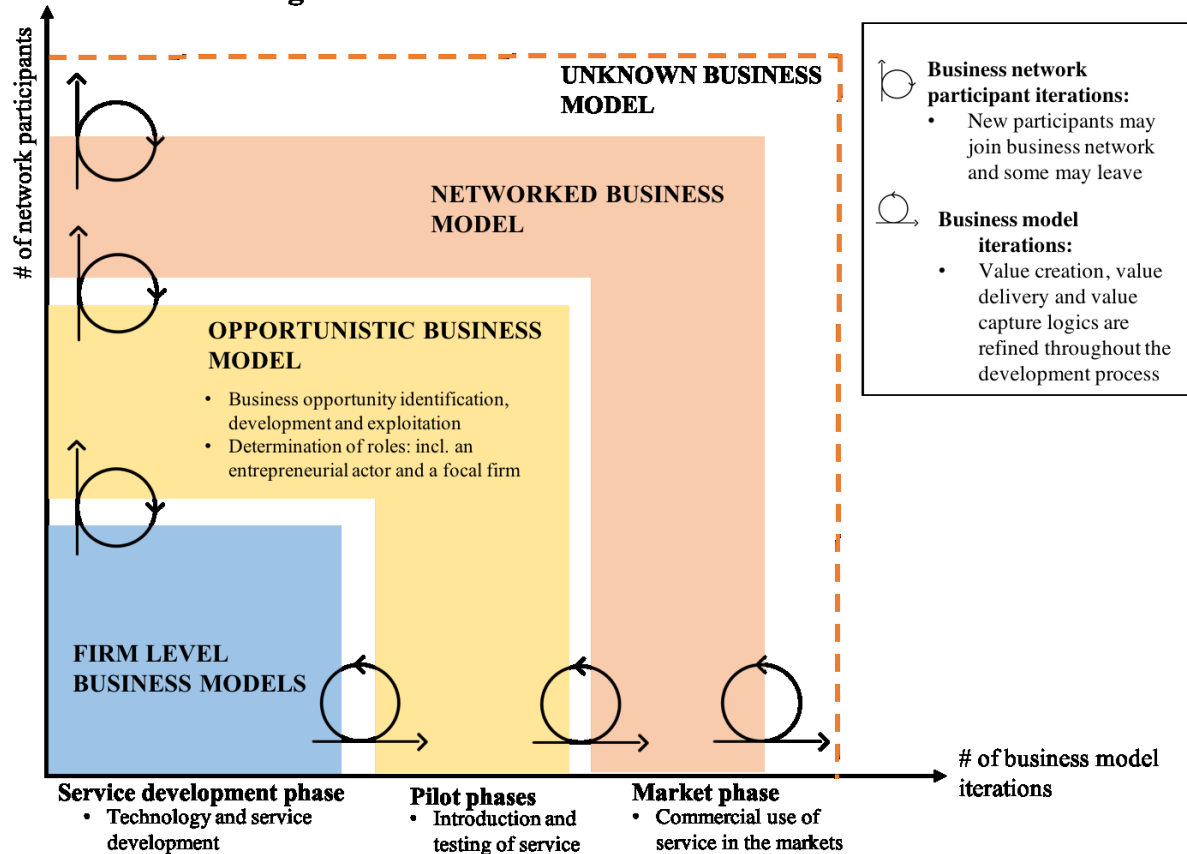


Figure 3. The theoretical framework

3 RESEARCH CONTEXT

This chapter describes the case studied - Mobility as a Service. I first define the concept of MaaS and illustrate the business ecosystem of it. Then I present the business models described so far in the MaaS literature and present identified pros and cons of MaaS. Finally, I discuss travellers' motivation to adopt such new mobility service.

3.1 Definition of MaaS and business ecosystem description

In the context of my research a unique single case studied is: Mobility as a Service business ecosystem in the Helsinki region. Here the term business ecosystem is used to describe a set or network of companies, that together produce an integrated, technological service system that creates value for customers (Bahrami and Evans, 1995; Basole, 2009; Lusch, 2010; Teece, 2007). Companies in the ecosystem work cooperatively as well as competitively in order to “co-evolve” capabilities to create innovative products and services (Moore, 1993).

The definition of Mobility as a Service is still under construction as little real-life evidence exists (e.g Kamargianni and Matyas, 2017; König et al., 2016; Jittrapirom et al, 2017). The so-called father of MaaS, Sampo Hietanen, originally defined the concept as a combination of different transportation (mobility) modes to offer a personalized mobility package to the end user. The end user might be anyone in need to move from place A to B. In addition to the journey itself, MaaS offers other complementary services, such as journey planning, reservation, and payments, through a single platform interface (Hietanen, 2014). Three years later Hietanen (2017) added that MaaS can be described as the final product of the digital disruption in the area of transportation.

In order to better understand the concept of MaaS and potential business models related to it, I will next discuss how different stakeholders contribute to the larger business ecosystem and also introduce the ecosystem studied in this research. In the context of MaaS, achieving scalable operations becomes impossible within one organization, as the amount of needed transportation and logistics services is huge, especially when it comes to international MaaS services. That is why the concept of MaaS is based on a business

ecosystem thinking where different types of actors contribute their core businesses to the ecosystem, adding value to the final MaaS offering (Holmberg et al., 2016).

The vision of MaaS is to see the whole transportation sector as a cooperative entity where players at the different levels are interconnected and provide services that reflect the customer’s specialized needs, combining different transportation modes such as public, private and shared services together (König et al., 2016; Kamargianni and Matyas, 2017; Holmberg et al., 2016). In addition to transportation modes and logistics services, the business ecosystem of MaaS can be seen as a network of a sheer number of interconnected participants benefitting from each other’s services. The guiding idea behind such ecosystem is utilizing the already existing mobility capacity more efficiently rather than only improving the existing public transportation system (König et al., 2016; Kamargianni and Matyas, 2017; Holmberg et al., 2016). Figure 1 below presents the possible structure of the ecosystem and shows how different offerings of participants relate with each other.

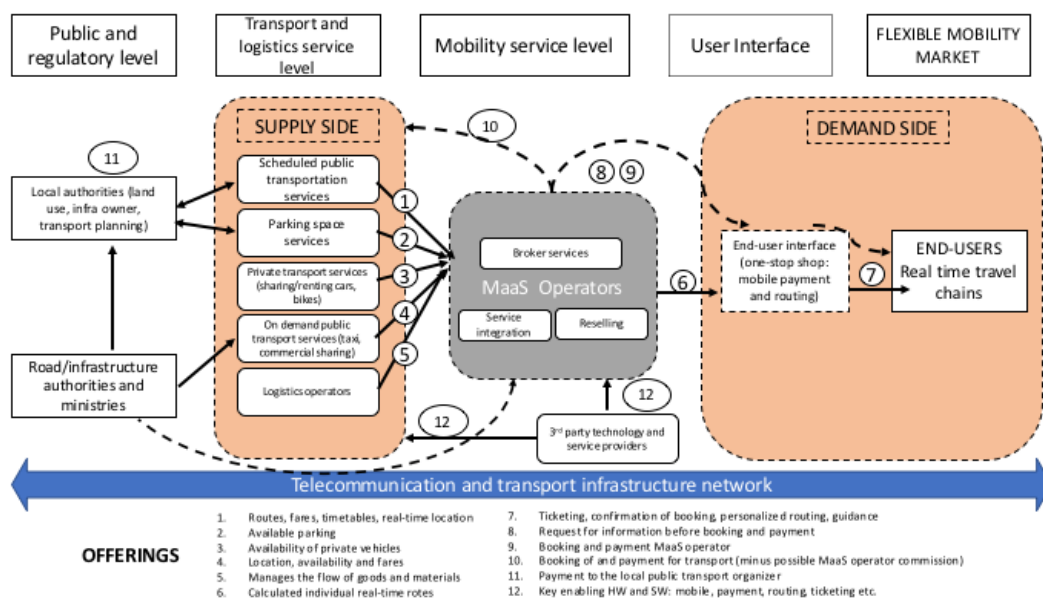


Figure 4. The structure of MaaS Business Ecosystem, adopted from Aapaoja, A., Sochor, J., König, D. and Eckhardt, J. (2016).

The upper line of the figure represents different levels of the ecosystem. Public and regulatory authorities play an important role in this ecosystem as they dictate the plans

and laws related to transportation and land use. Supply side consists of different transportation and logistics services that offer their services to the “Mobility service level”. Finally, demand side can be seen as a flexible mobility market where end-users interact with MaaS service operators through a user interface such as smartphone. In addition, the ecosystem needs a working telecommunication and infrastructure network enabling the seamless flow of information within the network.

It can be observed that the MaaS operator is actually the only new player in the ecosystem that has been long existing in the transportation sector. Nevertheless, it is unclear how the role of different players will change (König et al., 2016; Kamargianni and Matyas, 2017). More specifically, a transportation and logistics service provider or a public authority might become the MaaS operator and therefore have multiple roles in the ecosystem. To understand how different operation models are developed, I decided to examine the Mobility as a Service business ecosystem in the Helsinki region in my research. The ecosystem is depicted in figure 2 below.

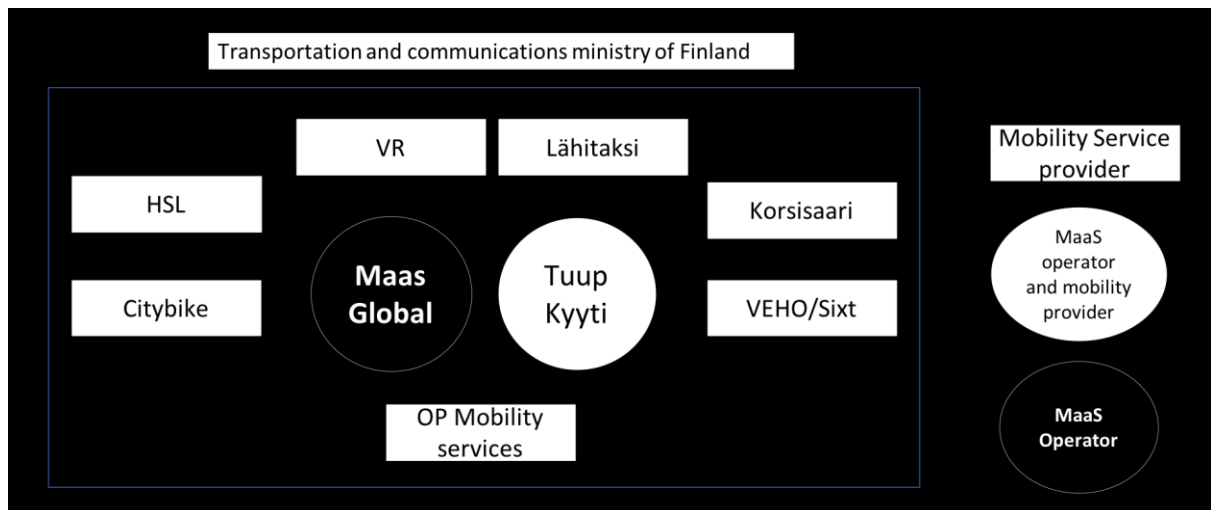


Figure 5. Research context

Due to the broadness of the Mobility as a Service concept, it is impossible to research an entire phenomenon in the limits of this study. Therefore, I framed my research to the Helsinki area ecosystem where I live and where the concept of MaaS is most broadly developed in Finland. Nevertheless, as MaaS aims to provide also a possibility to combine intercity and even intercountry travels, a complete MaaS ecosystem could possibly consist of tens of smaller MaaS ecosystems that are connected by an orchestrating MaaS

provider (Kamargianni and Matyas, 2017) or an agreement allowing usage of each other's application programming interfaces (APIs).

As Figure 5 shows, the studied ecosystem consists of different participants: service aggregators, mobility service providers and hybrid combinations of both. Together, all these entities represent a single case that is studied in my research, in which different types of participant are treated as subunits of analysis. According to Yin (2003), subunits provide opportunity for more extensive analysis and therefore improve the understanding of the case. Overall, the benefit of a single case study is that it allows examining details, such as specific links between events, environment and actions (Hirsjärvi and Hurme, 2004). Moreover, this type of single case study can be used as a trial for the broader multi-case study (Yin, 2003) and therefore serve as an avenue for a broader longitudinal Mobility as a Service study.

The subunits of analysis were chosen based on pre-research that aimed to identify key MaaS players in the Helsinki area. The materials used for the pre-study included recently published media, articles and orienting interviews with professionals from Finnish transportation industry. To gain even deeper understanding of the case, also a representative of the Ministry of Transportation and Communications of Finland was interviewed. Table 1 below presents the complete sample of companies and organizations studied.

Table 1. Description of researched organizations

Name of the company/Organization	Type of mobility service provided	Area of operations
MaaS Global	MaaS market platform operator	National and international
Tuup-Kyyti	MaaS market platform operator and on demand car sharing	National and international
Osuuspankki (OP)*	Long-term car rental, mid-term car rental and free-floating cars.	National
VEHO/Sixt	Car rental services. Sixt is operated by VEHO.	National
Lähitaksi	Taxi services	Great Helsinki area
Korsisaari	Long distance bus services	Great Helsinki area
HSL/Citybike	Public transport operator. Citybike provides its services in cooperation with HSL.	HSL-Great Helsinki area, Citybike- Helsinki area
VR*	National rail services	National
Ministry of Transportation and Communications, Finland	Government entity - the ministry is responsible for the oversight of Finland's transportation network and communication services.	National

*Osuuspankki (OP) and VR have piloted own MaaS services in 2017

3.2 Influencing travellers' motives to adopt new mobility services

More flexible and sustainable urban mobility has been identified as one of the most challenging issues of the future (Van Audenhove et al., 2014), and MaaS has potential to facilitate the move away from fossil-fuelled vehicles to the more sustainable travel modes. However, despite the fact that people often have positive attitudes and plans towards change, transforming intentions to sustainable practices remains difficult (Strömberg et

al., 2016). That is why in this chapter I briefly discuss the possible motives of travellers to adopt such new mobility services and introduce the importance of the trials as a facilitator of long term adaptation.

In order to understand the effect of trials, Strömberg et al., (2016) examined two successful mobility trial initiatives conducted in Gothenburg, Sweden. Both travel initiatives managed to change the behaviour of trial participants to more sustainable. During the Testcyklisterna project, 40% of participants replaced their automobile journeys with bicycling and respectively in the UbiGo MaaS trial project participants reported 50% reduction in car use.

Researches noticed that trials provided the participants space where they were able to safely test new services that they otherwise would not. Furthermore, people are not likely to try a new transportation offering if the uncertainty related to compatibility with their everyday activities and conditions is too high. Thus, it can be argued that the service offered must work very smoothly and offer possibility to revert things as they were in the beginning. In addition, trials add value because of the unpredictability of travel habits. For example, in the UbiGo project, the researchers Sochor, Strömberg and Karlsson (2014) reported that most participants experienced positive surprises and experienced new transportation services not as they were beforehand predicted.

To continue, Strömberg et al., (2016) propose that well-designed trials are the central catalyst of change. Trialling is not only about piloting if the specific solution might work, but rather the strategic tool to make people radically change their travel habits in the long term. According to the researchers, “the ease with which the participants could gain a taste of the travel behaviour about which they were curious”, is the single most important success factor of trialability.

3.3 Business Models of MaaS

In this section I aim to describe different MaaS service combinations in different geographical areas and their business models. Table 2 below provides a summary of

König et al. (2016) research project that focused on discovering the business and operator models for MaaS. The different geographical areas discussed are urban, suburban, rural, national and international. For the purpose of categorization, I used three categorization elements that are typical for business models: value creation system, value proposition and revenue model. These elements provide a big picture about the value of the service and its business logic - however, to understand the business model in more detail also other elements such as costs, customer segments and customer relationship would be beneficial to study. These elements are also presented in the business model canvas (Osterwalder and Pigneur, 2010) discussed in the end of this section.

Table 3. Business models of MaaS

	Value creation system	Value proposition	Revenue model
MaaS in urban areas	<ul style="list-style-type: none"> • MaaS operator • car sharing • bus • taxi • bikes • public ferries • subway • trams • local trains 	<ul style="list-style-type: none"> • Reduced use of private cars • Reduced emissions enhanced urban planning, • sustainable low carbon mobility, • fit for purpose services (individual preferences, priorities, constraints and needs & small parcel deliveries) • Multimodal one-stop-shop (intermodal services, planning, booking, payment at the same place) 	<ul style="list-style-type: none"> • Pay per use • Monthly commuter package • All-in one package with highly customizable services and offerings

	Value creation system	Value proposition	Revenue model
MaaS in suburban areas	<ul style="list-style-type: none"> • MaaS operator • car sharing • bus • taxi • bikes • public ferries • subway • trams • local trains 	<ul style="list-style-type: none"> • No need for second car fit for purpose services (individual preferences, priorities, constraints and needs & small parcel deliveries) • Integrating private transport with public services in city areas (Park & Ride, demand responsible transport, integrated routing, booking and planning.) 	<ul style="list-style-type: none"> • Pay per use • Monthly commuter package • All-in one package with highly customizable services and offerings

	Value creation system	Value proposition	Revenue model
MaaS in rural areas	<ul style="list-style-type: none"> • MaaS operator • (private) car sharing • bus • taxi • social services • parking lot • (local) trains 	<ul style="list-style-type: none"> • Increased efficiency and utilization of public transportation services and supported transport services • Sustaining current services • Accessibility for different groups of users • Fit for purpose services (individual preferences, priorities, constraints and needs & connection to long haul trains/busses, & combined passenger and parcel delivery) • Integrating public transport with public and social services (library services & small patch food and medicine deliveries) 	<ul style="list-style-type: none"> • Pay per use • Monthly commuter package • All-in one package with highly customizable services and offerings

	Value creation system	Value proposition	Revenue model
MaaS on national and international levels	<ul style="list-style-type: none"> • MaaS operator • car sharing • bus • taxi • planes • public ferries • subway • trams • local trains • events • accommodation • leisure 	<ul style="list-style-type: none"> • One-stop-shop for all travelling services • Comprehensive service offering for travelers who seek broader service offering • Door to door travel services combined with entertainment services • To fulfil the ultimate need and objective for travelling • Fit for purpose services (individual preferences, priorities, constraints and needs & long and short haul travels & mobile payment and ticketing) 	<ul style="list-style-type: none"> • Negotiated service ticket • Case specific pricing

It can be observed that the value systems of different geographical areas have shared elements, but as we move away from cities, the amount of additional services increases. The value proposition element changes the most depending on the geographical area, as potential of MaaS to replace a private car is also highly dependent on the location. Finally, the revenue model seems to have three shared characteristics: pay per use, monthly package and all-in-one tailored package. The literature review of this work proposes that the business model of an emerging business is iterated continuously, therefore the revenue or the value capture (Kaplan, 2012) logic of MaaS is also likely to become much broader as time passes.

