Business Model
Innovation – the solution
for EV producers

A qualitative study on Business Model
Innovation in the context of Electric Vehicles in
the Nordics

MASTER THESIS WITHIN: Business Administration
NUMBER OF CREDITS: 30 ECTS
PROGRAMME OF STUDY: Strategic Entrepreneurship
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JÖNKÖPING May, 2018
Master Thesis in Business Administration

Title: Business Model Innovation – the solution for EV producers

A qualitative study on Business Model Innovation in the context of Electric Vehicles in the Nordics

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Date: 2018-05-21

Key terms: Business Model, Business Model Innovation, Electric Vehicles, Nordics, Electric Mobility, Case study

Abstract

Electric Vehicles are a growing trend globally and are currently disrupting the conventional automotive industry, therefore firms in the sector need new business models around their new value propositions. The concept of business model innovation presents an interesting point of view towards the challenges those firms face and provide possible solutions for them. Literature on this relatively new topic is scarce and needs more cumulative empirical research. We engage in a multiple-case study and explore how entrepreneurial and incumbent electric vehicle companies in the Nordics use BMI to overcome their biggest challenges and advance the development of the sector. With our findings, we provide an insight of some of the newest advancements in the EV technology, investigate what are the key antecedents, moderators and outcomes of the BMI process for the researched companies and build on the existing literature on the topic. Finally, practitioners can gain better understanding of the concepts of BM and BMI process and their importance for surviving in the dynamic electric vehicle market.
Acknowledgements

This thesis would not have been possible without the valuable help, support and feedback from others. Accordingly, we would like to thank everyone who helped us while working on this Master thesis.

First and foremost, we would like to thank our thesis supervisor – Naveed Akhter, who has provided us with many useful advices for our research, as well as thorough guidance and support throughout the whole course of this work. Also, we would like to thank our colleagues - Filip Projic and Paul Mansberger, that have provided us with beneficial feedback and suggestions of how to improve our thesis. We are grateful to the companies and the managers who we interviewed for expressing their interest and participating with us in this research, as it is in favor of building up the knowledge and awareness about electric vehicle industry, thus contributing to its growth. We would like to thank them for devoting their time and sharing their experience and knowledge with us. Finally, we appreciate the support from our family and friends throughout writing of this thesis.
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List of Abbreviations

% – Percent
€ – Euro
BM – Business Model
BMI – Business Model Innovation
BYD – Build Your Dream
CEO – Chief Executive Officer
CO2 – Carbon Dioxide
EU – European Union
EV – Electric Vehicle
ICE – Internal Combustion Engine
Km – Kilometer
R&D – Research and Development
TCO – Total Cost of Ownership
1. Introduction

In the introduction chapter, we give an overview of the general field of our research, we present the electric vehicles market in the Nordics and reason our choice of this topic.

The electric vehicle industry holds big potential for the future of road transportation (Trigg et al., 2013). In recent years, the market for electric vehicles and alternative propulsion systems has been increasing dramatically, in result of the environmental concerns for the future and the advance in battery technology (Kley, Lerch & Dallinger, 2011). The most significant interest is upon electric cars, as they are at the forefront of electric mobility. There is no doubt that the internal combustion engine cars will soon be replaced by vehicles powered by an alternative power source and at this point the electric vehicles look like the obvious answer (Abdelkafi, Makhotin & Posselt, 2013).

Battery Electric Vehicle (we will use simply “electric vehicle” or “EV”) is a vehicle powered by an electric motor that is using electrical energy from batteries. It has several advantages over Internal Combustion Engine Vehicle, such as it has high power efficiency, does not release tailpipe emissions, exhibit good acceleration, and has cheaper and easier maintenance (Andwari, Pesiridis, Rajoo, Martinez-Botas, & Esfahanian, 2017).

According to the EU roadmap until 2020 there should be at least 5 million electric vehicles in Europe, while the number for 2025 is expected to rise to 15 million (Adams, Pickering, Brooks, & Morris, 2015). We have already seen that more and more European countries including France, Great Britain and Norway are going to prevent using older combustion engine cars in the near future (Petroff, 2017). Many countries also start including electric vehicles in their public transportation (e.g. Electric public buses) in order to lower the carbon emissions in the atmosphere, reduce pollution and slow down the global warming effect.

The automobile industry is one of the biggest in the world, and has huge impact on all other industries and the global environment. Cars affect our lives, not only by providing personal and public transportation for millions of people, they also present a variety of challenges for us and the environment we are living in (Wells, 2006). Therefore, in order to lower the negative impact of the automobiles on the ecosystem, many people consider the electric vehicles as the cars of future, since they use fewer resources for both manufacturing and usage.

The Nordic countries, especially Norway, Sweden and Finland are among the leading early adopters of this innovative technology, with some of the biggest electric vehicles markets per capita in the world. In 2017 sales of EVs in the Nordics have reached around 90 000, which is a 57% increase from the previous year (Nordic EV Outlook, 2018). Statistics show that in 2017 more than 71 000 electric vehicles were sold only in Norway, which accounted for 39.2% of all registered passenger cars in the country for the year (OFV, n.d.). The number of EVs sold in
Sweden for the same period was 19,981, which equals 5.2% of all registered cars in the year (Bil Sweden, 2018). Finland’s EV market accounted for 2.57% of all registered cars in 2017, while Denmark’s was 0.4% for the same period (EAFO, 2018). According to this statistics, Norway has the biggest EV market share in the world from all registered passenger cars for 2017, Sweden takes the third place, and Finland is sixth while Denmark falls behind at 14th place. Despite the comparably low number of EVs registered in Denmark for 2017, an interesting fact is that the charging stations for EVs in the country surpassed in numbers the existing petrol stations, thus showing the desire of the country to promote this technology (Turula, 2017).

The stock of electric vehicles in the Nordics has also been increasing steadily from 2010 onwards. By the end of 2017, it has reached almost 250,000 vehicles, and represents around 8% of the global EV stock (Nordic EV Outlook, 2018).

![Figure 1](image)

*Figure 1 Growth of EV stock in Nordics 2010-2017. Source: Nordic EV Outlook 2018 (p7).*

Norway, additionally has announced that all new passenger cars sold by 2025 should be electric or hybrid vehicles (Norwegian Electric Vehicle Association, 2017). Thus, the very likely development is that electric vehicles will dominate the transportation market in the future, as they represent the most advanced technology at the moment. Lemathe and Suares (2017) argue that in reality some EVs in traffic are already more cost-efficient and have lower TCO than comparable traditional vehicles, but the costs-benefits for the customers are non-transparent, or hard to notice if comparing only purchasing price.

This quite new emerging market gives opportunity to smaller producers to make innovations and create electric vehicles of their own. As Amit and Zott (2012) argue an innovative business model can even create a new market or allow companies to exploit new opportunities in existing markets, we believe that new innovative business models should be the main competitive advantage used by new emerging EV producers. In order for them to be competitive against the big car producers, they need to create and implement new business models, which enable them to differentiate themselves and introduce hard-to-copy advantages. In our initial research, we found out that there
are many new EV manufacturers emerging all over the world, especially in China, USA and the Nordic countries. Via online searches, we identified more than 10 new small to medium companies in Sweden, Norway, Denmark and Finland, which are starting to develop electric vehicles of their own including city cars, luxury and sport cars and even electric city buses. When we include the well-established manufacturers Volvo and Scania, which are also introducing new electric models, we can see that the region is highly motivated to be a role model and leading innovator for this industry in the future. Therefore, our focus will be particularly on Nordic countries, as they have multiple manufacturers in the industry and fast-paced progress in the field.
2. Problem

In this chapter we introduce the problem of the study. We show its relevance to the current state of the literature and argue why it is important to be studied. Lastly, we state the particular purpose and research question of our thesis.

Many studies have focused on the potentials of a successful business model for a company. While to a much lesser extent business literature has been addressing business model innovation, as this concept has only recently started gaining prominence (Foss & Saebi, 2017a). Christensen, Wells and Cipcigan (2012: p.499) state, “It might be that innovative technologies that have the potential to meet key sustainability targets are not easily introduced by existing BMs within a sector, and that only by changes to the BM would such technologies became commercially viable”. Accordingly, it is important that new EV firms recognize the potential of new innovative BMs for their business and for the transportation sector of the future.

Innovation plays a crucial part in the possibilities of businesses to create new products and services, scholars have proved multiple times the importance of innovating and creating new ways of doing business for long-term success of enterprises (Amit & Zott, 2012). With increasing global sustainable pressures, there is a growing interest in business models that could improve the sustainable performance of companies (Jiao & Evans, 2017). However, the study of business model innovations, specifically in regard to the EV sector, is still lacking enough research. The business model innovation (BMI) construct, according to Foss & Saebi (2017a), is mainly used as a classificatory device, and the literature does not seem to have built towards developing a distinct theory of BMI. There is absence of researches, studying the causes or prerequisites, the moderators, types and outcomes of BMI. Additionally, Bock, Opsahl & George (2010) argue that literature on business model innovation lacks systematic and big scale studies, which could allow a better understanding of the phenomenon. Therefore, many scholars (e.g. Schneider & Spieth, 2013; Foss & Saebi, 2017a, Zott, Amit & Massa, 2011) call for the necessity to derive a better understanding of the phenomenon as well as its drivers, and in this way, legitimate the academic interest in the topic. Thereby, we see the need for more research on how companies, actually approach business model innovation, and what are its main characteristics.

When we searched for literature on the topic of BMI, particularly in the EV sector we found even bigger deficiency of research. Most of the existing studies investigate either well-established multinational vehicle producers or emerging producers in China and USA, but the Nordic enterprises have not yet received much attention from the scholars interested in such topics. Governments in many countries (e.g. Norway, Sweden, China, USA) have started giving various incentives to both producers and customers of EVs in order to promote the expansion of EV use, but is not certain for how long will they be available and are they enough to change the customers’ resistance towards the full adoption of EV technology.
New insights for the EV industry in the Nordics and deeper understanding of how companies approach innovation and challenge the existing market barriers could have both managerial and theoretical implications for the future development of the industry. As Christensen et al. (2012) argue the instance of electric vehicle appears to offer good theoretical reasons for profound technological changes in the nature of the product, allied to repeated economic distress evident in the existing dominant business model for vehicle manufacturing, would yield the perfect opportunity for business model innovation to flourish. Exploring how producers adjust and develop their business models can also be useful for actors who, are not yet in electric mobility industry or consider entering this business sector (Abdelkafi et al., 2013). Moreover, Bohnsack, Pinkse and Kolk (2014) argue that by innovation in BMs, sustainable technologies, like electric vehicles, would create new sources of value for their customers and positively affect the environment. Consequently, since this industry has a high potential to shape the vehicle market in the future, we believe it is necessary to investigate the business models of producers at an early stage of their market penetration. We aim to contribute to the literature for BMI in the EV sector in the Nordics by exploring how small and medium EV producers in Sweden, Norway, Denmark and Finland innovate their BMs.