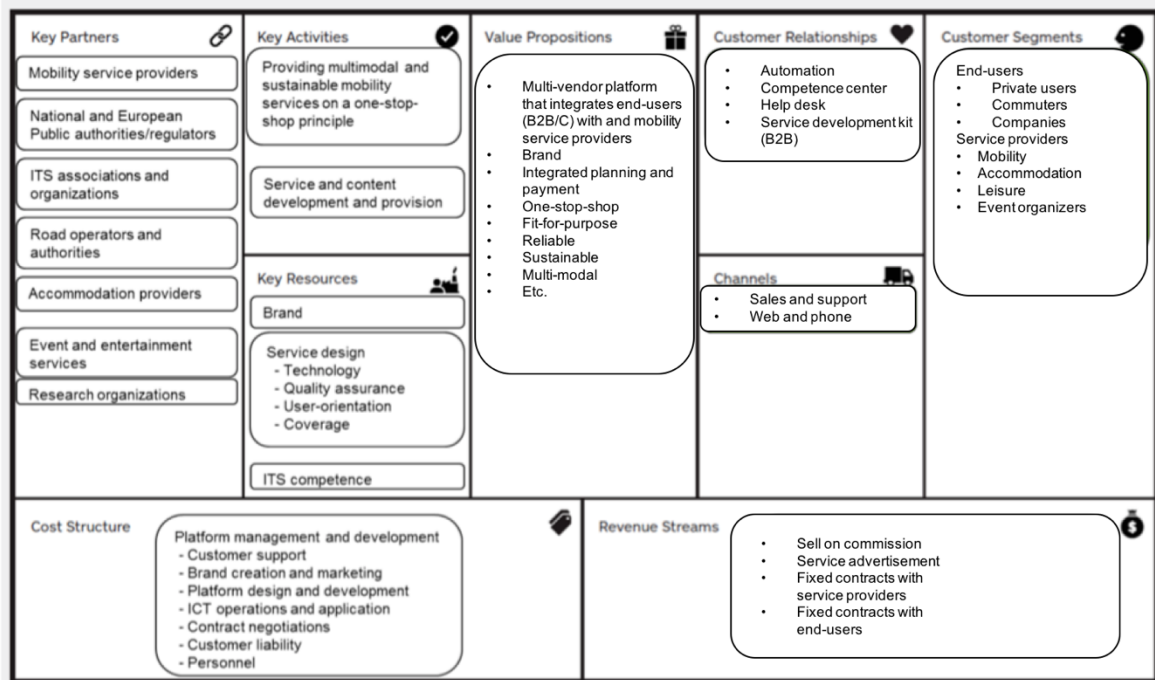


Figure 6. The business model canvas of MaaS (König et al., 2016)

The filled business model canvas (Osterwalder and Pigneur, 2010) above in figure 6 provides a holistic picture of the current view of the MaaS business model (König et al., 2016). This view is also shared by Holmberg et al., 2016 who focused on describing the framework for MaaS. In my research, I will try to broaden this canvas and present the updated version of this figure in the discussion section of this paper.

4 RESEARCH METHODS AND DESIGN

In this chapter, I introduce the methodology of my research. I begin by explaining and justifying my research approach. Then research methods such as data collection and analysis are discussed. Finally, I conclude by evaluating my research from the quality and ethical perspectives.

4.1 Research approach

Research philosophy creates the base and connects all research methods that the researcher chooses to use (Eriksson and Kovalainen, 2011:10). To understand why I have made particular choices to my research design, I will next reveal philosophical assumptions that guided my overall approach to the research process.

I aspired to produce information applicable to the business world, and my philosophical research assumptions are best reflected in the critical realist view. Easton (2010) summarizes that “The most fundamental aim of critical realism is explanation”, specifically, the critical realism research often aims to explain “What caused the events associated with the phenomenon to occur” (Easton, 2010). Critical realist researcher aims to picture the world as accurately as possible and therefore is particularly well suited for case research that is relatively clearly bounded, but studies complex phenomena (Easton, 2010). As a phenomenon, MaaS is surrounded by many uncertainty factors and therefore from a knowledge-creation point of view, critical realism is more rational and suitable than the more constructivist approaches.

From an ontological point of view critical realism assumes that there is hard to capture reality “out there” independent of observers (Easton, 2010). That is why we will always guess the nature of the real world depending on our personal expectations and beliefs (Gray, 2013). Critical realism recognizes the empirical events that we can observe and record, and events that are created by the real world. By accepting that reality is partly socially constructed, the critical realist knows that “the real world” breaks through at

some point and alters our complex interpretations about the research situation in case (Easton, 2010).

My approach was inductive in its nature, it pursued to develop theoretical ideas, concepts and questions based on the empirical data collected. The inductive approach is applicable when little prior theory exists as the central topic is new. In addition, inductive approach is valid for qualitative research that requires flexibility and aims to understand the focal topic very closely (Saunders, Lewis and Thornhill, 2009).

Inductive analysis is a systematic process that analyses a qualitative data set using specific objectives. These objectives are typically determined by the research question of a study and the whole process can be divided into three steps. First, the original raw data is summarized into a unified and approachable format. Then, the summarized data and research objective is linked in a transparent and defensible way. Finally, the empirical observations from the raw data are developed into a model or a framework (Saunders, Lewis and Thornhill, 2009).

To continue, I used the case study methodology (e.g. Eisenhardt, 1989; Yin, 2003), because it is an appropriate research strategy when examining complex and unstructured business issues, which are difficult to study with quantitative methodologies (Ghuri and Grønhaug, 2005; Easton, 2010). Eisenhardt (1989) indicates that case study does not necessarily rely on a previous empirical evidence or literature and is a relevant research approach for areas where little prior research exists. All of previously mentioned characteristics are relevant for my case in focus, Mobility as a Service ecosystem in the Helsinki region. Aside from many advantages of case study approach, it must be noted that building theory based on the case study inherits some weaknesses. The theory created might be overly complex, or narrow and idiosyncratic (ibid).

To proceed, Harre (1979) developed the distinction between two research designs typical for case studies: extensive and intensive. The later aims at finding out as much as possible about one or a few cases while the former focuses on mapping common properties and patterns between several cases. The nature of my study is intensive, as it focuses on building a holistic and thick description of a single case, Mobility as a Service ecosystem

in the Helsinki region. Researcher's own interpretations play a central role in intensive case studies, as thick description refers to the verbal interpretation of details and reasons behind the complex details of the case (Eriksson and Kovalainen, 2011:119).

Finally, Dyer and Wilkins (1991) presented that “the overall purpose of intensive case study research is to construct a rich narrative, ‘a good story worth hearing’” rather than producing generalizable knowledge. Intensive research focuses on understanding a specific unit of analysis and therefore the case is examined in its natural setting, usually over a certain period of time. My case represents a specific unit of analysis, but is limited to the snapshot of the current state due to the short time span of master’s thesis work. Nevertheless, Eriksson and Kovalainen (2011:121) state that the uniqueness of the case justifies the intensive case study approach rather than its generalizability to other contexts.

4.2 Data collection

For the purpose of this research, empirical data was collected through semi-structured interviews and recently published media articles. Semi-structured interviews are appropriate both for “how” and “what” type of research questions (Eriksson and Kovalainen, 2011:82) and therefore suit well for my research. In addition, semi-structured interviews are appropriate when researching a novel topic, the benefit of a semi-structured interview is that it provides researcher flexibility to ask additional questions and gain more intensive understanding about the topic like MaaS (Hirsjärvi and Hurme, 2004).

Eriksson and Kovalainen (2011:126) point out that “case studies are usually considered more accurate, convincing, diverse and rich if they are based on several sources of empirical data”. Therefore, to triangulate my data I examined recent media publication and reports published in Finland, thus improving the reliability of my study.

Interview questions were developed inductively in cooperation with my supervisor and based on academic literature about MaaS and the research objective of this study. When developing the interview guide the main focus was on formulating questions that are broad and allow the interviewee to reveal as much information as possible. The guide had

three types of questions: 1) Profile questions for all participants, 2) Platform provider questions used when interviewing potential orchestrators of Mobility as a Service ecosystem, and 3) Questions for MaaS ecosystem players providing different transportation services such as public transport, taxis, trains and shared cars. Also, the business model canvas (Osterwalder and Pigneur, 2010) was included in the interview guide as a reminder about areas to be covered for the sake of answering the original RQ. Nevertheless, the order of the questions was kept flexible in order to maintain the conversational nature of the interview. The complete interview guide can be found as an appendix 2 in Finnish and appendix 3 in English.

In total nine semi-structured interviews were conducted during September-October 2017. I recruited the interviewees by approaching them personally through email. As stated earlier the relevant organizations were chosen based on pre-research and the interviewees chosen from inside the identified organization. The selection criteria were that interviewee either has experience from MaaS or is directly responsible for the development of new mobility services. In addition, during the interview process I asked some participants to suggest relevant people to interview. All nine interviews were conducted in Finnish language, as according to Hirsjärvi and Hurme (2004), a common language between the researcher and interviewee should be used whenever it is possible. This approach improved the overall interview quality in several ways: it ensured that the nature of conversation remained relaxed, as interviewees were allowed to use their native language, and it helped to minimize the chance of misunderstandings due to language barriers.

The interviews lasted between 30 to 75 minutes, all of them were recorded and later transcribed for the analysis purpose with the permission of interviewees. All except one of interviews were conducted as face-to-face meeting either in the interviewee's offices or at a public cafe, one interview was done via Skype. In addition, two persons participated in the interview of VEHO/Sixt. All interviewees gave permission to publish their names, however the anonymity of interviewees was respected and all direct quotations were checked with the interviewees before publishing this work. The complete list of interviewees is presented in the Table 2 below.

Table 3. Interviewees

	Name	Company	Position
1	Affe Tavasti	VEHO/Sixt	Development Manager, Mobility Services
2	Antti Korsisaari	Korsisaari Oy	CEO
3	Juha Pietikäinen	Lähitaksi Oy	CEO
4	Krista Huhtala-Jenks	Ministry of Transportation and Communications, Finland	Minister adviser, Digital services and MaaS
5	Mari Flink	HSL	Director, Customer Experience and Sales
6	Nicholas Zaeske	VEHO/Sixt	Head of Mobility
7	Pekka Möttö	Tuup-Kyyti	CEO
8	Petro Tamminen	VR Group	Business Owner, New mobility services
9	Sampo Hietanen	MaaS Global	CEO
10	Sonja Heikkilä	OP	Program Director, Mobility services

The comments of interviewees used in this thesis were translated from Finnish to English as accurately as possible. Nevertheless, loss of meaning might have occurred in the translation and interpretation processes. To ensure the reliability of used quotations, I checked the accuracy of them with interviewees.

4.3 Data analysis

There are two main data analysis strategies Yin (2002). In the first, the coding system is developed deductively based on pre-formulated theoretical propositions. In the second,

the process starts with case development that leads to a formulation of research questions and a framework (Eriksson and Kovalainen, 2011:129).

In my study, I followed the later interpretative strategy as my main interest was to analyse themes, categories, activities and patterns that I detected from the natural variation of empirical data. This inductive-oriented strategy for case material analysis is also supported by several researchers (Eisenhardt, 1989; Dyer and Wilkins, 1991), and allowed me to revise and reformulate my research question as new data patterns emerged.

Even though my analysis was not based on the pre-given theoretical framework I used theoretical concepts related to business ecosystems, networked business model development and platform theory to sensitize empirical data as advised by Blumer, (1969) and Eisenhardt (1989). This type of abductive logic (e.g. Dubois and Gadde, 2002; Shank, 2002) helped me to analyse the central features and meanings embedded into my data.

Practically, I first transcribed all my interviews manually and developed a general interview narrative. Later to identify and group the common patterns in my data, I used thematic-coding analysis method. Thematic coding is an appropriate method when analyzing semi-structured interviews and allows research to structure the data in a logical way (Hirsjärvi and Hurme, 2004). I allowed my coding to emerge naturally instead of forcing it to emerge, which is a typical practice for the qualitative research (Kolehmainen, 2017). The coding process was done with the help of Atlas TI software which enabled linking quotes and codes together. All together I developed 30 different codes for my data and marked 317 relevant quotations.

After completing my coding process, I grouped the codes under bigger themes that served as a guiding structure of my findings chapter. In the end, I synthesized data to narrative form and developed a revised theoretical framework. During that process media, publications, and available reports were used to validate findings and fill potential gaps in the data.

4.4 Research evaluation

Eriksson and Kovalainen (2011:291) point out that the quality and trustworthiness of research should be actively evaluated during the research process and not only at the end of it. Adopting the explicit evaluation criteria at the early stage of research increases the transparency, helps researcher to highlight the strengths and weaknesses, and systematically guides towards the good quality final result. For instance, carefully picking the sample, developing a robust interview guide, and transcribing and coding interviews in a short run are ways to improve the overall quality of research (ibid).

There are two typical criteria used for evaluating trustworthiness of research: reliability and validity (Hirsjärvi and Hurme, 2004). The criteria can be tested with four tests often applied to empirical social research and case study like mine (Yin, 2003): 1) Reliability, 2) Construct validity, 3) Internal validity and 4) External validity. *Reliability* means the extent to which a study can be reproduced with the same result if the overall setting stays the same (Hirsjärvi and Hurme, 2004; Yin, 2003). My case study can be argued to be reliable, as my study methodology and design are well outlined and therefore repeatable. However, as MaaS is constantly evolving concept the answers of interviewees might vary to some extent due to change in the surrounding business environment. Therefore, an intensive case study is typically longitudinal in its nature (Yin, 2003). *Construct validity* refers to the degree of study's success at measuring what the research is set out to measure (Hirsjärvi and Hurme, 2004; Yin, 2003). In order to increase the validity of my constructs, I used a theoretical framework developed based on a business model development, platform and MaaS literature. *Internal validity* is not applicable to my type intensive exploratory study as it refers to establishing causal relationships (Hirsjärvi and Hurme, 2004; Yin, 2003). *External validity* refers to the extent to which a study can be generalized to other contexts (Hirsjärvi and Hurme, 2004; Yin, 2003). The aim of intensive case study is not to produce generalizable knowledge to other contexts, but rather develop a well-contextualized case, therefore generalizability is not the aim of my study. However, Stake (1995) refers to a naturalistic generalization of case study research, meaning the shared issues and aspects between the reader's experiences and the case study report itself (Eriksson and Kovalainen, 2011:121). For example, the findings of this study might be

applied to other similar size cities aiming to establish MaaS network or networked business models. Lastly, the purpose of my study was to provide a cumulative narrative where each subunit of analysis adds new information and develops understanding about MaaS in Finland and Helsinki region, therefore the rather small sample size can be justified.

Analytic introduction, member check and data triangulation are the common ways used to increase the validity of research (Eriksson and Kovalainen, 2011:131). Since my case study is inductive in its nature, it automatically has an analytic induction meaning that it develops causal explanations in an iterative way (Eriksson and Kovalainen, 2011:292). Member check refers to the process when the data is given back to interviewees for the recheck purpose (Eriksson and Kovalainen, 2011:293). In my research, member check was conducted at the final stage of my research, therefore increasing the validity of final work. Thirdly data triangulation refers to use of multiple data sources in order to cross-check information (Eriksson and Kovalainen, 2011:292). In addition to semi-structured interviews, my research used recently published Finnish media, articles, published reports and a thesis discussing MaaS in the Finnish context, therefore, further increasing the validity of my research.

Now that trustworthiness, validity and generalizability of my research have been discussed, I may evaluate the quality of my case study. Eriksson and Kovalainen (2011:115) establish that a good case study should be significant in some way. For example, it can be unique, interesting and relevant theoretically or practically. My case study is unique, because it is conducted in a well-narrowed area, the Helsinki region, and examines a socially timely topic that has gained significant media and research interest all around the world, due to its potential to impact lives of millions of people. In addition, a good case study must be complete. Completeness means paying specific attention to contextualization, definition, and collecting all relevant evidence (Eriksson and Kovalainen, 2011:133). Moreover, completeness means that a case study ends because it has reached a convincing end (Eriksson and Kovalainen, 2011:133). My case study could be argued to be complete as it has been narrowed down to a very specific context, the participants have been picked so that all currently available transportation modes are

represented and definitions given. Nevertheless, my study is not a longitudinal one and therefore reaching an end would require further research to develop a complete picture of the business model development process in Helsinki and Finland.

Finally, in order to complete my evaluation, I would like to address ethical issues of my research. Ethical considerations affect the whole research process and guide how knowledge is created and analysed. In my research, I have tried to treat other people, including other researchers and interviewees with respect. I have cited the work of others and given credit to the people entitled to it. In addition, I have ensured informed consent of research participants in order to make sure that they are respected and not harmed by my research. Finally, to further minimize the harm of my study I treated the responses confidentially. Consequently, it can be argued that I have conducted my research with respect to others and in an ethical manner.

5 FINDINGS AND ANALYSIS

The objective of this thesis is to describe the process through which the new networked business model Mobility as a Service is developed in Finland. However, due to the short time span of the thesis work, this study sheds mainly light on the current development state and discusses the factors affecting the development and market adaptation of the new model. In addition, this study aims to enhance the definition of MaaS and describe the business model of it.

This chapter outlines the findings of my research and my analysis of them. The chapter begins with the description of core characteristics and business model of MaaS. Next, it details findings related to the business model emergence process and portrays the current situation of the focus case. Finally, the summary of findings is provided. When applicable, transcribed quotes are used to support my findings and analysis.

5.1 Core characteristics of Mobility as a Service

One of the goals of this study was to understand, what is MaaS all about, and find the core characteristics as well as diverging factors of it. Surprisingly, most of the interviewees had shared thoughts about the core characteristics of MaaS. However, diverging views emerged when discussing the individual elements of the business model, such as customer segments and pricing model. This section aims to formulate a refined definition of MaaS by analysing its core characteristics, while the contradicting views on the business model elements are mainly discussed from section 6.2 onwards.

5.1.1. Customization and personalization

All interviewees agreed that by its nature MaaS is a customized and personalized mobility solution that is constantly evolving according to the end-user's changing needs. For example, they described that if the weather conditions are about to change, a mobility service will offer a public transport option instead of a city bike or even suggest a shared car if the rain is heavy. In addition, they said that the service may be personalized for

example for children, disabled people or people on the go and offer a voice control option to ease the use.