2.1 Research question and purpose.

The purpose of this study is to explore how EV producers in the Nordic countries use BMI in order to overcome their biggest challenges, such as public perception, high initial price and infrastructure availability. According to Bohnsack et al., 2014, the majority of EV producers still rely on business models optimized for traditional cars. Additionally, they do not create a new value proposition of their own, but only reconfigure an existing traditional one. That means that they do not make full use of their specific advantages as producers of new kind of products and services. This is especially true for traditional automobile producers, which are now introducing new electric models in their portfolio (Bohnsack et al., 2014). Accordingly, we want to explore how the BMI process differs in such incumbent companies compared to new entrepreneurial EV producers. Moreover, although the industry is developing rapidly through innovations and government support, the companies have not succeeded in overcoming market barriers such as price accessibility and availability of charging infrastructure. Probably EV producers focus on product innovation or include services in their proposition, are they investing in developing public charging infrastructure or rely on government help? It is yet unknown how the EV producers are approaching these major challenges through innovating their business models and if they do it at all. Accordingly, through our study we intent to answer those questions and advance the existing theory on business model innovation in the electric mobility sector. Thus, our research question for this thesis is:

**How firms work with BMI in the context of EV, and how entrepreneurial firms differ from incumbent companies in the sector?**
3. Theoretical Background

In this chapter, we firstly focus on the research done regarding business models (BM) and business model innovation (BMI). We then try to narrow down the phenomenon of BMI to the sphere of Electric vehicles and how it can help the development of this technology and its widespread adoption. Finally, we explore how actors from the EV field in the Nordics have used innovation for their business models.

“There is no inherent value in a technology per se. The value is determined instead by the business model used to bring it to a market. The same technology taken to market through different business models will yield different amounts of value. An inferior technology with a better business model will often trump a better technology commercialized through an inferior business model.”


3.1 Business Model (BM)

The concepts of business model and more recently business model innovation have gained significant interest from business scholars in the past 20 years (Foss & Saebi, 2017a). Foss & Saebi (2017a) conducted one of the most recent comprehensive literature reviews on business models and business model innovations, where they identify three major streams of research on business models: 1) Business model as a basis for classifying enterprises; 2) Business model and enterprise performance and 3) Business model innovation. These streams are also recognized within earlier literature reviews on the subject by Zott et al. (2011) and Lambert & Davidson (2013). Classifying enterprises by their business model is useful for projecting hypotheses about one firm onto a group of enterprises, also it is beneficial in studying the relationship between the BM and firm performance (Lambert & Davidson, 2013). BM is considered an important factor that contributes to company performance, evident from the findings that some types of BMs appear to be performing better than others (Zott & Amit, 2007, 2008; Lambert & Davidson, 2013), and it is suggested that successful BMs to be imitated or replicated (Chesbrough, 2010; Teece, 2010; Foss & Saebi, 2017a). In addition, innovating business models has become another major focus of the researches on business models, especially from a growing consensus among scholars considering business model innovation as a key to improving company performance, transformation, and renewal (Zott et al., 2011; Demil & Lecocq, 2010; Lambert & Davidson, 2013).

Despite of the rising interest, many authors tend to argue that the concept of business model is unclear and has no theoretical grounding in economics or business studies (Teece, 2010). It is impressive from a research point of view that the phenomena of BM and BMI have received numerous different definitions, none of which can be pointed as the main one. For instance, Zott
et al. (2011), in their extensive review of publications on business model, found out that about a third of authors do not define the concept of business model at all, and less than half of them state explicitly its definition or conceptualization, the rest of the authors chose to quote other authors’ definitions. Similarly, George and Bock (2011) in their literature review find that the academic literature on business models is fragmented and is inconsistent in terms of definitions and BM construct boundaries. Authors claim that this lack of convergent and definite construct of BM has resulted in inconsistency of empirical findings about its effect on company performance and development. Thus, many researchers point out the need to develop a clearly defined and comprehensive concept of a business model (Zott et al., 2011; Lambert & Davidson, 2013; Wirtz, Pistoia, Ullrich & Göttel, 2016; Foss & Saebi, 2017a).

For the first time the term “Business Model” has been mentioned by Bellman et al. (1957), after which it has been mainly used through the prism of informational technology to explain business system modelling, thus BM used to be mainly represented as a process model (Wirtz et al., 2016). The concept has gained much bigger prominence with the advance of Internet that gave way to new possibilities of “unconventional exchange mechanisms and transaction architectures”, such as electronic businesses (Amit & Zott, 2001; Wirtz et al., 2016), and has evolved into “integrated presentation of the company organization” that contributes to effective management of the decision-making processes (Wirtz et al., 2016, p. 37). Most of the early definitions of BM have tried to explain “how a firm makes money”, (Magretta, 2002) in order to convince potential investors and present new ways of acquiring profit. Wirtz et al. (2016) make another systematic literature review to investigate the origins and theoretical development of business model, combined with a survey of twenty-one research experts in BM field, to create a more comprehensive understanding of the BM concept and its future perspectives. They suggest their definition of BM as: “A business model is a simplified and aggregated representation of the relevant activities of the company”, which – along with value-added component – includes strategic, customer and market components, and which has a “superordinate goal” of creating a competitive advantage (Wirtz et al., 2016, p. 41). Authors emphasize that for achieving such goal business model needs to be viewed from a dynamic perspective, with a consideration for a business model evolution/innovation, so that a company can respond to internal and external changes.

In a more recent review of business models by Foss and Saebi, (2017a), authors find that most scholars conceptualize business model in alignment with Teece’s notion of business model as a “design or architecture of the value creation, delivery and capture mechanism” of a firm (Teece, 2010, p. 20). Despite the vast difference among authors’ definitions of the concept though, Schneider and Spieth (2013) argue that most of them do not limit their scope to the internal or external firm elements, but present a holistic perspective, which can allow managers to see how the firm performs its activities. Thereby our understanding of a business model is that it is effectively used to illustrate what different activities the firm performs with the various actors it works with. As Foss and Saebi (2017b, p. 10) put it, BM illustrate “specific constellations of
activities dedicated to value creation, delivery and appropriation” and the changes in those constellations are business model innovations.

3.2 Business Model Innovation

While business models and business model innovations are undoubtedly related, the BMI concept introduces the dimension of innovation, from which new questions emerge, such as what drives this innovation, under what conditions does the innovation occur, and who is the one who innovates (Foss & Saebi, 2017a). One of the first examples that the managers and entrepreneurs can purposefully innovate their business models has been presented by Mitchell and Coles (2003). Since that, numerous authors have started researching this phenomenon from different points of view, exploring the various angles of the innovation process (Foss & Saebi, 2017a). The number of literature reviews on BMI, however is limited (e.g., Amit & Zott, 2010; Schneider & Spieth, 2013; Foss & Saebi, 2017a). From our search, only two articles focused on systematically reviewing the literature on business model innovation. The first one by Schneider & Spieth (2013) reviews 35 articles and identifies the prerequisites, processes and effects of BMI as the three main streams of research on the topic. The other, most recent review is by Foss & Saebi (2017a). In it, the authors review 150 articles on the topic and identify four main research streams: Conceptualizing BMI, BMI as an organizational change process, BMI as an outcome and Consequences of BMI, then four critical gaps in the literature are analyzed and a definition for BMI is proposed, which is aimed at filling the identified gaps.

Among the various articles, focusing on BMI many different definitions of the concept can be found (see Table 1). Some authors define BMI as a process (e.g. Mitchell & Coles, 2003; Santos, Spector & Van der Heyden, 2009; Bucherer, Eisert & Gassmann, 2012), while other describe it as a prerequisite or a result (Amit & Zott, 2012; Abdelkafi et al., 2013). This variance comes to show that depending on the purpose of the research different authors describe BMI in a way in which it can best explain their findings. The different definitions also display that BMI can be looked through two different dimensions: the first one regarding the level of novelty of the innovation; and the second in regard to the capacity of BMI – how much of the BM is affected by the innovation (Foss & Saebi, 2017a). In relation to the first dimension BMI can be either limited to innovations, new to the company, or innovations which are new to the whole industry. When looking at the other dimension, at the one extreme BMI has effect only on one of the parts of a BM, while at the other it could entirely change the whole business model.
Table 1: Selected Definitions of Business Model Innovation

<table>
<thead>
<tr>
<th>Authors</th>
<th>Year</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mitchell &amp; Coles</td>
<td>2003</td>
<td>“By business model innovation, we mean business model replacements that provide product or service offerings to customers and end users that were not previously available. We also refer to the process of developing these novel replacements as business model innovation.”</td>
</tr>
<tr>
<td>Santos et al.</td>
<td>2009</td>
<td>“Business model innovation is a reconfiguration of activities in the existing business model of a firm that is new to the product service market in which the firm competes.”</td>
</tr>
<tr>
<td>Amit &amp; Zott</td>
<td>2012</td>
<td>Innovate business model by redefining (a) content (adding new activities), (b) structure (linking activities differently), and (c) governance (changing parties that do the activities).</td>
</tr>
<tr>
<td>Bucherer et al.</td>
<td>2012</td>
<td>“A process that deliberately changes the core elements of a firm and its business logic.”</td>
</tr>
<tr>
<td>Abdelkafi et al.</td>
<td>2013</td>
<td>“A business model innovation happens when the company modifies or improves at least one of the value dimensions.”</td>
</tr>
<tr>
<td>Foss &amp; Saebi</td>
<td>2017</td>
<td>“Designed, novel, and nontrivial changes to the key elements of a firm’s BM and/or the architecture linking these elements.”</td>
</tr>
</tbody>
</table>

3.2.1 BMI as a process

As we see from some of the definitions for BMI, many of the scholars characterize it as a process, through which companies change the way they perform internal and external activities. Some of the ways researchers have tried to describe this process are as a continuous reaction to changes in the environment (Demil & Lecocq, 2010), as an ongoing learning process (McGrath, 2010) or an evolutionary process (Dunford, Palmer & Benviste, 2010). Several authors also engage in describing the different steps involved in the process of BMI. Osterwalder, Pigneur and Tucci (2005) present five phases including mobilize, understand, design, implement and manage, while Bucherer et al. (2012) use analysis, design, implementation and control. These descriptions however, are not unique to the BMI process and can be implemented for any kind of business innovation or engagement in new activities. In their multiple case study Bucherer et al. (2012) also found that the different phases in the BMI process take different time to be completed, depending on the type and size of the firm, which is innovating, and the scope of the innovation. Despite the different approaches taken by scholars, Schneider and Spieth (2013) argue, that all researches done
on the process of BMI aim at achieving a basic understanding of the phenomenon, by using case study methods. This indicates that so far, the BMI process has been almost exclusively researched via qualitative methods, but no numerical data to support the findings is available.

3.2.2 Effects from BMI
Another popular stream of research on BMI is studying the results and effects it provides. Schneider and Spieth (2013) differentiate three types of effects accomplished by BMI. The first one affects the market or industry structures, the second one – the performance of the firm innovating, and the last one is focused on the change of the firm’s capabilities. Additionally, Foss and Saebi (2017a) found in their review, that significant part of the research done on the consequences of BMI focus on whether the innovation leads to better firm performance or not. For example, Cucculelli and Bettinelli (2015) and Zott and Amit (2012) discovered that firms involved in business model innovation achieve positive effects in their performance. The literature clearly recognizes that the positive effects expected from BMI are one of the main motivators to initiate it. Among the most mentioned desired effects in the literature, are reducing costs, development of new products, expanding to new markets and increasing profitability. Since this stream aims at empirically proving the results of BMI, the majority of the authors have used quantitative approaches (Schneider and Spieth 2013; Foss & Saebi 2017a).