This type of customization and personalization impacts the overall development of MaaS in several ways. Firstly, according to the interviewees it allows development of differentiated MaaS services that specialize in offering services for example for people leaving in the rural areas. And secondly, it gives development power to the end customers. Furthermore, MaaS evolves according to the user's needs and usage data, rather than being shaped by individual persons or organizations.

“MaaS gives finally the opportunity to have transportation system and services that are not “one size fits all”, which has long been the solution. MaaS in the big city and MaaS in a rural area is likely to be very different.”

- Krista Huhtala-Jenks, Ministry of Transportation and Communications-

5.1.2 An all in one mobility market platform

Due to its service aggregating nature, MaaS can be described as a one-stop-shop or an all in one mobility market platform that is orchestrated by a central MaaS operator. A MaaS operator is an intermediary between transport operators and users. It buys capacity from the former and sells it to the latter, or in some cases produces capacity itself. Moreover, the MaaS operator may suggest the optimal journey by knowing the real time transportation network conditions (supply side) and combining them to the user preferences (demand side) (Maas4eu.eu, 2017).

According to the interviewees, the MaaS operator should provide a MaaS application that offers at least the following functionalities: intermodal journey planning, booking and payment, all through single platform interface. In other words, a MaaS operator may be compared to a telecom operator who bundles together different services and provides them as a single service package.

5.1.3 Resource sharing

All interviewees agreed that MaaS is about sharing transportation resources. For example, one of the ideas of MaaS is that instead of fully owning a car, you can provide your car to a common car pool and receive compensation when others use it. Moreover, the idea is that by joining a MaaS service you not only minimize the time your car is out of use, but also avoid the struggle of car repairs as they are part of a service package.

Nevertheless, MaaS should not be confused with “car as a service or a rental car”. Furthermore, according to the interviewed MaaS operators, instead of car usage, MaaS encourages the use of sustainable transportation modes, such as city bikes and public transport, and thus has a bigger purpose. However, this claim was challenged by one interviewee, who stated that Finnish MaaS operators have received significant amount of funding from original equipment manufacturers (OEMs). This is supported by the expectation that traditional car sales will drop making OEMs seek for new revenue streams from different car-based mobility services (PWC, 2017). Therefore, it is hard to believe that MaaS operators would not be incentivized to maximize usage of car-based services.

5.1.4 Replacement of private cars

Interestingly, MaaS operators and other interviewees who have been part of MaaS development for longer time view MaaS from a broader perspective and understand MaaS as a change not only on a physical transportation level, but also on the conceptual level. MaaS is seen as a new digital transportation system that is tightly linked into all aspects of our lives and city planning. Moreover, all interviewees position MaaS as a possible replacement of a private car.

“For me, MaaS is a really big way of thinking about the future of transportation. Everything starts with thinking purely about what the user needs for his or her mobility and not narrowing the thinking to what the transport system currently offers. No need to own a car but instead using a service.”

-Sonja Heikkilä, OP-

“When digital disruption happens in the transportation industry, MaaS is the result of it. MaaS offers combination of all transportation modes so that it can be compared to a car – to car’s desirability and the service level”

-Sampo Hietanen, MaaS Global-

Furthermore, the interviewees implied that MaaS can be viewed as a bigger change on a societal level: it is about robotization and automation of transportation and incorporating transportation planning to all aspects of social development. Instead of having private cars, there is a car pool that is in some way shared and somehow robotized. In other words, MaaS makes moving around a true service.

“MaaS is the traffic system 2.0, a new way of looking at the transport system. That means we need to look at each piece again, for example how to use land to help MaaS to develop, how to use infrastructure and intelligent infrastructure to provide data and control the traffic system with intelligent traffic control.”

-Krista Huhtala-Jenks, Ministry of Transportation and Communications-

What is more, the interviewees saw MaaS as an international solution for mobility – a digital travel agency that ensures a pleasant journey and takes care of the connecting transportation. For example, the interviewees described that there could be a service that would take care of your luggage being transferred from a hotel to a train station and a rental car waiting when exiting the train in a new city.

“MaaS is about making travelling as easy and seamless as possible. Everything can be found in one ‘portal’. Then at some point MaaS will become international, no matter where you go, you can use the same platform to move around smoothly.”

-Affe Tavasti and Nicholas Zaeske, VEHO-

Overall, based on the interviews, MaaS can be defined as a holistic way of thinking about transportation. It offers intermodal transportation services not only on a national level,

but also internationally. Furthermore, MaaS is an all in one mobility market platform offering seamless user experience through one touchpoint. It results in a wider variety of transportation modes and services that together aim to provide service level comparable or even greater than a private car. Instead of one size fits all, MaaS is about customization, personalization, automation and robotization of transportation services.

5.2 MaaS business model elements and their implication on business model development

The aim of this section is to expand analysis of MaaS in Finland beyond the core characteristics and analyse the business model of MaaS in more detail. To structure my analysis, I use the business model canvas framework presented by Osterwalder and Pingneur (2010), due to its scientifically well-rooted nature and popularity in the business world, as described in the literature review chapter.

I begin by discussing the *product pillar* of business model canvas and describe the value proposition of MaaS. Next, the *interface pillar*, which includes customer segments, customer relationship and customer channels, is presented. Thirdly, the *interface management pillar* and aspects such as key partners, key resources and key activities are discussed. Lastly, the *financial aspects pillar*, that is the revenue streams and the cost structure of MaaS are analyzed.

5.2.1 The Product Pillar of MaaS

Value proposition

In this thesis, value proposition of MaaS, is mainly discussed from the end user point of view. Most of the interviewees proposed that the central value proposition of MaaS is flexibility. Furthermore, they explained that MaaS offers at least two types of flexibility: flexibility to use different transportation modes and financial flexibility. This value proposition is tightly linked to the customization and personalization characteristic discussed previously, as the service you buy can be tailored according to your changing

needs and wishes, therefore making it flexible. For example, the rental car that is part of a package can be switched to the other model or completely excluded from it.

“For MaaS users VEHO offers all sorts of cars. We have compact cars, like Smart, then we have different functional cars, for example lorries. In practice, we have the whole scale of cars to offer to the customers. This provides a lot of flexibility and I think that is the strength of our value proposition.”

-Affe Tavasti and Nicholas Zaeske, VEHO-

In addition to flexibility in available transportation modes, the interviewees proposed that MaaS offers financial flexibility. For instance, they described that customers tend to think only about the direct costs related to a car, namely gasoline, parking, taxes and insurance, while actually the average cost of holding a car is around 500-600 euros a month (the amount validated from Lehto, 2016 article). Moreover, cars are used approximately only 4-5% of the time available, making the investment even worse. In contrast, if MaaS service is purchased as a monthly package costs are easy to predict and budget. Besides, user may switch between cheaper and more expensive packages according to own financial situation, further supporting the argument for financial flexibility.

“MaaS is more flexible than own car that locks in capital. Capital invested in the car has a risk, for example taxation might change and the value of your car might drop unexpectedly. We and MaaS aim to offer flexibility to this type of situations.”

-Affe Tavasti and Nicholas Zaeske, VEHO-

The second value proposition of MaaS relates to the wide variety of services it may offer for the end user. According to all interviewees, MaaS enables the emergence of totally new transportation modes that enhance existing transportation service levels. Moreover, they stated that ultimately, MaaS solves the last mile problem and ensures that a customer gets literally from door to door in the fastest and easiest way. In addition, they mentioned that MaaS operators plan to link other services, such as food and parcel delivery to their network, therefore truly upgrading the current service level of a transportation system.

“Many people say that MaaS is about integration of transportation services. Inevitably, that is a big deal, but what we actually need is the totally new demand-based services. Car and ride sharing services have big market potential, they accomplish and replace the public transportation service offering, ultimately enabling creation of a good service level to the areas where masses do not exist (=rural areas).”

-Pekka Möttö, Tuup & Kyyti-

Overall, the research findings indicate that flexible demand-based service is expected to become the key value proposition provided by the MaaS operator. This value proposition is especially important for people living outside of the central metropolitan area, as there moving around without a private car is challenging at the moment.

5.2.2 The Interface Pillar of MaaS

Customer segments

With its flexible and wide offering MaaS hopes to attract various types of customer segments from families to elderly people to big corporations. Several interviewees agreed that early adopters are likely to be the representatives of mobile native generation, millennials, that live in the central areas and appreciate sustainable values and do not see cars as a necessity.

“Early adopters will be the hipsters living in the city centre. They have a need to be different, try out new things and set trends. Then will come people who seek for a better solution than a private car.”

-Juha Pentikäinen, Lähitaksi-

“Research shows that young people who live in the cities near to good connections and do not want to own a car are likely to be the early adopters”

-Petro Tamminen, VR-

“I believe that a young family is a dream user of MaaS. The family should live in the metropolitan area of Helsinki to be able to give up at least one car. In addition, responsibility and environmental thinking are likely be important for early adopters, if these values are meaningless it is hard to find an argument why one should adopt MaaS.”

-Antti Korsisaari, Korsisaari Oy-

Interestingly as the quotations below show, the discussion about the topic is open for debate. Furthermore, several interviewees mentioned that they believe that elderly people might be the ones who would really appreciate MaaS. Similarly to many other European countries, Finnish population is aging, and young pensioners represent post war generation who has solvency and is familiar with technology based services.

“I see hidden potential in elderly people. One old gentleman in my social circle, who has used a car all his live, just bought a yearly public transport ticket and travels unlimitedly. He enjoys that he can read instead of worrying about repairing and washing a car. MaaS perhaps needs an attitude change and willingness to invest in the wellbeing. If that happens, a car is many times seen as a hassle. If the baby boomers notice that they for sure have solvency.”

-Petro Tamminen, VR-

In addition to millennials and elderly people, the interviewees pointed out that even tourists who are new to the city are an attractive user group for MaaS. What is more, both mobility service providers and MaaS operators see big potential in the B2B customers and governments/cities. Furthermore, employers might buy and offer the mobility services instead of offering leasing cars. On the B2B side, also totally customized service might be created. For example, Tuup created a “work bus service” to the employees of Valmet Automotive that takes factory employees to work and back at a reduced price using the scheduled bus service (Case Valmet can be examined in Appendix 3). Based on these findings it can be concluded that at this point it is difficult to name one segment that would be more attractive for MaaS than others.

As a consequence, it remains interesting to see whether MaaS service will be first adopted by private users or by B2B customers. For example, OP run their MaaS pilot (OP Transit) during autumn 2017, the pilot was targeted for the employees of 20 small-and medium size companies whose employees travel a lot. In contrast, MaaS Global (Whim app) has been widely advertised during late autumn 2017 and clearly aims for mass adaptation, while Tuup Kyyti has been concentrating on development, finding new company partners and going international. In my opinion, the difference between approaches is good for the overall development and provides also interesting avenues for the further research.

Customer relationship and Channels

Customer relationship and channels are the central components of the interface pillar and aim to describe how and where the end customer is reached and served. According to the original definition by Osterwalder and Pigneur (2010) customer segment determines also the nature of relationship and channels. Thus, as the core customer segment of MaaS is rather undefined also relationship and channels remain open.

According to the interviewees, the customer relationship of MaaS is linked to the one of the core characteristics – customization and personalization. The customer relationship of MaaS thus is personalized and tailored. To allow high personalization the relationship is also tight and, in many cases, daily. Moving around is part of our daily routines and MaaS aims to become part of that routine. Moreover, the interviewees described that the relationship between MaaS provider and end user might also change its intensity. For example, they pointed out that when a customer travels to a new city, his or her dependency on a service might rise and consequently service expectation change. Thus, customer relationship can be also described as adaptive.

“As there are many customer segments, also the relationship must differ, for example, if we compare the ordinary customer to a tourist who does not know anything about the city. A tourist needs more guidance and journey map is crucial, while a local might get along without the detailed instructions. For these users MaaS service offers totally different value and must work in a customized way.”

-Sonja Heikkilä, OP-

When it comes to channels, most of the interviewees agreed that at least in the beginning MaaS is a mobile application or progressive web application that can be accessed through the mobile phone on the go. In addition, they reported that MaaS operators are expected to provide online (for example chat bot) and phone service support. However, several interviewees pointed out that as the future is unpredictable we cannot name one touchpoint that MaaS will utilize, instead we should try different ones and follow the technology trends closely.

“One important thing to remember is that MaaS doesn’t need to happen through an app or even a mobile phone, since we don’t know to which direction MaaS will develop. Someone might come up with MaaS service for elderly people who do not use mobile phones at all, this should not be ruled out.”

-Krista Huhtala-Jenks, Ministry of Transportation and Communications-

5.2.3 The Interface Management Pillar of MaaS

Key partners

Due to the networked nature of MaaS, the network of key partners is perhaps the most important part of the business model. Without the network, a MaaS provider would struggle to offer flexible and diverse transportation services to the end customer. Indeed, according to the interviewees, the key partners to the MaaS operator are therefore the other transportation service providers that help a network to expand, business to grow and networked business model to develop. During the interviews transportation modes mentioned were: bus, tram, train, subway, plane, ferry, bike, electric bike, taxi and various shared and on demand car services. Furthermore, the interviewees stated that representatives of these travel modes are all key partners that must have shared interest in order to realize the value proposition.

As MaaS operators are typically start-ups themselves, investors, venture capitalists and other financial institutions are key partners for development. The research findings reveal that at the moment, typical investors are OEMs and other big players on the automotive market such as car rental companies. These companies are seeking to diversify their

business opportunities in the disrupting world. For example, MaaS Global has received significant investment from Toyota during summer 2017. Also, another studied MaaS operator, Tuup Kyyti, mentioned that car making companies are interested in investing in MaaS and developing car sharing and on demand services.

In addition to commercial players, the interviewed industry experts noted that cities, governments and public transport representatives are important stakeholders for MaaS. They are responsible for city and infrastructure planning, transportation regulation, legislation and sometimes financing. According to the interviewees, establishing good relationship with them is crucial, as without the right policies, legislation and infrastructure, operating MaaS business would not be possible.

Lastly, the interview participants reported that operating MaaS network successfully requires big amount of data storage and analysis. Therefore, technology partners, such as capacity optimization providers, payment system providers and travel ticket initiators play an important role among the key partners. Finally, marketing and media agencies were mentioned as enablers of mass awareness, that is required for the development and adaptation of MaaS among end users.

Key resources

Notably, key resources did not receive much attention in the interviews, which can be partly explained by the fact that most of the interviewees represented transportation service providers whose key resource is its fleet. Nevertheless, from MaaS operator perspective, in addition to fleet, different technologies were mentioned as important assets. Technologies enable data aggregation, integration and analysis that are part of key activities. In addition, interviewees mentioned that tickets, maps and payment tools can be classified as digital resources of MaaS. Lastly, one interviewee noted that data security is an important resource and contributes to the brand value of a company.

Key Activities

A company performs key activities to run the business and achieve its goals. Since MaaS is a network of actors orchestrated by a MaaS operator, I discuss key activities from the

MaaS operator perspective. Based on the interviewees views, the most central activity of a MaaS operator is orchestration of key partners network. Orchestration means attracting and acquiring new partners and serving as an entrepreneurial actor who inspires others to develop the business. To do so, the MaaS operator must be integrated to the network participants through APIs. Thus, integration is the first important activity. According to the interviewed experts, a MaaS operator must also refine and manage huge amounts of data available. Data refining and managing is therefore a second key activity that enables orchestration and in general the whole business. For example, the interviewees pointed out that root planning and optimization would not be possible without data refining and management.

In addition to data refining, the interviewees claimed that an important capability and activity of MaaS operator is data modelling. Modelling, for example, allows transportation system modelling that is crucial for planning of transportation capacity allocation. Furthermore, to allocate capacity, a MaaS operator has to offer automatized fleet-management that is possible due to the APIs mentioned earlier.

Nevertheless, it is unclear whether this or any other capability has to be developed and performed in-house or if it could be outsourced. For example, to do the data modelling, Tuup Kyyti uses services of Stratica, that is a close partner and even shares the same office space, while MaaS Global claims to do data management and analysis in-house. In practice, it seems that a MaaS operator has to find the right balance between in-house development and outsourcing. Indeed, the CEO of Tuup Kyyti mentioned that despite the high cost of development activities, in-house development is the only way to stay ahead of competition, prove the concept of MaaS to users and investors, and rise the entry barrier for players like Google. Lastly, in addition to the IT-related activities, experimentation and piloting seem to be crucial activities that enable the development of the whole networked business model.

5.2.4 The Financial Aspects Pillar of MaaS

Revenue Streams

Looking at the research findings, the *financial aspects pillar* of MaaS seems to be the most undefined and open for changes and debate. More specifically, the revenue logic and pricing-model that are part of revenue streams discussion are unclear and media and researches have been trying to find an answer to that ambiguity. Reviewed MaaS literature suggests sales commissions, service advertisement and fixed contracts with different end-users and service providers as main revenue streams and interviewees validated their relevance. Thus, the main part of the following discussion is dedicated to the pricing model and revenue logic discussion. Lastly, I also introduce two new identified revenue streams.

Overall, interviewees brought up two pricing models for MaaS services: monthly subscriptions and pay-as-you-go payments. Half of interviewees believed that pricing MaaS service can happen on a monthly basis, while the rest were suspicious about the idea. Those who favoured a monthly subscription believed that subscription maximizes usage of services, makes revenue streams predictable for MaaS network participants, and is also a user-friendly solution. Those who favoured pay-as-you-go model believed that at least in the beginning, pricing MaaS services on a monthly basis is impossible due to the lack of usage data. Thus, the majority agreed that it is wise to have both options and analyze viability of each option later when concrete data is available. The quotes below illustrate the vivid nature of this discourse:

“MaaS should offer both payment options, if we decide to have either one, we can be sure that part of customers will be disappointed”

-Juha Pentikäinen, Lähitaksi-

“I myself wondered how durable is the idea of monthly pricing at this stage. In fact, I would prefer to use MaaS for individual journeys. That is how it is. This service is convenient when you have a lot of irregular trips and you can rely on the service and even in the new environment travel without extra effort.”

-Antti Korsisaari, Korsisaari-

“Revenue generation is simple. We sell different product than what we buy. We buy transportation services at a production price and we sell service promise, service level and even a dream (if we are very good). OEMs have been excellent at selling dreams.”

-Sampo Hietanen, MaaS Global-

” MaaS is a completely new service and I personally do not believe that monthly pricing is possible or at least it is not easy. You need to have quite a lot of data to be able to do the pricing. The problem is that if you price something on a monthly basis, but incur costs based on the real usage rates, the end result is difficult to predict.”

-Pekka Möttö, Tuup Kyyti-

The last quote refers to the fact that for example, if taxi is included in the package and user is allowed to use it limitlessly the final bill that MaaS operator receives might be significantly higher than the monthly payment that user makes. In addition, the interviews and press releases revealed that at the moment, MaaS Global (operator), which offers monthly public transportation ticket, pays in reality for individual single tickets that are more expensive compared to the monthly ticket, due to the difficulties in reaching pricing agreement with public transportation authorities. These observations support the view that the monthly pricing model is not very sustainable.

Based on the interviews, it is evident that the revenue model of MaaS is based on economies of scale and commissions. The more users MaaS operator has the bigger “bulk” of a service it buys from the mobility service provider, this “bulk purchase” can be potentially sold at a discounted price. However, this bulk or production price thinking received criticism especially among those mobility providers whose operations are subsidised by government. Their prices are already now below the real cost and discounts are not seen as an option.

“Many seem to think that being a MaaS operator means buying tickets for cheap and reselling them at a profit. Someone can make it work, but in many places public transport is subsidized. For example, in the Helsinki region, 50% of a ticket’s price is public support. Therefore, purchasing a public transportation ticket at a discount is not possible and MaaS operator has to find a way to monetize on additional services or something similar.”

-Petro Tamminen, VR-

Based on the interviews, commission based revenue distribution model appeared to be more familiar and logical to commercial transportation services providers. Paying 10-20% in exchange for new customers and a new sales channel was perceived as a reasonable way of conducting business. Nevertheless, interviewees mentioned that they are a bit worried about how things will work in practice, as currently all revenue estimates are based on ever changing assumptions and little real data exists. Instead of making assumptions, the transportation service providers would prefer getting started as soon as possible, and agreeing on the distribution percentages later on.

Finally, the research findings revealed that on the B2B side revenue streams might take a completely new form. The MaaS operator might serve as the outsourcing and consulting company of transportation services and systems. When it comes to outsourcing services, for example, in the United States many cities were interested in the services of Tuup Kyyti and willing to discuss possibilities to rebrand the public transportation services to MaaS model. Of course, it is not likely that governmental transportation services would completely vanish, but at least the role of government might change significantly, which is also supported by the findings of this study. Then again, consulting services are related to data modelling, simulation, analytics of mobility, transport system planning and design. These activities create MaaS operators’ a unique expert position that might be leveraged as an additional revenue stream. However, the research findings show that already now players such as Google are interested in this area and naturally have significant advantage at least in terms of HR and financial resources.

Costs

The second half of financial pillar consists of costs that are required for running the business. According to the interviewees, the biggest cost drivers for the MaaS operator are IT-development, salaries, marketing, and payment transaction fees. IT-development takes the largest proportion of expenses as the services themselves are heavily based on technology. Furthermore, the interviewees expected that as MaaS providers move to the aggressive user acquisition and brand awareness building phase, the marketing costs increase significantly, and continue growing as the competition among different MaaS providers emerges.

In addition to the cost drivers mentioned above, the research findings revealed payment transaction fees as a new source of costs not discussed in the previously reviewed literature. According to the interviewed industry experts, at the moment, it is not clear who is responsible for the payment transaction fees, that typically are 3-4% of total transaction price. Nevertheless, this aspect might be researched only when operations of MaaS reach true market phase and data is available. Furthermore, the interviewees agreed that this type of questions are negotiable and secondary at the current stage of development process, which is discussed in the next section.

Finally, when it comes to transportation service providers, the interviewees mentioned that these actors incur some IT-investment costs when they join MaaS network, as MaaS is based on open APIs and mobile payment system, which must be in place before joining. Still, interviewees perceived investments to APIs, mobile payment system and mobile ticket system as positive, and admitted that they would anyways make them sooner or later.

5.3 The networked business model development

This chapter discusses the development of the MaaS business model. It is organized chronologically and moves from historical attempts to the future outlook of MaaS development. After this, the discussion continues around enabling and restricting factors which I have categorized into five main categories.

5.3.1 Early attempts

The research process revealed that in fact, current hype related to MaaS is nothing new, but already 30 years ago first attempts to establish a networked transportation system that would offer demand-based services took place. According to the interviewees, for example, CEOs of taxi and bus companies saw MaaS as an opportunity to develop their business, but at the same time were suspicious about its possibility to finally succeed.

“Since 1974, we have tried to develop the transportation system, and new mobility concepts have been launched every five years. MaaS is the latest concept launched and has clearly received greatest amount of attention, I don’t know if that’s only a hype or something real.”

-Juha Pentikäinen, Lähitaksi-

“We have been involved in various EU projects for the past 30 years, this is actually the second round when we combine different mobility services, hybrid combination of bus and taxi has been tried out also. What is new is the service promise. Is this enough for people, I don’t know.”

-Antti Korsisaari, Korsisaari-

Unfortunately, all previous attempts shared the same destiny. The interviewees explained that despite wide public interest, they were economically unsustainable and therefore terminated. Interviewees who have been in the Finnish transportation industry for several decades are therefore doubting, but agreed that today the market is readier to adopt a MaaS type of service due to the social trends, which are discussed in the end of this chapter.

“Before, there has been some sort of a vicious cycle. Since 1995, the final reports of all mobility projects are pretty much the same. Everyone finds that the idea was great, the project was just fine, the pilot succeeded, everyone was happy, but project is nevertheless terminated as there is no more public money available. It’s a funny phenomenon.”

-Juha Pentikäinen, Lähitaksi-

Several interviewees mentioned that Kutsuplus (currently MOIA Finland), an on-demand bus line that operated in Helsinki area several years ago, is the latest important learning project for the development of MaaS. Participants of Kutsuplus project learned that smooth operations would have required significantly bigger fleet: instead of 14 cars the real need would have been around 1000 cars. This significantly bigger number of cars would have allowed a convenient door-to-door transportation service and truly improved service of public transport offering in Helsinki. After termination in Finland, Kutsuplus was sold to the US. However, there the service was also terminated due to the lack of financing, and in 2017 acquired by the Volkswagen Group (Rautiainen, 2017). Nevertheless, a lot of experience has been retained in Finland and, for example, the team of Tuup Kyyti (MaaS operator) consists of people who have been part of the Kutsuplus project and apply lessons learned to the development of MaaS.

Lastly, several interviewees mentioned that in fact, Helsinki has had MaaS service already for a long time as citizens of the metropolitan area of Helsinki can use different transportation modes with only one travel card. With “matkakortti=travel card” citizens and guests of the city can use buses, trains, trams, ferries and subway, which has been internationally recognized as a unique arrangement. However, the interviewees pointed out that today, some cities like London have adopted an even better “travel card” – the contactless credit card, which is an easy payment method and makes travel flow comfortable not only for citizens, but also for tourists. Despite international competition, my research findings demonstrate that the metropolitan area of Helsinki has been and still is a pioneer in terms of transportation services development as its relatively small size is suitable for experimentation.

5.3.2 The current state

The previous section revealed that Helsinki’s forerunner position can be largely attributed to the historical pilots of new transportation services and the lessons learned. However, several interviewees pointed out that to objectively evaluate the current development state of MaaS in Finland it should be first defined. If MaaS is simply an integration of services,

Finland and Helsinki are already quite far, but if we talk about the robotization and automatization of transportation we are only in the beginning.

“According to my personal MaaS definition, I strongly associate MaaS with shared rides, thus I would argue that other countries are in this case way ahead. For example, Uber and Lyft do not operate here. Driverless cars are also important, General Motors has announced that their production is ready, and first pilots shall be launched next year. There is little chance that Finland could jump into this train. “

-Mari Flink, HSL-

However, if we speak about MaaS service and its core characteristics described in the first part of this findings chapter, it can be said that Finland is living an ‘early hype’ phase. Furthermore, during autumn 2017, the media constantly promoted the concept of MaaS, and representatives of MaaS Global, Tuup Kyyti and Sito have been actively taking part in different public panel discussions. In addition, the amount of academic papers related to MaaS has also been rising on a continuous basis, supporting the ‘early hype’ argument.

Interestingly, one of the interviewed transportation service providers, OP, started their own MaaS pilot that aims to provide B2B MaaS services (Appendix 3) in November and December 2017, meaning that the next attempts to develop a wider MaaS offering are starting. What is more, in 2018 The Code on Transportation Services will come into force, and as a part of it, the Finnish taxi market will open for competition. As a result of the rapid development of the market, the government of Finland is happy, and promises to continue facilitating an environment where new transportation services may flourish.

“We are at the sweet spot of development. In the ministry, we have tried to provide an environment where different business models would emerge. Now we have three successfully working MaaS services: Sito, MaaS Global and Tuup Kyyti, which all have different business and operating models and that is why we are so satisfied. Government is not building MaaS or dictating how it should look like, instead MaaS operators can independently experiment with different models and find out what customers actually want. From this point of view Finland is doing very well.”

-Krista Huhtala-Jenks, Ministry of Transportation and Communications-

When speaking about the current development state of MaaS, interviewees presented contradicting views. The MaaS ecosystem actors that are mostly involved, for example the MaaS operators, felt that in terms of development MaaS is already in the market phase and going global, while many mobility service providers described the development to be in the “pilot phase”. Therefore, it can be concluded that as the networked business develops, actors analyze the development phase based on how much new business the new model brings to them. Moreover, the networked business model, like MaaS, is seen ready only when all its participants perceive the clear business case in it. The diverging opinions of different actors in the MaaS ecosystem are illustrated with the quotations below.

“The market and business are emerging, but there is not any real business yet. We are now reaching the stage when ideas, promises and assumptions have to be transformed to real actions. During past two years we have been talking that “now MaaS comes”, a lot of legislation has been made to help the development, but now we need something tangible instead of merely words.”

-Juha Pentikäinen, Lähitaksi-

“From within the industry, the view becomes blurry. I think that we are still going up the Hype curve, next year (2018) we will have new legislation that will help the development and for sure attract many new players to the industry. It is interesting to see where we are in 2-3 years, now we are still studying and learning.”

-Petro Tamminen, VR-

“There are several pilots in the different cities. However, MaaS has not yet reached the awareness of customers. If person outside of the industry is asked what is MaaS, nobody would know. In Helsinki, we have technical capability to operate MaaS business, and that is of course good, but now we need to increase awareness and start doing something real.

-Antti Korsisaari, Korsisaari-

Out of many factors enabling development that will be discussed later in this chapter, Finnish legislation has been strongly linked to successful development process by the interviewees. Thus, I propose that also other countries aiming to develop MaaS services should pay attention to legislative development, as it is typically time consuming and subject to public debates. However, despite the positive outlook, one of the interviewed industry experts noted that Finland lags behind in the variety of transportation modes available on the market, which slows down the development as services must be developed from scratch instead of simply integrating them into the network.

“On one hand, in Finland, the market is actively emerging, we are way ahead of other countries and our legislation is constantly improving in the right direction. On the other hand, we have very limited transportation market and we lack many travel modes especially shared cars and on demand services. To sum up, in Finland the ecosystem or network is the most developed but the scope of service delivery lags behind”

-Sampo Hietanen, MaaS Global-

To conclude, Finnish atmosphere can be described as positive and hopeful. Furthermore, many players in the transportation and automotive industry have publicly expressed their interest in MaaS and the Finnish government strongly supports the initiative. As the post Nokia country, Finland has excellent information infrastructure and most of its citizens use smartphones, supporting the development of MaaS. Finally, it is important to mention that both MaaS operators interviewed noted that despite their Finnish origins, the development focus is strongly and mainly international, as MaaS needs masses to become profitable. Still, Finland is an excellent pilot area and promises a good future.

5.3.3 The future vision

As described in the literature review chapter, the development of networked business models happens through iterations and in the future the model might look totally different from what it is now. In this section, the expectations, visions and thoughts about future development of MaaS are gathered together and elaborated.

First of all, to understand the future of MaaS, I asked the MaaS operators, what is the vision of their company, as they represent the entrepreneurial actors that inspire the development of a networked business model, set the direction, and ultimately affect the core characteristics of MaaS. Both operators revealed that the overarching goal of their operations is to achieve bigger change in society, transform people's perception about car ownership and revolutionize the whole transportation system.

“Vision and goal is big. We want to do a system-level change in transportation, as widely as possible across the globe. We want to create and enable better mobility opportunities for people, so that the significant shift from a private car to completely redefined public transport - MaaS could happen.”

-Pekka Möttö, Tuup Kyyti-

“We want to be as desirable as car ownership. We do not want to be a player that provides a system-solution, rather we want to build a service that reflects individual's personal needs, we want to be so good that people want to pay for

giving up the car. If we look a little bit further, on average people waste every day 90 minutes to travelling, we want to give them that time back. While developing MaaS towards this dream we have possibility to affect how cities work, and how much traffic emissions there are. People need a new dream, a dream that is better than a car.”

-Sampo Hietanen, MaaS Global-

The research findings revealed that in the future, in addition to new mobility service providers, traditional industrial companies and especially logistics companies might become important participants of the MaaS network. By optimizing the system, people and cargo transportations can be integrated at least to some extent. Moreover, internalization and globalization, briefly discussed in the core characteristics section, is seen as the next step for MaaS development. Lastly and interestingly, some interviewees proposed that MaaS has potential to commercialize the public transportation around the world.

“If we want to aim for a bigger change and a bigger business, we must make mobility and transportation a consumer business. Business actors and organizations in this market must acknowledge that in the future the major part of money will not come from government in forms of subsidies.”

-Krista Huhtala-Jenks, Ministry of Transportation and Communications-

Finally, when talking about the concrete steps, Sampo Hietanen, the CEO of MaaS Global was hopeful about the future. He stated that he believes that in two years everyone in the transportation industry will understand how MaaS works and will be willing to join the network. Furthermore, in his view, in five years, MaaS will reach a stage in which the value propositions will be truly fulfilled and MaaS market will be full of competition, later competition leads to a big bang and consolidation of networks to even bigger networked ecosystems.

“In 5 years, MaaS will be near to the stage when the value and service promise is actually fulfilled, “we simply deliver you wherever you want”. In addition, I believe that in five years this will be highly competitive market. These new business models will experience evolution, in five years we will have seen the first big bang and a lot will start to happen. I believe that at that point the individual MaaS ecosystems will consolidate to the bigger clusters, as that happens actually even now.”

-Sampo Hietanen, MaaS Global-

To sum up, based on the interviews it seems that in the future, individual MaaS networks are likely to continue development until they reach some sort of a limit and players will start to consolidate, much like in the telecom industry where small operators have vanished and the market is dominated by big corporations. Furthermore, competition will most likely come outside of the core MaaS market, as already now Google is seen as a potential entrant with their self-driving car and unique access to people’s data.

5.3.4 Factors restricting MaaS development

Now that different development stages of MaaS have been discussed chronologically, I want to present and analyse the bigger themes that affect the development of MaaS. I begin with findings related to hindrances, factors that currently restrict the development of MaaS in Finland. Based on the interviewees answers and my thematic analysis of them, I classified the hindrances into five main groups presented in Table 4. These main groups are: technology, legislation, market structure, competitive actions and mindsets & behaviors. Next, I will discuss each main group in more detail.

Table 4. The MaaS networked business model development restraining factors as based on interviews

	Technology	Legislation	Market structure	Competitive action	Mindsets & behaviors
Restricting factors	<ul style="list-style-type: none"> Unanswered questions related to cyber security, user data protection 	<ul style="list-style-type: none"> MaaS still at a tax disadvantage 	<ul style="list-style-type: none"> Limited variety of service providers Long geographical distances/low population density 	<ul style="list-style-type: none"> Many service providers lacking in digital maturity (interoperability difficult – lack of mobile payment/APIs) 	<ul style="list-style-type: none"> Incumbents resistant to change or slow to embrace possibilities Users slow to adapt new ways of travel General wariness due to previous failures Few interested in being first mover

When it comes to technology, cyber security and user data protection were seen as significant risk factors that take a lot of development effort from MaaS operators. As MaaS is a networked business model, also the information needs to flow freely within the network. However, securing the privacy of users and building the governance processes is demanding. Moreover, in the future when the system operates mostly automatically the cyber-attacks become real risk factors to the entire transportation system of cities and countries. Finally, the physical security of customers was mentioned by several interviewees. Controlling the quality and safety of transportation services becomes harder and harder as the network expands and drivers without professional driver education may become part of it.

In terms of legislation, even though Finnish legislation is in many ways ahead of other countries', MaaS is still at a tax disadvantage compared to other transportation modes according to the interviewed industry experts. This was seen as a big hinderer especially on the B2B side, as employers and employees cannot receive tax deductions if they offer and use MaaS services, leaving no real motive for employer to offer MaaS packages to their employees. Nevertheless, the interviewee from the Transportation and Communication Ministry was aware of the situation and stated that this hinderer is likely to disappear in the future.

Looking at market structure, two of the bottlenecks related to it are somewhat unique to Finland: the limited variety of transportation services and long geographical distances combined with low population density. Moreover, the interviewees noted that the average population density of Finland is 17 inhabitants per square kilometre, making providing on demand services highly challenging and requiring an enormous fleet. On the other hand, they stated that the population density of Helsinki is around 3000 inhabitants per square kilometre, making the service more viable. In other words, the interviewees saw that long geographical distances will become a challenge especially when designing and implementing MaaS services outside of the Helsinki metropolitan area. They also pointed out that the limited variety of different on demand and car sharing services can be also partly explained with the relatively low demand and long distances, as Finns tend to own one or even two cars enabling careless moving around even without additional need for

services. Nevertheless, thanks to the social trends and attitude shifts discussed in the next section, positive development has been occurring especially in the Helsinki metropolitan area, and the amount of MaaS service providers is likely to continue growing also in the future.

Next, when it comes to competitive action, many service providers are lacking in digital maturity, which makes the integration between different IT-systems complicated, costly and time consuming, therefore hindering the development process of the whole MaaS network. Furthermore, it was mentioned by both interviewed MaaS operators that surprisingly many transportation providers do not have APIs and mobile payment systems in place. Yet, the interviewees noted that many actors are willing to invest into new IT-components as they understand their benefits in the long run, meaning that the future of MaaS still looks promising.