3.2.3 BMI as an outcome
In the literature exploring the BMI as an outcome, researchers look for what are the antecedents of the innovation process. One of the main distinctions made for the reasons to innovate the business model is that it is a result from internal or external to the enterprise changes. Bucherer et al. (2012) for example distinguish four main reasons to start innovating, namely Internal Opportunities, Internal Threats, External Opportunities and External Threats. Additionally, Doz and Kosonen (2010, p.1) claim that BMI is a response to “strategic discontinuities and disruptions, convergence and intense global competition”. In their review Foss and Saebi (2017a) argue that most of the authors contributing to this stream of the BMI literature focus on the emergence of new business models in particular industry, such as the electric mobility (Abdelkafi et al. 2013).

The literature recognizes that not only challenges and opportunities can be antecedents for BMI, but often the goals and targets, which firms put for themselves, serve as reasons to start innovating. According to Sarasvathy (2001), there are two general strategies, which firms use in approaching their goals – Effectuation and Causation. Firms and entrepreneurs who use effectuation employ an action and control approach, while pursuing the innovative opportunities (Sarasvathy, 2001). Dew, Sarasathy, Read and Wiltbank (2009) add that by effectuation organizations make use and focus on their resources, form many partnerships and leverage surprises in the markets. Therefore, effectuation aims to capitalize on contingencies and uncertainty (Sarasvathy, 2001). Oppositely, causation approach relies more on goal orientation, prediction and planning (Gruber, 2007). Starting from specific goals and addressing the uncertainty by prediction-oriented planning
activities, firms engaged in causation approach focus on expected returns, extensive market analysis and try to avoid surprises (Berends, Jelinek, Reymen & Stultiëns, 2014).

One of the first scholars who connected the potential role of effectuation as BMI antecedent was Chesbrough (2010). He states that effectuation with its action orientation is a key component when firms are trying to reframe their current logics and to foster latent opportunities. Other scholars additionally argue that by using the effectuation strategy companies should deal with their constraints, experiment (Crossan, Cunha, Vera & Cunha, 2005), and use improvisation (Hmieleski and Corbett, 2008). Activities like these are well known to be a source of innovation (Baker, Miner & Eesley, 2003). Moreover, Velu and Jacob (2016) have found a positive relationship between the presence of owner-manager entrepreneurs, applying an effectual approach and the degree of BMI for entrepreneurial companies. Finally, according to Futterer, Schmidt and Heidenreich (2017) taken together, all of the effectuation prerequisites lead to innovating one or several of the business model core elements, which in fact is BMI.

Contrary to the statements above, other scholars argue that causation and its four principals can also be regarded as incentives of BMI. According to Ireland and Webb (2006), an innovation start from goals is likely to occur when a venture manager works in an entrepreneurially committed organization with well-expressed vision and a corresponding development strategy. Additionally, studies on product development have shown that existence of goals, which are broadly defined, leads to better innovation performance (Gemünden, Salomo & Krieger, 2005; Salomo et al., 2007). Thereby, the reasoning builds on the idea that goals usually stay stable over time and contribute to quality and dependability in process management and planning (Salomo et al., 2007) which can also be applied to the context of creating or innovating a new BM (Futterer et al., 2017).

3.3 BMI for EV Industry

Now we are going to focus on the literature, exploring business models and innovations particularly in electric mobility industry. Most authors agree that new business models could transform the industry of sustainable technologies, such as electric vehicles, and lead to new ways of creating value and, importantly, help to overcome the challenges that prevent for widespread adoption of these technologies (Bohnsack et al., 2014; Kley et al. 2011; Amit & Zott, 2012; Chen & Wen 2016; Abdelkafi et al. 2013). The current disadvantages of electric cars, such as lack of infrastructure, high cost of batteries and short driving range, can be seen as possibilities for new business model introduction (Abdelkafi et al., 2013). Kley et al. (2011) explore new approaches to BMI in electric mobility industry, which can specifically target the challenges and turn them into opportunities for entrepreneurial enterprises. The authors differentiate two general types of BMs – Product oriented and Service Oriented; the product oriented models represent the classic way of doing business in the car industry, by selling certain products, while the service models present new opportunities for developing “Use-oriented” and “Result-oriented” models, where companies offer services, such as car sharing or mobility guarantees. Further on, Kley et al. (2011)
develop a morphological model to analyze potential business models in the electric mobility. By using this model, companies in the EV sector can create (or change) designs for their BMs, including various product and service elements.

3.3.1 Challenges and Barriers for the Electric Vehicle Industry

From a wider perspective, many authors who focus on EVs state that the main challenges in front of the EV industry are: Lack of charging infrastructure, Long battery charging time, Short driving range, High cost of battery, and Low acceptance by the consumers (see Table 2).