Lastly, looking at mindsets and behaviors, incumbents' lack of willingness to change, find common commercial interest and embrace the change were currently perceived as the main issues restricting the development by the interviewees. According to the interviewees, incumbent players, such as public transportation authorities, are around the world refusing to cooperate, and their mindset is a big problem. Moreover, the interviewees saw that the risk is that all important players will not reach an agreement, but create silos in the industry and further slow down the development of MaaS. Furthermore, the interviewees perceived incumbent operators as jealous about "their own" customers, and therefore for example Tuup Kyyti has decided that in addition to reselling someone's services for a MaaS operator, it is crucial to develop own transportation services to gain new customers. In other words, the readiness of the transportation ecosystem network to be open has not yet reached the desirable state.

In addition to already described factors, on the transportation service provider side the rigidity for change refers also to rigidity to open up the APIs and transform the business model towards a common networked business model. On the customer side, the rigidity is also evident. Moreover, Finns enjoy travelling alone, they prefer sitting alone and not being disrupted by outsiders, and therefore adaptation of shared vehicles is expected to

be slower than in many European cities. Furthermore, according to the interviewees, it is hard to make people realize the actual cost of a car as the emotional link is strong. As a consequence, overcoming this type of restriction requires mindset change on the individual level.

Finally, some of the interviewees challenged the robustness of the MaaS business model. Firstly, they mentioned that currently, customers are promised better service and seamless experience, which in practice is difficult to deliver. Secondly, they saw the revenue logic as restrictive. By this they meant that small transportation service providers have only limited capital and ability to experiment with the different pricing and revenue sharing models, and therefore the model has to become profitable in a relatively short term. This then again general wariness towards MaaS which is related to the previously discussed failures, and creates an environment where few players want to be the first movers, thus overall impeding the development of the networked MaaS business model.

5.3.5 Factors enabling MaaS development

To facilitate comparison between enabling and restricting factors, enablers were also classified into the same five main groups as restricting factors, and will be discussed one by one in this section. The enabling factors are summarized in Table 5 below. What is more, in the later part of this section I discuss the megatrends and social trends related to MaaS development that the interviewees and media brought up.

Table 5. The MaaS networked business model development enablers as based on interviews

	Technology	Legislation	Market structure	Competitive action	Mindsets & behaviors
Enabling factors	<ul style="list-style-type: none"> Intelligent transportation systems (e.g. autonomous vehicles, electric bicycles) Existence of multiple technologies (open APIs, open data, sensors) 	<ul style="list-style-type: none"> Government supportive of MaaS (Transportation Code) Imminent bill to force leasing cars onto corporate balance sheets 	<ul style="list-style-type: none"> High demand for transportation Availability of technically skilled labor (e.g. software developers) Developed ICT infrastructure, high smartphone penetration and low network fees 	<ul style="list-style-type: none"> New entrants act as catalysts 	<ul style="list-style-type: none"> Willingness to participate in MaaS network if market matured

When it comes to technology, intelligent development of vehicles and transportation systems is perceived as the central factor enabling the development of MaaS by the interviewees. Furthermore, the interviewees mentioned, that sensors, distance control systems, and new intelligent locking systems make sharing economy possible and increase safety of transportation. Driverless cars were also perceived as the goal of ongoing technological development, and according to the interviewees, will totally disrupt our mobility. In addition, the interviewees believed that new technology-enhanced transportation modes will help adaptation of MaaS among new users. For example, if someone switches to an electric bike, there is a good chance that he or she will become also a MaaS user instead of a private car owner.

As the price of sensors gets cheaper and cheaper, gathering data becomes easy. Nevertheless, to provide value, data needs to be analyzed, and in case of MaaS, shared with other players. Indeed, the second most central technology-related enabling factor mentioned by the interviewees was open APIs, open data and in the future usage of Internet of Things. Moreover, according to the interviewees, in the early stage, it is crucial to open up the APIs so that no major player can block the development of new business. Furthermore, open APIs and real-time transportation data make possible emergence of completely new transportation services to the so-called whitespaces of the transportation system. Therefore, it is not a surprise that with the data, the Finnish government plans to create intelligent incentives to transportation companies to provide services in the areas where the public transportation system fails to serve.

Another reason why opening APIs is important for the development of MaaS is that when APIs are open, each component of the transportation network creates more intelligence for the whole transportation system. As a result, MaaS operators may provide highly customized services to end users and support each other's operations. Of course, open APIs carry some risk that especially relates to user data privacy, cyber security and to some extent the competition on the market. What is more, there is a risk that open APIs will lower the entry barriers, and Finland will become an easy to enter market for the global players such as Google. Therefore, MaaS operators need to carefully think how they utilize and share the data.

Looking at legislation as an enabling factor, Finnish legislation was perceived to be ahead of many countries and to play a central role in the development of MaaS. First, opening up of taxi market in 2018 was seen by the interviewees to enable the development of different Uber-like services on the market. Secondly, the APIs and the payment systems are also opened up with the new Act on Transportation Services, further supporting the view on legislation as an enabler of MaaS. Finally, one interviewee mentioned that the upcoming new leasing law will help MaaS, as according to the new law, leasing cars should be visible on the balance sheet of companies, and therefore will become less attractive for B2B users.

In addition to legislation, different regulations and policies were mentioned by the interviewees as an effective way to speed up the development and adaptation of new mobility services. Furthermore, they explained that road usage fees, high costs of parking, new bike and walking lanes and such are factors that drive users away from private cars, at least in the central areas of Helsinki. Overall, new legislation provides the transportation service providers a safer environment to operate and encourages investments for the MaaS operators.

From market structure perspective, high number of engineers, natural need to travel a lot and a developed ICT infrastructure are positive MaaS development contributors in Finland. In general, the ICT infrastructure, mobile phone penetration rate and network coverage are high in Finland and therefore do not restrict the development in any part of the country. Moreover, MaaS requires a lot of engineering knowledge and Finland has natural supply of it. Nonetheless, the high number of engineers was also seen as a problem by the interviewees, as an engineer might design a good service from technical point of view but commercial and UX sides might be neglected.

When it comes to competitive action, it is noteworthy that all research participants saw competition as a positive factor for the MaaS business model development. All interviewees perceived that the more MaaS networks there are, the better. Moreover, they explained that a variety of models allows more experimentation and development of specialized MaaS services. Still, one interviewee brought up that the development may

suffer if all current major transportation industry players will start developing their own MaaS network instead of cooperating. The risk of fragmentation also relates to the globalization and interest of international players such as Google, Amazon, Apple and Alibaba to absorb markets outside of their current core business.

“For me it is hard to understand, why some industry actors do not understand that if they do not open their API’s and refuse to cooperate with other domestic transportation providers, there is a risk that one day for example Apple Pay will come and say that since your customers are using our system we require the 20% commission on all payments, in practice they will little by little start dominating the market.”

-Krista Huhtala-Jenks, Ministry of Transportation and Communications-

Moreover, interviewees noted, that in addition to different MaaS ecosystems, also competition within the smaller markets such as car rental market is required. They described that Finland is lagging behind in terms of amount of services offered and therefore players coming from outside of the industry are welcome to enter. For example, a Finnish bank and Insurance company, OP, has last year renewed their business strategy and entered the mobility market. Currently they offer different types of mobility services, pilot own B2B MaaS service and actively promote electric vehicles. This move has been perceived as a good and fresh strategy not only by media but also by competitors.

“OP has invested quite a lot into mobility products and services. Their offering is slightly different than ours, but of course we see them as a competitor. Nevertheless, we acknowledge that this type of business network or ecosystem requires competition. If there is no competition, it is bad for the end consumer.”

*-Affe Tavasti and Nicholas Zaeske
VEHO-*

To sum up, new entrants such as OP, act as catalysts for the MaaS development. They not only enable the growth of the networked business model but also act as examples for incumbents and generate positive buzz around the emerging market. This positive buzz

is accompanied by some megatrends and social trends that positively affect the development of MaaS.. These trends are presented in Table 6 below.

Table 6. Megatrends and social trends supporting the future of the MaaS networked business model

Megatrends	Social trends
<ul style="list-style-type: none"> • Urbanization • Increasing congestion • Population aging • Increasing pollution • Automatization 	<ul style="list-style-type: none"> • Social responsibility and sustainable values • "Everything as a Service" • Shifting attitudes toward care-free lifestyles • Declining want to own

Furthermore, the shifting attitudes towards care-free way of living, declining need to own things and increasing popularity of services were seen by the interviewees, as major social trends helping MaaS. Also, sustainable values and social responsibility awareness were described to play an important role, as people realize that urbanization, increasing congestion and pollution related issues must be addressed. Finally, the aging and growing population creates a need for more efficient transportation systems and completely new transportation services, supporting the need for MaaS.

5.4 Summary of findings

Based on the findings of this research, MaaS can be described as a holistic way of thinking about transportation. It offers intermodal transportation services not only on a national level, but also internationally. MaaS is a door-to-door travel chain, offering seamless user experience through one touchpoint. It results in a wider variety of transportation modes and services that together aim to provide service level comparable or even greater than a private car. Instead of one size fits all, MaaS is about customization, automation and robotization of transportation services.

When it comes to the business model of MaaS, it is networked with each actor in the network contributing their own service, and therefore enabling more customized mobility solutions for the end user. The development of MaaS happens through iterations of the business model, and thus, actors need to be ready to experiment and modify their own business models for the benefit of the network. What is more, historicals attempt to create MaaS-like services shape the development process and attitudes of participants in Finland.

In addition to past experiences, the government plays an important role in the development process, as it shapes the environment where MaaS actors operate. This is done with the help of legislation and regulations. Within the network, the process is orchestrated by the central “MaaS operator”, while also investors, mainly coming from the automotive industry, shape operations of MaaS start-ups and are largely interested in the development. Local established transportation companies then again are slow and rigid for change, and thus finding a common language and commercial interest with them is a crucial part of the future MaaS development process that helps to avoid silos and monopolies.

When it comes to competition among MaaS operators and within smaller transportation markets, it was perceived as highly positive. Furthermore, according to the research findings, variety of models allows more experimentation and development of specialized MaaS services and creates awareness and visibility for the whole concept. Competition within the smaller markets such as car rental market then again creates the basis for the platform economy, since Finland is lagging behind in terms of amount of services offered.

Finally, technological advancements, such as cheap sensors, automated vehicles and new powerful information systems were also seen as the engines of MaaS development. Many interviewees believed that MaaS has true potential to move from hype and pilot phase to the actual market phase and find customers among not only young early adopters, but also among elderly people and families. To get there, openness of the network and APIs are key, while cyber and data security issues should be carefully considered before opening everything.

6.DISCUSSION

Previous chapter outlined and analyzed the findings related to the business model of MaaS and its development process. The purpose of this chapter is to take the discussion on the next, broader level and examine the findings against the theory presented earlier. The chapter begins with the discussion of the business model of MaaS. Next, it analyses the business model development process, and finally it presents the revised theoretical framework describing the process of networked business model development and the factors affecting it.

6.1 Mobility as a service – The marketplace for smart mobility

My research concludes that Mobility as a Service is not a traditional emerging business model, but rather a networked business model that is co-created in the network of actors. Furthermore, Palo and Tähtinen (2013) view the business model as a dynamic method for creation and planning business in a net of actors rather than a static method for a single firm. They bring up that networked business models alter from the traditional understanding of business models as they focus on the shared benefits for all within the business network. By leading and shaping actions not only within but also between companies, the networked business models facilitate the win-win arrangements that are a prerequisite for successful cooperation (Palo and Tähtinen, 2013; Storbacka and Nenonen, 2011). Mobility as a Service is not a specific concept, a business model or technology, but rather a one-stop-shop for smart and personalized mobility. It emerges at the intersection of several concepts and ideas, multiple business models and technologies, and therefore fits the networked business model definition.

Despite the wide range of tools and methods for business model development discussed in the literature review, the study shows little evidence that these tools are actively used in the development of a new networked business model. The business model canvas (Osterwalder and Pigneur, 2010) seems to be the only tool that has been employed to some extent. I propose two reasons for that. Firstly, as MaaS is a networked business model, it consists of tens of individual business models and therefore formulation and definition of the combined business model is challenging and will take time. Secondly,

as the concept is still developing, companies are simply not willing to restrict development by defining and locking individual elements into a framework. In addition, Casadesus-Masanell (2011) states that the different descriptions of business models and detailed names like value proposition, profit formula, key resources and such surely help c-level executives to evaluate business models, but at the same time this type of categorization may become a constraint for developing radically different models, as definitions impose preconceptions about what they should look like. Therefore, at this point, I conclude that the openness of business models for changes is a crucial enabler of the overall development.

Overall, the business model canvas seems to be an important tool for crystallizing cause-and-effect relationships and consistency of strategic choices and actions of a company. The business model canvas is used especially by outsiders to evaluate the different emerging business models and their business viability (Chesbrough, 2010). Therefore, to summarize my findings and their relationship with the previous research on MaaS, I constructed the canvas presented in Figure 9 below.

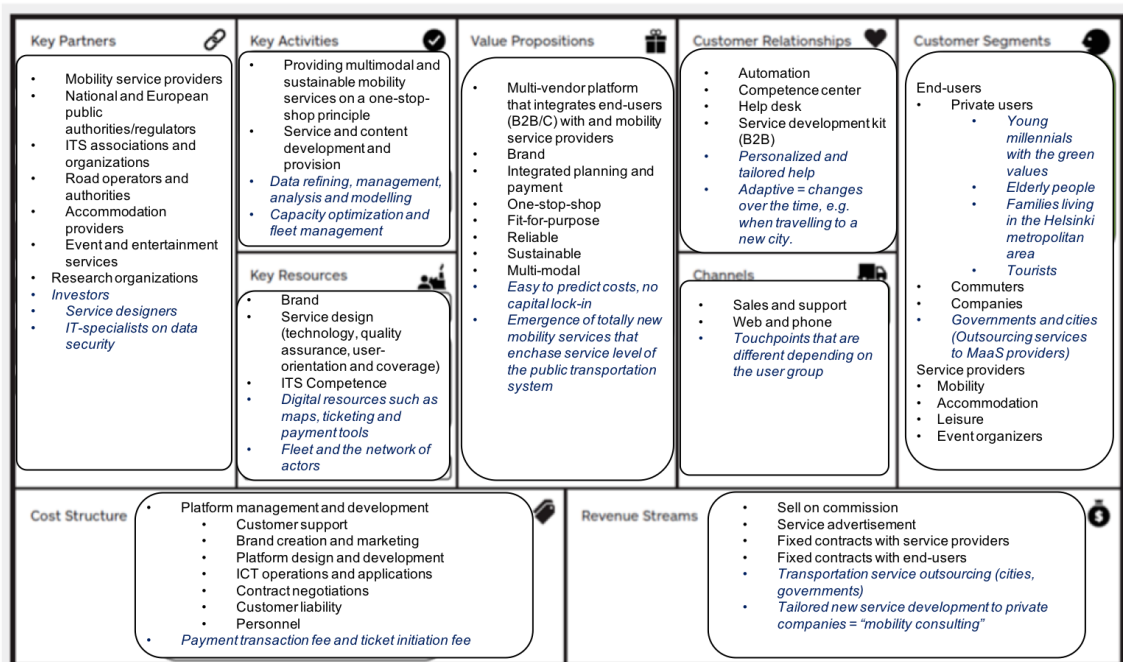


Figure 7. Revised MaaS business model canvas

My research findings support all original elements of the MaaS business model canvas of König et al., (2016), written with the black colour, and contributes several new factors that are marked with *the dark blue colour and italic style* in Figure 9. It can be observed that the business canvas of MaaS is broad and its different parts are linked to each other creating a unique combination. However, it should be noted that the presented figure is a snapshot of the current development state and the future vision rather than the ultimate representation of how the business model of MaaS should look like.

During my research process, I observed that different actors evaluate the business model, the value proposition and the development stage of MaaS largely from the perspective of their own business. This observation is in line with Palo and Tähtinen (2013) who distinguish two different levels of a networked business model and help simplify the complex multilayer structure of a networked business models. They propose that the inner level of a business model is the firm-specific one, in which the actors interact according to the rules specified in the elements of their own business model, while the second layer is the “net or network” level where participants play and do business according to the collective business model. Therefore, I propose that also in the MaaS network, these two levels exist, and the business model canvas depicts only the second layer where commercial and non-commercial organizations develop the joint understanding about the market opportunities and exploit them together.

Perhaps due to the networked nature of MaaS, the value proposition of it is broad and interviewees struggled to crystallize it into one sentence. Nevertheless, factors mentioned in the value proposition box of Figure 9 fulfill the characteristics of a good value proposition described by Johnson, Christensen and Kagermann (2008). Moreover, the authors suggest that to create a precise value proposition, it is important to think about four common barriers that keep persons away from getting things done: wealth, time, skills and access. The value proposition of MaaS tackles all four, and therefore may create real value to customers.

When it comes to value delivery, it is co-created and then co-delivered to users in two forms, in the form of information about alternative transportation modes and in the form

of digital tools such as maps, tickets, and payment methods (Ovaska, 2017). Co-creation happens between the network participants, and it is delivered to users through one unified user interface or touchpoint. In my research, several interviewees emphasized the importance of user-centric development and value delivery. This means that network participants should not think only about transportation services that are possible with their current business models, but rather use imagination and try to fulfill all possible needs that the different end users might have. In addition, it means giving users the power to give continuous open feedback and actively develop the service.

The third and centric element of a business model is value capture (Kaplan, 2010). Despite its importance, value capture mechanisms of MaaS are subject to changes and clarification. The revenue model of MaaS is based on economies of scale and large user amounts, nevertheless achieving this large installed base is challenging. The network of mobility services is valuable to users only if it provides a wide range of services that can substitute the private car, however new mobility services will not emerge and join the MaaS network if there are not enough users. This type of chicken-egg problem (Hagiu and Wright, 2015; Parker and Van Alstyne, 2005) is typical for platform businesses, part of which MaaS can also be seen (Ovaska, 2017).

Moreover, this research contributes to the research on platforms by Reponen (2017) and suggests that MaaS network relates to the government-as-a-platform phenomenon. In her thesis, Reponen (2017) discusses the possibility of government experiencing the platform revolution and becoming a service orchestrator. According to Reponen, (2017:5) *“government-as-a-platform (GaaS) is a technology-enabled government service innovation ecosystem, which consists of several smaller connected platforms or micro-entities, which represent different industry-level platforms within the public sector. Together these entities form an open innovation ecosystem, in which both public and private sector actors can create innovative solutions in a citizen-centric way”*. Findings of this research suggest that in 5 years MaaS networks will consolidate and formulate bigger industry-level ecosystems, meaning that MaaS networks or platforms are likely to become part of government-as-a-platform. However, this topic is out of the scope of this research and might be an avenue for the further research.

6.2 Development process of MaaS

Johnson, Christensen and Kagermann (2008) state that pursuing a new business model which is not disruptive to the industry and the market is not worth the effort. This study shows that during the past 30 years, Finland has been part of different EU-level transportation system transformation projects and in fact, current MaaS hype is the latest wave of this development. Earlier trials to introduce a MaaS-like system into the Finnish market have failed, mostly because the true demand and need from customer side did not exist and service coverage was too narrow. Now, as experience and sharing economy oriented millennials grow up and technologies enabling the transformation are ready, the opportunity has emerged, and Finland may pursue the development of a new disruptive model.

To continue, Chesbrough and Rosenbloom (2002); Johnson, Christensen and Kagermann (2008) propose that ultimately, the success of a business model comes not from detecting new technology, but from enveloping it in an appropriate, powerful business model. This research confirms this proposition and suggests that in addition to developing technological capabilities, MaaS operators should focus on the networked business model development and testing the model in real life.

The idealised business model development processes presented for example by Johnson, Christensen and Kagermann (2008); Chesbrough (2010) and Dmitriev et al. (2014), do not seem to be relevant in the case of MaaS or in the development of a networked business in general. Of course, the development process involves 1) identification of customer need to be satisfied, 2) generation of a blueprint of how a company can fulfil that gap at a profit and 3) comparing new model to existing business model, but alone these activities do not explain the complex process of the emerging business model development.

Nevertheless, looking at the current development from theoretical and business model emergency perspective, this research concludes that development begins with tens of individual business models evolving to the networked business model, supporting the

findings of Palo and Tähtinen (2013); Doganova and Eyquem-Renaul (2009). Furthermore, the findings show that the amount of mobility service providers play a crucial role in the development process of MaaS and networked business models in general. The more different transportation modes are integrated into one MaaS network, the better value it may offer to the end customer's various needs. In addition to transportation service providers, also other actors such as investors, government and IT-companies are central network participants and enablers of development.

If networks are so important, how relevant networks are identified and entered to? The research on this topic is scarce and for example, McCarthy et al. (2007) propose that one way to get started is to use the personal networks of company's employees, organizational contacts and contacts of private individuals within the target industry. This research reveals that MaaS operators put significant effort into growing the network and finding reliable partners. In Finland, this happens to a large extent through personal networks, but internationally press releases and industry conferences are important mediums for finding new companions. The process works also the other way around; transportation service providers approach MaaS operators as they are interested in diversifying their businesses and see MaaS as a way to secure business continuity in the digitalizing world. Therefore, I propose that today, personal networks are still relevant, but the view of McCarthy et al. (2007) should be expanded and include different industry forums as well as social and digital media. All these new factors help creating the global mass awareness and attract new network participants, which are needed for the success of MaaS.

What is more, in their research Chesbrough and Rosenbloom (2002) found that while faced with technological and market disruptions, management of established companies is cognitively trapped and finds it difficult to link the new technology to the economic domain using the new business model. Instead, during the face of business discontinuity, organizations specialize employees to focus within each domain, therefore missing the opening opportunity (Chesbrough and Rosenbloom, 2002). My research validates these findings and agrees that managers of established incumbent companies may have little incentive to search for alternatives outside the dominant successful business model, while managers of emerging companies behave in an opposite way.

Several interviewees described negotiations with established players as tough, since finding common commercial interest is demanding. Established players see customers relationship as precious resources that they want to guard, and believe that they are the best service providers for their current customers and therefore want to first observe how the MaaS market develops before making any concrete moves to join the network and open their APIs. This situation is similar what Chesbrough and Rosenbloom (2002) discovered in their research: management is trapped with the prevailing business model and finds it difficult to jump into a new train.

To sum up, according to my research, the development of MaaS in Finland is in good shape. The Finnish government has put significant effort into creating an environment and legislation enabling operations of MaaS market platforms in Finland. One of the most important efforts is the new Act on Transportation Services that opens up the market for new entrants, such as providers of on demand car sharing services, and creates guidelines for usage of new technologies such as APIs. Overall, based on these findings and using the theoretical framework developed in this study, I classify MaaS to the opportunistic business model phase. It is experiencing early hype and slowly moving towards the networked business model (Palo and Tähtinen, 2013). To transfer, MaaS must create awareness among users and actors outside of the traditional transportation industry, which will enable it to once more iterate the developing business model and start scaling up the operations. Nevertheless, I predict that after reaching the networked business model phase (Palo and Tähtinen, 2013) MaaS will continue its development towards an even more open business model, and finally start merging with other platforms, and therefore creating ecosystems of connected industry platforms (Reponen, 2017).

6.3 Revised theoretical framework

In the literature review chapter, I presented a theoretical framework that provides an overview of the networked business model development process. The framework was

constructed and based on the two literature streams relevant to the research focus of this study. The relevance of the framework was tested through the nine semi-structured interviews, review of research context literature and media publications relevant to the focus case, Mobility as a Service. The purpose of the empirical part of research was to find whether the theoretical framework requires some modifications.

The research findings supported the initially developed theoretical framework. Both the amount of network participants and the amount of business model iterations are evidently central to the process of networked business model development. Thus, these core elements of the original framework remain unchanged. Nevertheless, the research findings revealed multiple new factors affecting the development process that were not considered and discussed earlier, therefore resulting in some modifications to the original theoretical framework.

This research identified several main categories critical for the development of the networked MaaS business model, these categories are: technology, legislation, market structure, competitive action, and mindsets and behaviours. Some factors are specific to the case and therefore their generalizability remains still to be tested. However, out of five I selected two factors that can be generalized and added to the original theoretical framework. These factors were picked due to their centrality in the interviews, applicability to the several industries and partial linkage to the existing literature. In my framework I call these factors “reinforcing elements”, as despite their centrality, they would not alone enable development of networked business models.

Firstly, it was discovered that emergence and advancement of enabling technologies serves as a central reinforcing factor for networked business model development. Even though an emerging business model is not a technology itself, it is largely enabled by the development of several technologies that for example allow the focal company to operate and connect the network of actors into a single coherent network that together may produce products and services. Secondly, the research indicated that legislation related to the emerging business model creates a supportive legal environment for doing business and ensures that the emerging model is not at a legislative disadvantage compared to the

established models within the given industry. As a result of the empirical study, the original core factors are represented as two purple arrows, and new reinforcing elements as a green arrow. The revised framework is represented below in the Figure 8.

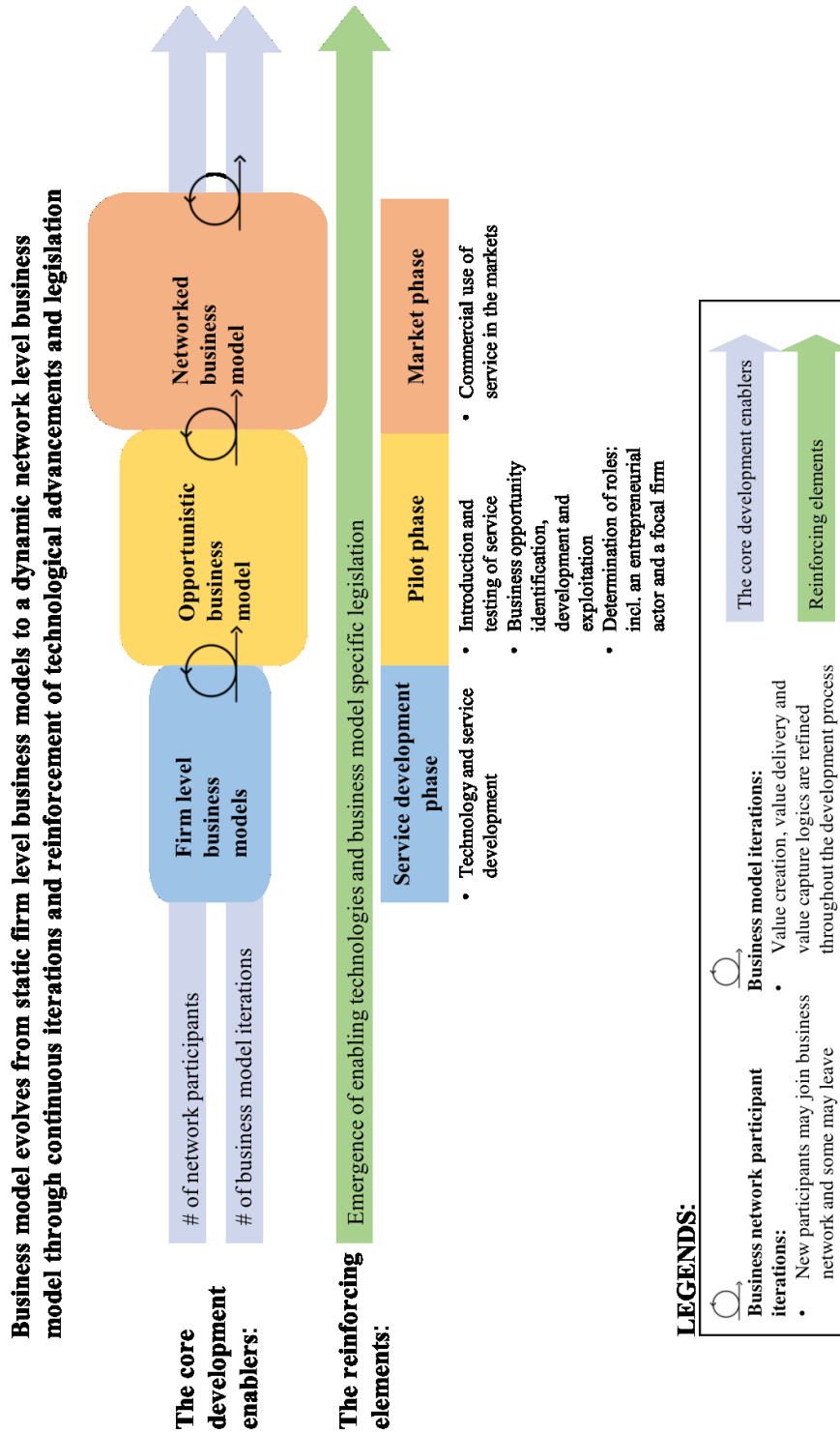


Figure 8. Revised theoretical framework

7. CONCLUSION

In this chapter, I summarize the main findings of this research, discuss practical implications of them, and lastly conclude by explaining the limitations of my study and suggesting areas for future research.

7.1 Main findings

In this study, I have examined the concept of Mobility as a Service – a current phenomenon in the Finnish transportation industry that has gained significant interest on the global transportation markets. The overarching empirical purpose of this work was to understand the on-going development process in Finland and especially in the Helsinki metropolitan area where the concept is most developed. My work answers one specific research question:

How is the new business model Mobility as a Service developed in Finland?

In addition to examining the business model development process, the objective of this thesis was to describe the concept of MaaS itself and describe the elements of the business model of MaaS. I also aimed to describe the history and origins of MaaS, and indeed, the research showed that historical attempts play a central role in the current development process. Theoretically, the goal was to contribute knowledge to the very limited literature on business model development and especially networked business model development. Based on the literature review and the empirical study, I created a revised theoretical framework describing the process of networked business model development and the factors affecting it.

My research concludes that Mobility as a Service is not a traditional emerging business model but rather a networked business model that is co-created in the network of actors. It emerges at the intersection of several concepts and ideas, multiple business models and technologies. In addition, MaaS is a holistic way of thinking about transportation. It offers intermodal transportation services not only on a national level, but also internationally. MaaS is a door-to-door travel chain, offering seamless user experience through one

touchpoint. It results in a wider variety of transportation modes and services that together aim to provide service level comparable or even greater than a private car. Instead of one size fits all, MaaS is about customization, automation and robotization of transportation services.

Despite the wide range of tools and methods of business model development discussed in the literature review, this study showed little evidence that these tools are actively used in the development of a new networked business model. Different descriptions of business models' elements help c-level executives to evaluate business models, but at the same time this type of categorization may become a constraint for developing the radically different models as definitions impose preconceptions about what they should look like. Therefore, I conclude that the openness of business model for changes and iterations is the crucial enabler of the emerging business model development.

Looking at the current development from theoretical and business model emergency perspective, this research concludes that development of a technology based networked business model begins with tens of independent business models evolving to the networked business model, supporting the findings of previous research. Therefore, before embarking to the endeavour of developing a shared business model, managers of independent companies should understand their own prevailing business models and their structural linkages inside out.

As the development process of a networked business model is continuous and iterative in its nature, various business model elements influence each other through learning and involvement of new participants. This learning and involvement process facilitates identification of opportunities, their development and exploitation. Thus, I propose that before becoming a fully functioning networked business model, emerging model takes the form of an opportunistic business model, during which introduction and testing of the emerging service happens.

The actual transition from the model to the business happens as a series of try-outs in the market. During those try-outs, also the potential partners are met, and the network of

cooperation established. In this phase, the roles of actors become defined and new opportunities are explored through a shared networked business model. However, the development of the business model does not stop but rather it continues and may for example evolve to an even bigger networked business model constellation or ecosystem where smaller networks merge and exchange services with each other.

Moreover, to describe the development process, this research has identified two core and two reinforcing factors affecting the development process. The core factors are: the amount of business network participants and the amount of business model iterations, while the reinforcing factors are: new technological advancements and legislative support. The core factors were already addressed in the previous paragraphs and therefore only the latter ones, the reinforcing factors, are addressed next.

Similarly to many other emerging business models, MaaS is enabled by the advancement of several technologies and ICT infrastructures. While ICT infrastructure, fast internet connections and high mobile phone penetration serve as the base for development, APIs, cloud computing, sensors, big data and data analytics were identified as the central technologies enabling the development. Thus, I conclude that technological advancements help the focal company operate and connect the network of actors into a single coherent network that together may produce products and services.

Legislation and regulations imposed by government is the second important reinforcing factor affecting the development process. In Finland, the government aims to facilitate a bigger transportation reform and as part of it issues new laws, regulations, and modifies the old ones. According to this research, aforementioned actions facilitate emergence of new industry players that are vital for the networked business model development. Moreover, legislation related to the emerging business model creates a supportive legal environment for doing business and ensures that the emerging model is not at a legislative disadvantage compared to the established models within the given industry.

Finally, in addition to answering the proposed research question, an intensive study at hand focused on building a holistic and thick description of a single case, Mobility as a

Service ecosystem in the Helsinki region. Findings of this research therefore provide not only a theoretical framework about business model development, but also practical knowledge about the current development state of MaaS, MaaS services existing in the Helsinki region and a summary on MaaS related literature. Together, this knowledge may be used to plan and develop MaaS in other cities and countries. Moreover, all of these factors may potentially be used as a basis for upcoming empirical studies and for identifying possible avenues for the further research. The result of this research is the theoretical framework that describes the development process of an emerging networked business model and the main factors enabling that development. From theoretical perspective, this is a novel contribution to the existing business model development literature and may be used in future studies in the field. Furthermore, this research identified a set of suggestions for the further research, which are discussed in the final section of this research.

7.2 Practical implications

As digitalization reshapes the traditional transportation industry boundaries, it is important to understand how technologies and different industry players are starting to interact and where and how the new opportunities emerge. This study describes in detail the current development process and the business model elements of a single case, Mobility as a Service in Finland. Due to the highly practical nature of this study, I will not repeat the findings, but rather point out the main ideas and discuss what actions actors in the Finnish MaaS network may take.

First of all, the development process of a networked business model, where several actors co-create the customer value, starts from the entrepreneurial actor(s) who drives and inspires the development. The entrepreneurial actor may be a governmental or a commercial entity and originate from inside or outside of the industry. Using personal and business networks, the entrepreneurial actor attracts other relevant players to the network. In the beginning, the network participants interact through their own business models and the entrepreneurial actor orchestrates that interaction. This stage can be compared to a traditional provider-supplier relationship.

The Helsinki metropolitan area has several MaaS operators who serve as entrepreneurial actors, for example, MaaS Global and Tuup Kyyti. However, the overall development of MaaS could benefit if there were more companies aiming to become the entrepreneurial actors and MaaS operators. Based on this research these companies could be, for instance, OP and VR, as these companies have established operations all around Finland, wide partner network, and sufficient financial resource to pursue the challenge. However, as both are established companies, I suggest that the development of new services should happen in a separate business unit, this would ensure that the managers are not rationally bounded.

To continue, according to the theory, as the amount of a network participants grows, the network moves from the firm-level business model to the opportunistic business model level, where different players iterate and pilot the future product or service. As a result of iterations, the roles of an individual players get determined and the emerging business model starts moving towards the networked business model level. When reaching the networked business model level, the entrepreneurial actor(s) and the other network participants have a truly shared business model that operates on the market and delivers the promised value to end-customers. During this stage, the entrepreneurial actor still has the role of orchestrator, but the responsibility of value delivery and innovation is distributed among the network participants.

This research suggests that currently the existing MaaS networks are still in the opportunistic business model phase. To make a move to the market phase and networked business model level, I suggest MaaS operators to do more pilots and market try-outs. It was evident that interviewed transportation service providers were restless and would prefer doing quick market iterations rather than first developing technologically perfect service.

Lastly, I will briefly discuss suggestions for other actors. For the transportation service providers, I suggest taking more active role in the development, voicing opinions, and even trying to become an entrepreneurial actor. For example, transportation service

providers could have own short marketing campaigns featuring the new MaaS service. For governmental actors, I suggest continuing the legislative work and developing the legislation that would encourage employers to offer MaaS service to the employees, since commuters make the big portion of overall transportation. For technology and marketing companies, I advise taking the proactive approach and showcasing skills and capabilities to the MaaS operators. At the moment, MaaS providers seem to be busy with IT-development and advertising the service abroad, therefore having a reliable partner in the home country could increase the development speed. Lastly for the transportation service providers that are not yet part of the network I suggest considering MaaS as a business development opportunity and joining the network sooner than later. Moreover, I encourage the transportation providers to experiment with new services and pricing models themselves, as previous experiences are valuable learning points for the whole networked business model.

7.3 Limitations and suggestions for further research

The presented framework and findings of this research provide a step forward in understanding the process and factors affecting the development process of an emerging networked business model. However, they have some limitations. Firstly, the framework that emerged as a result of this research needs further empirical validation. Eisenhardt (1989) notes that aside from many advantages of a case study approach, the theory based on the case study inherits some weaknesses and might be overly complex, or narrow and idiosyncratic. Therefore, studying the Mobility as a Service concept as a multiple case study with a greater sample would provide a more complete understanding of the concept.