In most of the studies, focused on the challenges of EV industry and how innovative business models can overcome them, authors engage in descriptive analysis, exploring multiple case studies of existing companies, which have adopted a new BM representing a new value proposition (e.g. Johnson & Suskewicz, 2009; Naor, Druehl & Bernard, 2018; Bohnsack & Pinkse, 2017; Andwari et al., 2017). One of the most popular among scholars, companies in this sector is “Better Place” (e.g. Andwari et al., 2017; Kley et al., 2011; Christensen et al., 2012; Naor et al., 2018; Johnson & Suskewicz, 2009; Chen & Wen, 2016). The company tried to integrate a BM similar to those of a mobile telecommunication provider, by providing a battery charging and swapping service. Better place did not sell electric cars, but aimed at providing enough charging infrastructure so owners of EVs can easily charge their batteries or swap them with new ones at multiple suitable for them locations. The unique part of Better place’s BM was that it aimed at solving all of the biggest challenges mentioned for the EV industry. Ultimately, the company was not successful since it went bankrupt in 2013, but the general agreement among scholars is that it represents one of the best examples of how innovative business models can help the future success of the EV industry. Thus, the major challenge for electric vehicle industry is to offer easy and convenient use of electric cars, such that there is a need for improved usage concepts or business models. New business models are required to create “new use patterns, car-sharing and intermodal mobility” to address the high selling price, low range and lacking infrastructure (Augenstein, 2015, p. 108). There is a need for new functionalities that would redefine the role of a car, and would help to adapt Electric Vehicles into the system that was initially developed and is still dominated by traditional vehicles (Augenstein, 2015). Put in shortly – “Right business models can make electric cars more attractive to customer” (Abdelkafi et al., 2013).
<table>
<thead>
<tr>
<th>Authors</th>
<th>Year</th>
<th>Main ideas towards challenges for EV industry</th>
<th>Main ideas towards Opportunities for EV industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kley, Lerch,</td>
<td>2011</td>
<td>● Limited concepts for Utilization</td>
<td>● Secondary Battery Usage</td>
</tr>
<tr>
<td>Dallinger</td>
<td></td>
<td>● Low public acceptance</td>
<td>● New Concepts for utilization (BM)</td>
</tr>
<tr>
<td>Abdelkafi et al.</td>
<td>2013</td>
<td>● Battery technology</td>
<td>● Propose integrating numerous new BMI from other industries, solving several challenges at once</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Standardization of charging infrastructure</td>
<td>● Creating a smart electric grid for charging.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Electric motors and drivetrain</td>
<td></td>
</tr>
<tr>
<td>Augenstein</td>
<td>2014</td>
<td>● Consumers view as underperforming</td>
<td>● Environmentally friendly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Charging infrastructure not built</td>
<td>● Cheap maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● High cost for consumers</td>
<td>● Lower charging costs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● High cost of production</td>
<td>● Incentives</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>● Low noise</td>
</tr>
<tr>
<td>Adams et al.</td>
<td>2015</td>
<td>● High price</td>
<td>● Product-service system configurations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Low range</td>
<td>● Government incentives</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Lack of infrastructure</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Doubt/distrust from the public</td>
<td></td>
</tr>
<tr>
<td>Cheng &amp; Wen</td>
<td>2016</td>
<td>● Purchasing cost</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Range anxiety (low range)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Charging time</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Battery life and uncertainty</td>
<td></td>
</tr>
<tr>
<td>Andwari et al.</td>
<td>2017</td>
<td>● Expensive electricity storage</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Time consuming charging</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Low distance range</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>● Charging infrastructure</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Social acceptance</td>
<td></td>
</tr>
<tr>
<td>Naor et al.</td>
<td>2018</td>
<td>● Affordability</td>
<td>● Alternative business models</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Range anxiety</td>
<td>● Cross-industry collaboration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Power source (battery)</td>
<td></td>
</tr>
</tbody>
</table>
3.3.2 Opportunities for Electric Vehicle Industry

As we can see from above, the electric mobility industry faces many complex challenges, which need to get resolved, some authors, however see the challenges as potential opportunities for the electric vehicle producers to increase their market share and become more attractive to consumers.

Abdelkafi et al. (2013) have proposed a way to systematically generate business model innovations for the industry of electric mobility through using examples of business model patterns of other industries that are not necessarily in automotive industry. They introduce a framework that distinguishes five different value-focused dimensions within a business model, namely – value proposition, value communication, value creation, value delivery and value capture. Then various known business model patterns are categorized according to the five dimensions, and the combinations of patterns from different dimensions can result in a new business model innovation. This systematic generation of business model innovations can build some useful and substantial changes into electric mobility businesses, some examples of which have been already successfully adopted, for instance product-to-service model in car-sharing business, while others have high potential to find application in the future. Authors also explore the transferability of these patterns into the electric vehicle industry and assess how suitable they are for the different actors (manufacturers, infrastructure providers, power distributors, governments etc.) involved in it.

Another often mentioned opportunity for the EV sector is developing and integrating Smart Electric grids, which enable bi-directional power interfaces, or charging of the batteries for the vehicles in time when the consumption of energy is lower and the prices are cheaper, while in other periods of time the batteries help fill the gap for additional energy in the grid, when the need for power is greater, and prices are higher (e.g. Andersen, Mathews & Rask, 2009; Naor et al., 2018; Jiao & Evans, 2016; Christensen et al.,2012). The development of intelligent charging is described as being crucial for the future success of electric vehicles, because the mass usage of energy might overload existing grids if not controlled adequately (Christensen et al., 2012). Andersen et al., (2009) give the example of Denmark where at least 20% of electricity production is generated by alternative sources, such as wind power. The authors argue that currently the power generated by the wind turbines is not used effectively, since at some points of time more energy than it is need is produced, and it cannot be stored for future needs. The involvement of the batteries, powering the electric vehicles in a smart electric grid is seen as a suitable solution to this problem, since they can store the additional power and then release it in the grid when it is needed. This is even seen as an opportunity for the owners of electric vehicles to generate additional earnings from selling the power stored in their batteries (Christensen et al., 2012; Andersen et al., 2009).

Particular attention has been directed towards the possibility to address the high cost of batteries in the EVs, mainly through developing new business models, as battery technology is still considered immature for the developments that would reduce its costs (Jiao & Evans, 2016; Augenstein, 2015). Many scholars have proposed secondary use of batteries, such that the batteries at the end of their life cycle would find application in energy storage systems for wind and solar
energy industries (Jiao & Evans, 2016; van Wee, Maat & de Bont, 2012; Pehlken, Albach & Vogt, 2017). This in the end would reduce the cost of battery utilization, that would possibly have effect in reducing its purchasing cost for consumers, as well as address some sustainability issues of EVs, thus improving their customer attractiveness. Lemathe and Suares (2017) state that the resale or further use of the batteries is critical to achieve better cost efficiency for the electric vehicles and make the total cost of ownership (TCO) lower than that of traditional cars. Scholars also emphasize that such result of reusing batteries would be best achieved under certain conditions when the customers do not need to own the batteries, improving cooperation between the actors in the industry, and government policies (Jiao & Evans, 2016). Additionally, Naor et al. (2017) suggest servitized business models that would lead to better affordability and control of the batteries at the end of their lifecycle, for the further reuse.

The concept of servitizing aims on creating a new innovative sustainable solution economically affordable to the customer by including services to the value proposition of companies (Agrawal & Bellos, 2016). Cherubini, Iasevoli and Michelini (2015) propose that the Product-Service System (PSS), which is “a system of products services, supporting networks, and infrastructures that is designed to be competitive, to satisfy customer needs, and to have a lower environmental impact than traditional business models” (Mont, 2002, p. 239) is particularly suitable for the analysis of EV business models, since the sector is dominated by services and is aimed at solving sustainability problems. By interviewing multiple managers from the EV industry, the authors found that the further development of electric cars will not depend on advances in technology, as it already exists, but other factors, like services, should be addressed (Cherubini et al., 2015). One of the most frequently used examples of successful business model innovation is car-sharing, where electric vehicle advantages – such as reduced maintenance costs – helped to achieve cost-effectiveness and better utilization of the electric vehicle, as compared to internal combustion car (Bohnsack & Pinkse, 2017). Abdelkafi et al., (2013) also propose several service oriented business models, including subscription model for charging infrastructure providers, where their customers subscribe for their service and can use all their charging stations whenever they need them, or according to specific subscription plan; Affinity Clubs model, which supposes creating membership clubs for customers, where they receive special rewards and promotions, such models are already widely used by gas stations for example; Electronic Bourse model which proposes that different actors in the electric mobility network can trade electricity via internet. The possibilities for including different services, complementing the products of EV companies are great in numbers and variety and could allow the faster mass adoption of the technology worldwide.

3.3.3 Difference in BMI between incumbents and entrepreneurial firms

How the BMI process differs in newly created and existing companies is an understudied topic (Foss & Saebi, 2017a). Bohnsack et al., (2014) however, are among the few scholars who have researched the differences between BMI done by existing car manufacturers (shortly called incumbents) and new entrepreneurial firms. They explored the evolution of business model innovations by comparing three main path dependencies: Dominant business model logic,
complementary assets and contingent events. The authors conducted their study by analyzing the business models and the innovations introduced in them among 15 traditional car manufacturers, selling new electric models and 15 entrepreneurial firms, created specifically for the EV sector. The results from their study show that incumbents and entrepreneurial firms innovate differently with both types having advantages and disadvantages in certain innovation processes. Generally, Bohnsack et al. (2014) argue that incumbents are more cognitively constraint by their existing business models than the entrepreneurial firms, when innovating for the EV sector. These firms have primarily focused on efficiency as their biggest value generator and have included few innovations, which have not been used before for their traditional cars business models. Entrepreneurial firms, on the other hand, have been the key innovators for the EV sector, as they have found innovative ways to overcome existing drawbacks for the electric vehicles (Bohnsack et al., 2014). The path through innovation seems to have been the only possible one for new entrepreneurial firms, considering that they did not have access to complementary assets such as dealer networks, existing facilities, internal financing and government help, while incumbent firms had significant advantage possessing some or all of the mentioned assets. Consequently, the business models of incumbents have proved to be more stable and resilient to contingent events than the ones of entrepreneurial firms and changes in the models during time have generally been marginal (Bohnsack et al., 2014). This, according to the authors, is a result of the fact that, traditional car producers could afford to continue exploitation of their business models even if they were not profitable, because of their financial power and government incentives, while entrepreneurial firms were dependent on venture capital financing and their future was highly uncertain. Incumbent firms also more often form alliances to gain expertise in developing EVs, owing to their greater level of resources, which provided incumbents with a competitive advantage over entrepreneurial EV firms (Sierzchula, Bakker, Maat & Wee, 2015).

3.4 BMI in Nordic EV industry

Research on the topic of BMI in the Nordic EV industry is scarce. Among the few authors contributed to the field are Andersen et al., (2009) and Christensen et al., (2012) who investigate the case of the still operating at the time of their research company “Better Place”, which was building their charging infrastructure in parts of Denmark; Tongur and Endwall (2014) who explore the business model dilemma shift to EV technology for the Swedish truck manufacturers “Volvo” and “Scania”. Other authors (e.g. Noel & Sovacool, 2016; Vassileva & Campillo, 2016; Wikström, Eriksson & Hansson 2016; Löfsten, 2016) study the EV market in the Nordics, its challenges and opportunities from different perspectives, (e.g. consumers, policy makers, battery suppliers, energy suppliers, etc.) but do not focus on the business models or innovations in the sector, which is why we are not going to discuss their contributions in this review.

Tongur and Endwall (2014) investigated how the Swedish truck manufacturers “Volvo” and “Scania” are preparing for the technology shift from producing internal combustion engines to start production of electric motors for their trucks. The authors argue that often technology shifts are related to change of the business model criteria and the key challenge for the shift is the
interaction between business model innovation and technology development. With the emergence of the new technology, traditional truck (and vehicles as a whole) manufacturers lose their biggest competitive advantage of producing the engines, because electric motors are much easier to produce and the competition in the sector is much higher. Accordingly, Tongur and Endwall (2014) propose that one of the best approaches for truck manufacturers is to servitize their business models, switching from selling trucks to providing transport solutions and other transportation services. This shift would enable the companies to innovate in not only technology development, but also presenting a new value proposition, better suited for the new conditions in the industry.