Furthermore, an intensive research like mine focuses on understanding a specific unit of analysis and therefore the case is examined in its natural setting, usually over a certain period of time (Dyer and Wilkins, 1991; Yin, 2003). My case represents a specific unit of analysis, but is limited to the snapshot of the current state due to the short time span of the master's thesis work. Thus, as MaaS is a constantly evolving concept, the answers of interviewees might in the future vary to some extent due to changes in the surrounding

business environment. Therefore, conducting a longitudinal intensive case study would further increase the reliability and comprehensiveness of the research.

In addition, in future research endeavours, studying the end-users' point of view is important, as they are the fundamental reason why MaaS exists. Nevertheless, this type of research would require most likely maturity of MaaS. Besides, extending the geographical scope of research would generate comparative data that might be used to discover whether the enabling and hindering factors of development are different across countries or not.

Also, introduction of other research methods besides semi-structured interviews and media research might be used to gain even deeper insights on the phenomenon. Indeed, Eisenhardt (1989) proposes that use of both quantitative and qualitative research methods improves the triangulation of study. Lastly, specifically the value capture mechanisms of MaaS might be studied in more detail, as this research indicated that this particular area is the most undefined despite its importance for the business (Johnson, Christensen and Kagermann, 2008). In addition, studying the relevance of MaaS for government-as-a-platform, which was briefly discussed in this study, might be an interesting challenge and contribute increased knowledge on the rising platform economy.

To sum up, the findings and the theoretical framework presented in this study provide only a starting point for research on the networked business model development and do not answer several important questions. Despite of that, these remaining questions are promising avenues for further research and have the potential to elevate our understanding of emerging business models like Mobility as a Service.

“A developed country is not a place where the poor have cars. It's where the rich use public transportation.”

-Gustavo Petro-

REFERENCES

- Ahuja, G. (2000). Collaboration Networks, Structural Holes, and Innovation: A Longitudinal Study. *Administrative Science Quarterly*, [online] 45(3), p.425. Available at: <http://journals.sagepub.com/doi/abs/10.2307/2667105> [Accessed 5 Dec. 2017].
- Amit, R. and Zott, C. (2012). Creating Value Through Business Model Innovation. *MIT SLOAN MANAGEMENT REVIEW*, pp.41-48.
- Baden-Fuller, C. and Mangematin, V. (2013). Business models: A challenging agenda. *Strategic Organization*, [online] 11(4), pp.418-427. Available at: <http://journals.sagepub.com/doi/abs/10.1177/1476127013510112> [Accessed 6 Nov. 2017].
- Bahrami, H. and Evans, S. (1995). Flexible Re-Cycling and High-Technology Entrepreneurship. *California Management Review*, 37(3), pp.62-89.
- Bettencour, L. and Ulwick, A. (2008). The Customer-Centered Innovation Map. *Harvard Business Review*, [online] 86(5), pp.109-14, 130. Available at: <https://hbr.org/2008/05/the-customer-centered-innovation-map> [Accessed 6 Dec. 2017].
- Blumer, H. (1969). Fashion: From Class Differentiation to Collective Selection. *The Sociological Quarterly*, 10(3), pp.275-291.
- Bohnsack, R., Pinkse, J. and Kolk, A. (2014). Business models for sustainable technologies: Exploring business model evolution in the case of electric vehicles. *Research Policy*, [online] 43(2), pp.284-300. Available at: <http://www.sciencedirect.com/science/article/pii/S0048733313001935> [Accessed 11 Nov. 2017].
- Boston Consulting Group (2008). *Customer Segmentation - A Call to Action*. Focus. [online] Paris, p.2. Available at: <https://www.bcg.com/documents/file15287.pdf> [Accessed 18 Dec. 2017].
- Bouton, S., Mihov, I., Swartz, S. and Knupfer, S. (2015). Urban mobility as a tipping point. *McKinsey*.
- Casadesus-Masanell, R. and Ricart, J. (2011). How to Design A Winning Business Model. *Harvard Business Review*, pp.101-107.
- Chandra, Y., Styles, C. and Wilkinson, I. (2012). An Opportunity-Based View of Rapid Internationalization. *Journal of International Marketing*, [online] 20(1), pp.74-102. Available at: <http://journals.ama.org/doi/abs/10.1509/jim.10.0147?code=amma-site> [Accessed 13 Dec. 2017].
- Chesbrough, H. (2010). Business Model Innovation: Opportunities and Barriers. *Long Range Planning*, [online] 43(2-3), pp.354-363. Available at: <http://www.businessmodelcommunity.com/fs/root/8oex8-chesbrough.pdf> [Accessed 5 Nov. 2017].

- Chesbrough, H. and Rosenbloom, R. (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*, [online] 11(3), pp.529-555. Available at: <https://academic.oup.com/icc/article-abstract/11/3/529/1044102?redirectedFrom=PDF> [Accessed 8 Nov. 2017].
- Christensen, C., Birnbaum, R. and Raynor, M. (2005). The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail. *Academe*, 91(1), p.80.
- Coombes, P. and Nicholson, J. (2013). Business models and their relationship with marketing: A systematic literature review. *Industrial Marketing Management*, [online] 42(5), pp.656-664. Available at: <http://www.sciencedirect.com/science/article/pii/S0019850113000734> [Accessed 14 Nov. 2017].
- Coombes, P. and Nicholson, J. (2013). Business models and their relationship with marketing: A systematic literature review. *Industrial Marketing Management*, [online] 42(5), pp.656-664. Available at: <http://isiarticles.com/bundles/Article/pre/pdf/7835.pdf> [Accessed 7 Jan. 2018].
- Das, T. and Teng, B. (1998). Between Trust and Control: Developing Confidence in Partner Cooperation in Alliances. *The Academy of Management Review*, [online] 23(3), p.491. Available at: <http://www.jstor.org/stable/259291> [Accessed 7 Dec. 2017].
- Deloitte (2017). *The rise of mobility as a service-Reshaping how urbanites get around*. [online] Available at: https://dupress.deloitte.com/dup-us-en/deloitte-review/issue-20/smart-transportation-technology-mobility-as-a-service.html?id=us:2ps:3gl:confidence:eng:cons:112816:em:na:YT1cD2by:1035786749:185523941186:e:Future_of_Mobility:MaaS_Exact:nb [Accessed 24 Oct. 2017].
- Dmitriev, V., Simmons, G., Truong, Y., Palmer, M. and Schneckenberg, D. (2014). An exploration of business model development in the commercialization of technology innovations. *R&D Management*, 44(3), pp.306-321.
- Doganova, L. and Eyquem-Renault, M. (2009). What do business models do?. *Research Policy*, [online] 38(10), pp.1559-1570. Available at: <http://www.sciencedirect.com/science/article/pii/S0048733309001668> [Accessed 13 Dec. 2017].
- Driverless Transportation. (2016). *Mobility as a Service (MaaS) Growing in the EU - Driverless Transportation*. [online] Available at: <http://www.driverlesstransportation.com/mobility-service-maas-growing-eu-12608> [Accessed 20 Jan. 2018].
- Dubois, A. and Gadde, L. (2002). Systematic combining: an abductive approach to case research. *Journal of Business Research*, [online] 55(7), pp.553-560. Available at: https://www.researchgate.net/publication/222563830_Systematic_Combining_An_Abductive_Approach_to_Case_Research [Accessed 24 Sep. 2017].

- Dyer, W. and Wilkins, A. (1991). Better Stories, Not Better Constructs, to Generate Better Theory: A Rejoinder to Eisenhardt. *The Academy of Management Review*, [online] 16(3), p.613. Available at: <http://voynnetf.free.fr/mrq/02dyerwilkinsstories.pdf> [Accessed 15 Sep. 2017].
- Easton, G. (2010). Critical realism in case study research. *Industrial Marketing Management*, [online] 39(1), pp.118-128. Available at: <http://www.sciencedirect.com/science/article/pii/S0019850109001424> [Accessed 16 Sep. 2017].
- Eisenhardt, K. (1989). Building Theories from Case Study Research. *The Academy of Management Review*, [online] 14(4), p.532. Available at: http://www.jstor.org/stable/258557?seq=1#page_scan_tab_contents [Accessed 19 Sep. 2017].
- Eriksson, P. and Kovalainen, A. (2011). *Qualitative methods in business research*. London: Sage.
- Foss, N. and Saebi, T. (2017). Fifteen Years of Research on Business Model Innovation. *Journal of Management*, [online] 43(1), pp.200-227. Available at: <http://journals.sagepub.com/doi/pdf/10.1177/0149206316675927> [Accessed 13 Dec. 2017].
- Freytag, P. and Clarke, A. (2001). *Business-to-business market segmentation*. [online] Findresearcher.sdu.dk. Available at: [http://findresearcher.sdu.dk/portal/en/publications/businessstobusiness-market-segmentation\(5e2e8500-ba96-11dc-9626-000ea68e967b\).html](http://findresearcher.sdu.dk/portal/en/publications/businessstobusiness-market-segmentation(5e2e8500-ba96-11dc-9626-000ea68e967b).html) [Accessed 19 Dec. 2017].
- Gartner (2017). *Gartner Says Digital Disruptors Are Impacting All Industries; Digital KPIs Are Crucial to Measuring Success*. [online] Available at: <https://www.gartner.com/newsroom/id/3810771> [Accessed 22 Jan. 2018].
- Gartner Research (2003). *Understanding Gartner's Hype Cycle*. [online] Gartner. Available at: <http://www.bus.umich.edu/KresgePublic/Journals/Gartner/research/115200/115274/115274.pdf> [Accessed 19 Dec. 2017].
- Gay, B. (2014). Open innovation, networking, and business model dynamics: the two sides. *Journal of Innovation and Entrepreneurship*, [online] 3(1), p.2. Available at: <https://innovation-entrepreneurship.springeropen.com/articles/10.1186/2192-5372-3-2> [Accessed 15 Nov. 2017].
- Geertz, C. (1973). *The interpretation of cultures*. New York: Basic Books, Inc., Publishers.
- Ghauri, P. and Grønhaug, K. (2005). *Research methods in business studies: A practical guide*. Pearson Education.
- Giesecke, R., Surakka, T. and Hakonen, M. (2016). *Conceptualising Mobility as a Service - A User Centric View on Key Issues of Mobility Services*. [online]

- Ieeexplore.ieee.org. Available at:
<http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=7476443> [Accessed 24 Oct. 2017].
- Gray, D. (2013). *Doing research in the real world*. SAGE.
- Grönroos, C. (2005). *What can a service logic offer marketing theory*. Helsingfors: Swedish School of Economics and Business Administration, pp.354-364.
- Grönroos, C. (2008). Service logic revisited: who creates value? And who co-creates?. *European Business Review*, [online] 20(4), pp.298-314. Available at: <http://www.emeraldinsight.com/doi/abs/10.1108/09555340810886585> [Accessed 13 Dec. 2017].
- Hagiü, A. and Wright, J. (2015). Multi-Sided Platforms. *SSRN Electronic Journal*.
- Håkansson, H. and Olsen, P. (2012). Innovation management in networked economies. *Journal of business market management*, [online] 5(2), pp.79-105. Available at: <http://jbm-online.net/index.php/jbm/article/view/15> [Accessed 12 Dec. 2017].
- Harré, R. (1979). Social being: A theory for social psychology. *European Journal of Social Psychology*, [online] 11(4), pp.445-450. Available at: <http://onlinelibrary.wiley.com/doi/10.1002/ejsp.2420110409/full> [Accessed 24 Oct. 2017].
- Hietanen, S. (2014). Mobility as a Service' – the new transport model. *ITS & TRANSPORT MANAGEMENT SUPPLEMENT*, 12(2).
- Hietanen, S. (2017). *Master's thesis interview*.
- Hirsjärvi, S. and Hurme, H. (2004). *Tutkimushaastattelu. Teemahaastattelun teoria ja käytäntö (Research interview. Theory and practice of thematic interview)*. Helsinki: Gaudeamus Helsinki University Press.
- Holmberg, P., Collado, M., Sarasini, S. and Williander, M. (2016). *MOBILITY AS A SERVICE- MAAS Describing the framework*. [online] Victoria Swedish Ict AB. Available at: https://www.viktoria.se/sites/default/files/pub/www.viktoria.se/upload/publications/final_report_maas_framework_v_1_0.pdf [Accessed 24 Oct. 2017].
- Jittrapirom, P., Caiati, V., Feneri, A., Ebrahimigharehbaghi, S., González, M. and Narayan, J. (2017). Mobility as a Service: A Critical Review of Definitions, Assessments of Schemes, and Key Challenges. *Urban Planning*, [online] 2(2), p.13. Available at: https://www.researchgate.net/profile/Peraphan_Jittrapirom/publication/310424579_Understanding_decision_makers%27_perceptions_of_Chiang_Mai_city%27s_transport_problems_-_an_application_of_Causal_Loop_Diagram_CLD_methodology_-_In_publication/links/595cbdfda6fdcc86232993b7/Understanding-decision-makers-perceptions-of-Chiang-Mai-citys-transport-problems-an-application-of-

- Causal-Loop-Diagram-CLD-methodology-In-publication.pdf [Accessed 29 Aug. 2017].
- Johnson, M., Christensen, C. and Kagermann, H. (2008). Reinventing Reinventing Your Your Business Model. *Harvard Business Review*.
- Kamargianni, M. and Matyas, M. (2017). The Business Ecosystem of Mobility as a Service. [online] Available at: https://www.researchgate.net/profile/Maria_Kamargianni/publication/314760234_The_Business_Ecosystem_of_Mobility-as-a-Service/links/58c5b805aca272e36dda9e09/The-Business-Ecosystem-of-Mobility-as-a-Service.pdf [Accessed 17 Aug. 2017].
- Kamargianni, M., Li, W., Matyas, M. and Schäfer, A. (2016). A Critical Review of New Mobility Services for Urban Transport. *Transportation Research Procedia*, 14, pp.3294-3303.
- Kijl, B., Bouwman, H., Haaker, T. and Faber, E. (2005). DEVELOPING A DYNAMIC BUSINESS MODEL FRAMEWORK FOR EMERGING MOBILE SERVICES. [online] Available at: http://userpage.fu-berlin.de/~jmueller/its/conf/porto05/papers/Kijl_Bouwman_Haaker_Faber.doc [Accessed 5 Dec. 2017].
- Kolehmainen, E. (2017). *THE PROCESS OF BUSINESS MODEL DEVELOPMENT*. Graduate. Aalto University School of Business.
- König, D., Eckhardt, J., Aapaoja, A., Sochor, J. and Karlsson, M. (2016). *Deliverable 3: Business and operator models for MaaS*. [online] VTT Technical Research Centre of Finland Ltd, AustricTech, Chalmers University of Technology. Available at: <http://www.vtt.fi/sites/maasfie/fi/tulokset> [Accessed 24 Oct. 2017].
- Lehto, L. (2016). *Autoilun todellinen hinta? Näin paljon auton omistaminen maksaa*. [online] Kauppalehti.fi. Available at: <https://www.kauppalehti.fi/uutiset/autoilun-todellinen-hinta-nain-paljon-auton-omistaminen-maksaa/Y27A3wHu> [Accessed 30 Jan. 2018].
- Lundgren, A. (1995). *Technological innovation and network evolution*. London [etc.]: Routledge.
- LUSCH, R. (2011). REFRAMING SUPPLY CHAIN MANAGEMENT: A SERVICE-DOMINANT LOGIC PERSPECTIVE. *Journal of Supply Chain Management*, 47(1), pp.14-18.
- Maas4eu.eu. (2017). *MaaS4EU – Mobility as a Service for European Union*. [online] Available at: <http://www.maas4eu.eu> [Accessed 18 Jan. 2018].
- Mason, K. and Spring, M. (2011). The sites and practices of business models. *Industrial Marketing Management*, 40(6), pp.1032-1041.

- McCarthy, I., Pitt, L., Campbell, C., Van der Merwe, R. and Salehi-Sangeri, E. (2007). Exploiting the business opportunities in biotech connections: The power of social networks. *Journal of Commercial Biotechnology*, 13(4).
- Möller, K., Rajala, A. and Svahn, S. (2005). Strategic business nets—their type and management. *Journal of Business Research*, [online] 58(9), pp.1274-1284. Available at: <http://www.sciencedirect.com/science/article/pii/S0148296304000487?via%3Dihub> [Accessed 13 Dec. 2017].
- Moore, J. (1993). Predators and Prey: A New Ecology of Competition. *Harvard Business Review*. [online] Available at: <https://hbr.org/1993/05/predators-and-prey-a-new-ecology-of-competition> [Accessed 28 Sep. 2017].
- Morris, M., Schindehutte, M. and Allen, J. (2005). The entrepreneur's business model: toward a unified perspective. *Journal of Business Research*, 58(6), pp.726-735.
- Nyström, A. and Mustonen, M. (2017). The dynamic approach to business models. *AMS Review*.
- OP Lab. (2017). *OP pilots a mobility service to manage the travel expenses of employees* | OP Lab. [online] Available at: <https://op-lab.fi/op-pilots-a-mobility-service-to-manage-the-travel-expenses-of-employees/> [Accessed 7 Jan. 2018].
- Osterwalder, A. (2013). A Better Way to Think About Your Business Model. *Harvard Business Review*.
- OSTERWALDER, A. (2004). *THE BUSINESS MODEL ONTOLOGY A PROPOSITION IN A DESIGN SCIENCE APPROACH*. Ph.D. UNIVERSITE DE LAUSANNE ECOLE DES HAUTES ETUDES COMMERCIALES.
- Osterwalder, A. and Pigneur, Y. (2010). *Business model generation: a handbook for visionaries, game changers, and challengers*. Hoboken, N.J.: Wiley.
- Ovans, A. (2015). What Is a Business Model?. *Harvard Business Review*. [online] Available at: <https://hbr.org/2015/01/what-is-a-business-model> [Accessed 2 Jan. 2018].
- Ovaska, J. (2017). *Emergence of mobility market platforms Case: Mobility as a Service in Finland*. Master's thesis. Aalto University School of Business.
- Palo, T. and Tähtinen, J. (2013). Networked business model development for emerging technology-based services. *Industrial Marketing Management*, [online] 42(5), pp.773-782. Available at: <http://www.sciencedirect.com/science/article/pii/S0019850113001004> [Accessed 2 Nov. 2017].
- Parker, G. and Van Alstyne, M. (2005). Two-Sided Network Effects: A Theory of Information Product Design. *Management Science*, 51(10), pp.1494-1504.

- Parker, G., Van Alstyne, M. and Choudary, S. (2016). *Platform revolution: How networked markets are transforming the economy-and how to make them work for you..* New York: WW Norton & Company.
- Parker,, G. and Alstyne, M. (2008). Managing Platform Ecosystems. In: *ICIS 2008*. [online] AIS Electronic Library (AISeL). Available at: <http://aisel.aisnet.org/icis2008/53/> [Accessed 2 Jan. 2018].
- PWC (2017). *The 2017 Strategy& Digital Auto Report Fast and furious: Why making money in the “roboconomy” is getting harder.* [online] Price. Available at: <https://www.strategyand.pwc.com/media/file/2017-Strategyand-Digital-Auto-Report.pdf> [Accessed 7 Jan. 2018].
- Radcliffe, B. (n.d.). *Sharing Economy.* [online] Investopedia. Available at: <https://www.investopedia.com/terms/s/sharing-economy.asp> [Accessed 3 Dec. 2017].
- Rautiainen, M. (2017). *Split Finland siirtyy Volkswagen Groupin liikennepalveluyhtiölle – "Suomi tulee olemaan meille osaamiskeskus".* [online] Talouselämä. Available at: <https://www.talouselama.fi/uutiset/split-finland-siirryy-volkswagen-groupin-liikennepalveluyhtiolle-suomi-tulee-olemaan-meille-osaamiskeskus/cd537c43-30dd-3c9a-ad17-8db79514aea3> [Accessed 1 Feb. 2018].
- Reponen, S. (2017). *GOVERNMENT-AS-A-PLATFORM: ENABLING PARTICIPATION IN A GOVERNMENT SERVICE INNOVATION ECOSYSTEM.* Master's Thesis. Aalto University School of Business.
- Rumble, R. and Mangematin, V. (2015). Business Model Implementation: The Antecedents of Multi-Sidedness. *Busienss model and modelling*, [online] pp.97-131. Available at: <http://www.emeraldinsight.com/doi/abs/10.1108/S0742-332220150000033021> [Accessed 2 Nov. 2017].
- Sarasini, S. and Linder, M. (2017). Integrating a business model perspective into transition theory: The example of new mobility services. *Environmental Innovation and Societal Transitions.* [online] Available at: <https://www.sciencedirect.com/science/article/pii/S2210422416301046> [Accessed 13 Dec. 2017].
- Saunders, M., Lewis, P. and Thornhill, A. (2009). *Research methods for business students.* 5th ed. Pearson, pp.106-128.
- Shafer, S., Smith, H. and Linder, J. (2005). The power of business models. *Business Horizons*, [online] 48(3), pp.199-207. Available at: <http://www.sciencedirect.com/science/article/pii/S0007681304001132> [Accessed 6 Nov. 2017].
- Shane, S. and Venkataraman, S. (2000). THE PROMISE OF ENTREPRENEURSHIP AS A FIELD OF RESEARCH. *Academy of Management Review*, 25(1), pp.217-226.

- Shank, G. (2006). *Qualitative research*. Upper Saddle River, N.J.: Pearson Merrill Prentice Hall, p.130.
- Sochor, J., Strömberg, H. and Karlsson, I. (2014). TRAVELERS' MOTIVES FOR ADOPTING A NEW, INNOVATIVE TRAVEL SERVICE: INSIGHTS FROM THE UBIGO FIELD OPERATIONAL TEST IN GOTHENBURG, SWEDEN. [online] Available at: http://publications.lib.chalmers.se/records/fulltext/204386/local_204386.pdf [Accessed 9 Aug. 2017].
- Stake, R. (1995). *The art of case study research*.
- Steinert, M. and Leifer, L. (2010). Scrutinizing Gartner's hype cycle approach. In: *PICMET 2010 TECHNOLOGY MANAGEMENT FOR GLOBAL ECONOMIC GROWTH*. [online] Available at: <http://ieeexplore.ieee.org/document/5603442/?arnumber=5603442> [Accessed 19 Dec. 2017].
- Storbacka, K. and Nenonen, S. (2011). Scripting markets: From value propositions to market propositions. *Industrial Marketing Management*, [online] 40(2), pp.255-266. Available at: <http://www.sciencedirect.com/science/article/pii/S0019850110001215?via%3Dihub> [Accessed 13 Dec. 2017].
- Strömberg, H., Rexfelt, O., Karlsson, I. and Sochor, J. (2016). Trying on change – Trialability as a change moderator for sustainable travel behaviour. *Travel Behaviour and Society*, [online] 4, pp.60-68. Available at: <http://www.sciencedirect.com/science/article/pii/S2214367X1600003X> [Accessed 31 Sep. 2017].
- Teece, D. (2007). Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13), pp.1319-1350.
- Teece, D. (2010). Business Models, Business Strategy and Innovation. *Long Range Planning*, 43(2-3), pp.172-194.
- The Guardian (2014). *Helsinki's ambitious plan to make car ownership pointless in 10 years*. [online] Available at: <https://www.theguardian.com/cities/2014/jul/10/helsinki-shared-public-transport-plan-car-ownership-pointless> [Accessed 24 Oct. 2017].
- Todnem By, R. (2005). Organisational change management: A critical review. *Journal of Change Management*, [online] 5(4), pp.369-380. Available at: <http://www.tandfonline.com/doi/abs/10.1080/14697010500359250> [Accessed 13 Dec. 2017].
- Transportation Service Provider (TSP) Law and Legal Definition. (n.d.). [online] USLegal. Available at: <https://definitions.uslegal.com/t/transportation-service-provider-tsp/> [Accessed 17 Jan. 2018].

- United Nations, Department of Economic and Social Affairs, Population Division (2015). *Population 2030 Demographic challenges and opportunities for sustainable development planning*. [online] New York: United Nations. Available at: <http://www.un.org/en/development/desa/population/publications/pdf/trends/Population2030.pdf> [Accessed 20 Jan. 2018].
- Van Audenhove, F., Dauby, L., Korniiichuk, O. and Pourbaix, J. (2014). *The Future of Urban Mobility 2.0*. [online] Arthur D Little. Available at: http://www.uitp.org/sites/default/files/members/140124%20Arthur%20D.%20Little%20%26%20UITP_Future%20of%20Urban%20Mobility%202%200_Full%20study.pdf [Accessed 14 Nov. 2017].
- Van Der Valk, T., Meeus, M., Moors, E. and Faber, J. (2010). R&D COLLABORATION IN THE LIFE SCIENCES: FINDING PARTNERS AND THE ROLE OF RESOURCE-BASED INDUCEMENTS AND OPPORTUNITIES. *International Journal of Innovation Management*, [online] 14(02), pp.179-199. Available at: <http://www.worldscientific.com/doi/abs/10.1142/S136391961000260X> [Accessed 13 Dec. 2017].
- Witell, L., Kristensson, P., Gustafsson, A. and Löfgren, M. (2011). Idea generation: customer co-creation versus traditional market research techniques. *Journal of Service Management*, 22(2), pp.140-159.
- Yankelovich, D. and Meer, D. (2006). Rediscovering Market Segmentation. *Harvard Business Review*. [online] Available at: http://www.viewpointlearning.com/wp-content/uploads/2011/04/segmentation_0206.pdf [Accessed 13 Dec. 2017].
- Yin, R. (2003). *Case Study Research: Design and Methods*. SAGE Publications.
- Zott, C., Amit, R. and Massa, L. (2011). The Business Model: Recent Developments and Future Research. *Journal of Management*, 37(4), pp.1019-1042.

APPENDICES

APPENDIX 1: INTERVIEW GUIDE IN FINNISH HAASTATTELURUNKO

PROFIILI JA YLEISET KYSYMYKSET

- Kertoisitko hieman itsestäsi ja miten olet päätnyt sinun positioon?
- Miten määrittelisit MaaS-ilmion X näkökulmasta?

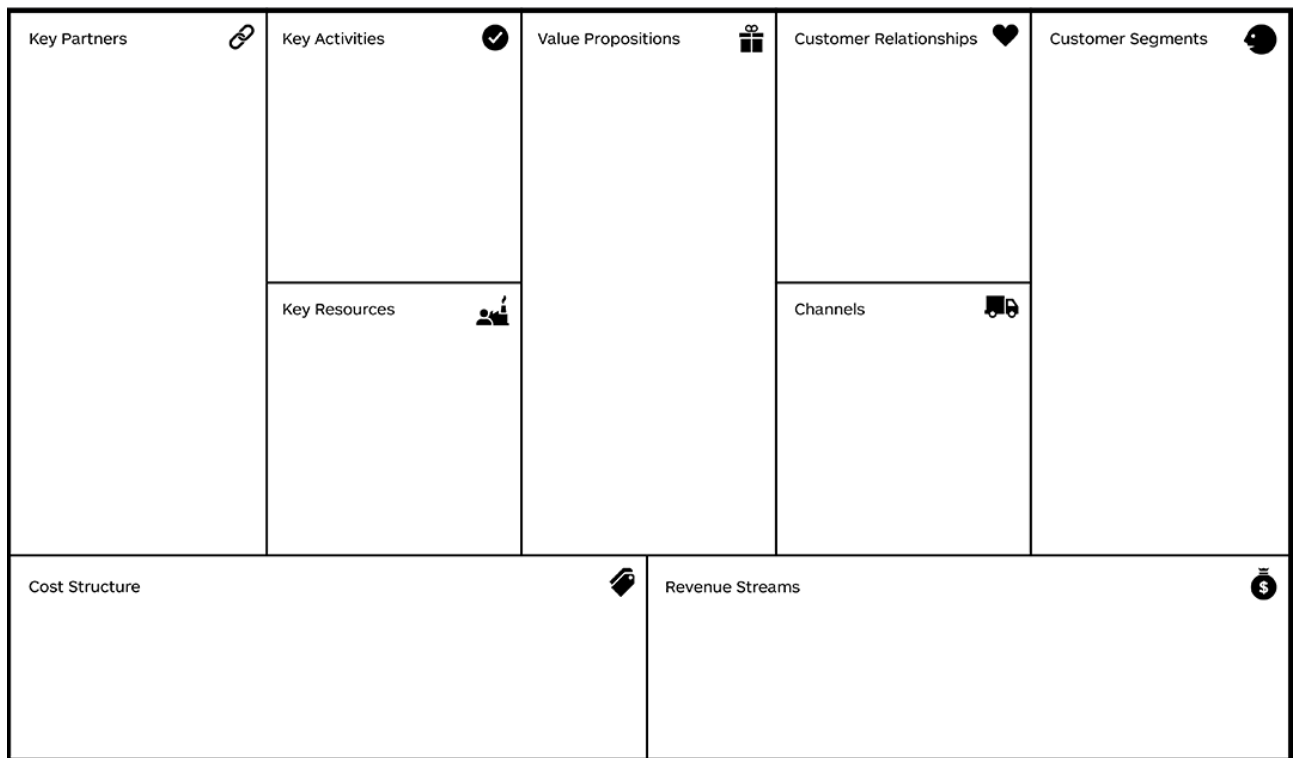
KYSYMYKSET MaaS OPERAATTOREILLE (MaaS Global/Tuup)

- Mikä on MaaS alan tilanne Suomessa?
- Miten etenee ja millaisia haasteita on? Mitkä ovat pullonkauloja?
- Mitä haluatte toiminnalla saavuttaa?
- Ketkä ovat muita toimijoita?
- Millaisia rooleja heillä on?
- Minkä takia muut haluavat olla mukana?
- Miten te houkuttelette niitä mukaan?
- Mistä ajaa teidän toimintaa, mikä on tavoite ja visio tulevaisuuden tilasta?

YLEISET KYSYMYKSET MaaS VERKOSTON JÄSENILLE

- Missä vaiheessa MaaS:issa mennään?
- Millaisiin muihin trendeihin MaaS-ilmionä linkittyy?
- Ketkä ovat muita toimijoita?
- Mitkä ovat heidän erilaiset roolit?
- Mitkä ovat sinun mielestä keskeisiä pullonkauloja/avaintekijöitä jos ajatellaan MaaS:ia Suomessa ja X-organisaatiossa?
- Millaiset tekijät houkuttelevat liittymään mukaan MaaS ekosysteemiin?
- Mitä seuraavaksi tapahtuu/ pitäisi tapahtua, jotta MaaS kehittyä eteenpäin?

Mikäli aikaa vielä jää, voi kysellä business malliin liittyviä asioita. Tarkentavat kysymykset voivat liittyä: Tuottoihin, kuluihin, riskeihin, yhteisön rakentamiseen, asiakkaalle tulevaan lisä hyötyyn.



APPENDIX 2: INTERVIEW GUIDE IN ENGLISH

INTERVIEW GUIDE

PROFILE QUESTIONS

- Would you tell a little about yourself and how did you end up in your position?
- How would you define MaaS?

QUESTIONS FOR MaaS OPERATORS (MaaS Global/Tuup)

- How would you describe the development stage of MaaS in Finland?
- How does it evolve? What are the bottlenecks and enabling factors?
- What are you aiming to archive?
- Who are the other players/actors?
- Why other actors are willing to join MaaS network?
- What roles do they have?
- What action does MaaS operator do to engage new actors?
- What drives and motivates your business? Mission and vision about the future?

COMMON QUESTIONS FOR MAAS ECOSYSTEM PLAYERS SUCH AS OP, VR, VEHO ETC.

- How would you describe the development stage of MaaS in Finland?
- What megatrends and societal trends are related to MaaS?
- Who are the other players/actors?

- What roles do they have?
- What are the central bottlenecks and enabling factors of MaaS development in Finland and particularly in your organization?
- Why you want to be part of MaaS network?
- What should happen next, if we want to enable further development of MaaS?

In case that there is some time left, additional questions related to MaaS business model may be asked (use business model canvas). The additional questions may for example be related to: profit mechanisms, costs, risks, the value proposition etc.

APPENDIX 3: EXAMPLES OF CURRENT MaaS SERVICES IN FINLAND

MaaS Global and Whim app

Finnish company MaaS Global is the world's first ever mobility operator. For travelers it offers a mobile app – Whim, that covers all travelers' journeys. Whim service operates in Helsinki (2017) and is about to be launched in UK (2018), Amsterdam and Antwerp. At the moment (01/2018) service offers three monthly mobility packages: Whim to go, Whim Urban and Whim Unlimited, their service offering is in detail presented in the picture below. More details about service offering on: <https://whimapp.com/monthly-plans/>.

	Whim To Go	Whim Urban	Whim Unlimited
Monthly payment	Free	49€	499€
Local public transport	Pay per ride	Unlimited Single Tickets	Unlimited Single Tickets
Taxi (5km radius)	Pay per ride	10€ per ride	Unlimited
Car	Pay per ride	49€ per day	Unlimited
City Bike	Coming spring 2018	Coming spring 2018	Coming spring 2018
Cancel anytime	☑	☑	☑
Add-ons incl regional HSL ▾			
Add-on Car subscription	☑	☑	☑
Add-on HSL Regional	Pay per ride	+50€ per month	+50€ per month
Add-on HSL Regional 3	Pay per ride	+100€ per month	+100€ per month

At the moment MaaS Global has five transportation service providers in its Finnish network. This service providers are:

1. Sixt/VEHO (car rental)
2. Helsinki Region Transport (HSL, public transportation provider and City Bike operator)
3. Taksi Helsinki (Taxi)
4. Lähitaksi (Taxi)
5. Korsisaari (As soon as integration of IT-systems has been completed)

In addition, the following companies have invested in MaaS Global (01/2018):

- Transdev (Franch-based international private public transport operator)
- KARSAN (Turkish commercial vehicles manufacturer)
- Korsisaari (Finnish private bus transportation provider)
- Goodsign (Finnish company providing intelligent business automation software for service intensive businesses & business ecosystems)
- VEHO (Mercedes-Benz importer and car rental company operating Sixt in Finland)
- GoSwift (Finnish Queue Management Service, committed to deploy innovative traffic management solutions based on web and mobile solutions)
- Maas/aus (Mobility as a Service Australia, is Australian investor and contributor to the MaaS Global, aiming to help Australians and New Zealanders gain earlier access to MaaS)
- Innovative Mobility (no information found)
- Toyota Financial Services (Japanese car maker)
- DENSO (Japanese supplier of advanced automotive technology, systems and components for all the world's major automakers)
- MS&AD INSURANCE GROUP (Japanese insurance company)

Tuup Kyyti and Kyyti app

Tuup is a Finnish start-up developing digital mobility services and MaaS. It also operates Kyyti, a ride sharing service that is integrated into MaaS service that Tuup provides. At the moment Tuup operates mainly in several Finnish cities and aims to expand especially to US markets.

At the moment Tuup has eleven service providers in its Finnish network. This service providers are:

1. VR (Finnish national rail company)
2. Helsinki Region Transport (HSL, public transportation provider and City Bike operator)
3. 24Rent.fi (Finnish car rental company)
4. VINKA (Finnish tech start-up providing smart mobility solutions, such as automatic ride sharing and route optimization)
5. Föli (Public transportation provider in Turku, Finland)
6. Witra.fi (Finnish smart parking company)
7. Strafica (Finnish company specializing in transportation and community planning)
8. PiggyBaggy (Finnish company providing ride-sharing for physical goods)
9. EkoRent (Finnish car rental company providing electric vehicles)
10. CityCarClub (Finnish car sharing service)
11. Taksi Virpi (Taxi operator from Oulu, Finland)

Case Valmet Automotive

One third of Valmet Automotive Uusikaupunki (a Finnish city) factory employees resident in Turku. In cooperation with the local bus transportation company, Tuup has developed a bus transportation service that operates according to the factory's working hours. The bus line is part of subsidized public transportation services, but employees of Valmet get a ticket for 4€ instead of 14€. According to the CEO Pekka Möttö, developing this service required complex IT-integrations that help identifying the particular user group (the employees) and offer them the service at a negotiated special price. This type of service has gained wide interest from private companies both in Finland and internationally.

OP Mobility Services and OP Transit app

Finnish company OP (Osuuspankki) has piloted the OP Transit, a MaaS service in November-December 2017. The pilot service was targeted for the employees of 20 small and medium-sized businesses in the Helsinki Metropolitan Area whose employees travel extensively during work days. In the service an employee is able to choose a suitable travel mode, check travel times, pay travel expenses and track past business travels. OP "Transit charges journeys directly from the employer, removing the need for separate travel expense reports" (OP Lab, 2017). The following transportation service providers were part of the pilot phase:

1. Helsinki Region Transport (HSL, public transportation provider)
2. Taksi Helsinki (Taxi operator)
3. DriveNow (Car sharing service operated by OP in Finland)

More information on: <https://op-lab.fi/op-pilots-a-mobility-service-to-manage-the-travel-expenses-of-employees/>