Since the number of EV producers in the Nordic countries is small compared to other parts of the world (e.g. China, USA, Japan, and Germany) and the fact that the majority of emerging new companies have not yet started offering their products and services on the market, it is understandable that literature on the BMI for this sector is very limited. Therefore, with our research we will attempt to address this gap in the literature and shed light on the BMI done by EV companies in the Nordics.

3.5 Suggestions for research approach of BMI

Based on our review of the literature we found some suggestions on how to research the topic of BMI in context of the EV sector. According to a model, proposed by Foss and Saebi (2017a), it is suggested to use the main challenges and opportunities for the sector (or the individual firms) as motivators and antecedents of the process of Business Model Innovation. Then, while the process of BMI is analyzed, the different scope and level of novelty of the innovation could be characterized, according to the literature on the topic. During the research of the BMI process, it is also recommended to explore how the various internal and external moderators and factors involved in the sector influence this process. Following Bohnsack’s et al. (2014) conclusion that incumbents and entrepreneurial firms in the EV industry differ in the way they construct their business models and in the results achieved with their innovations, we believe that those differences are important factor affecting the BMI process and they deserve to be further researched. The external actors such as governments, power suppliers and infrastructure providers also have critical role for overcoming the biggest challenges in the EV sector and their role in the BMI process cannot be dismissed. Finally, we will focus our research on the outcomes resulting from the BMI.
4. Research Methods

This chapter presents our research approach, the design and strategy for our data collection and analysis. Additionally, the methodological structure of the thesis is explained and discussed. Our method for respondent selection is explained.

4.1 Research Philosophy

For our method of research, we have chosen the constructivist approach. According to Easterby-Smith, Thorpe and Jackson (2015) constructionist researchers start from the assumption that the studied phenomena can be subject to very different interpretations and the role of the researcher is to clarify how various claims of truth can be constructed in everyday life. The key difference between the constructivism philosophy and positivism is in the fact that the latter argues that knowledge is created in a scientific method, while constructivists believe knowledge is constructed by scientists and it opposes the idea that there is a single methodology to generate knowledge (Dudovskiy, 2016). Hence, we build our research on the assumption that different companies use different approaches towards innovation process and there is not one correct method, but all of them need to be explored in order to be better understood and theorized.

4.2 Research Approach

Two different strategies are usually considered, when a business-related research is conducted – the inductive and deductive approach. According to Eisenhardt and Graebner (2007) inductive and deductive research logics are opposing each other, with inductive theory forming from cases in order to develop new theory from data, while the deductive approach uses data to test the theory and close the cycle. According to Gabriel (2013), deductive approach usually begins with the proposition of a hypothesis, which will later be tested by data, while the inductive approach on the other hand, starts with a research question and aims to research a previously studied phenomenon from a different perspective. The deductive approach also puts emphasis on causality and tries to prove the reasons for the researched phenomena, whilst for inductive approach the aim is to explore the new phenomenon. The inductive approach, on the other hand, intends to generate meanings from data, in order to recognize patterns and relationships and build theory (Saunders, Lewis, Thornhill & Wilson, 2009). Inductive reasoning tries to learn from experience, observe the patterns, resemblances and regularities in that experience, to come to conclusions (Dudovskiy, 2016). Since our goal is to explore how EV producers innovate their business models, we will follow the principles of the inductive approach, and reach to conclusions, advancing the existing literature on BMI.
4.3 Research Strategy

4.3.1 Review of the Literature

We used the Web of Science database to look for articles on the topic, combing the “business model*”, “innovat*” and “electric vehicle*” search terms. In result, there were 87 articles in business, economics and management fields. After the initial reading of their abstract paragraphs, we found that less than half of them are relevant to our research topic. We additionally searched for Literature reviews on the topic of “Business model innovation” and found three relevant articles, which we use in our theoretical background. In addition, we have conducted similar searches in the “Google Scholar” database, as well as the Jönköping University Library database using the same keywords as in “Web of Science”.

When we tried to look for studies done specifically for the Nordic region (including Sweden, Norway, Denmark and Finland), we found only five relevant for our study articles. This comes to show that the field, despite its attractiveness, is not well researched and presents an opportunity for us to find out how the EV sector in the region is developing.

During our study of the existing literature, we additionally discovered more articles, cited by other authors, which were relevant for our research, but we did not identify previously. Therefore, we included them in the development of our theoretical background.

As a result of our literature research, we ended up with a total 72 articles, used for our theoretical background on the topic of Business Model Innovation in Electric Vehicle industry.

4.3.2 Research design

Among the main methodologies used by constructivists in business researches are action research and cooperative inquiry, archival research, ethnography, narrative methods, case study and mixed methods (Easterby-Smith et al., 2015). According to Saunders et al. (2009), the case study method is appropriate, when researchers want to understand how a firm makes decisions and to analyze the incentives behind the corresponding choices. Essentially the case study method looks in depth at one or several organizations, events or individuals (Easterby-Smith et al., 2015). Some of the advantages of case studies include data collection and analysis within the context of a specific phenomenon, which in our case is the BMI process used by EV producers. By adopting a case study method, we would also be able to capture complexities of real-life situations so that the BMI phenomenon can be studied in greater levels of depth (Dudovskiy, 2016). Depending on the purpose of the research, case studies can further be divided into exploratory, descriptive and explanatory types. Exploratory study is used to answer the questions “why” and “how” (Baxter & Jack, 2008). Additionally, Shields and Rangarjan (2013) argue that the exploratory research is used for problems, which have not been clearly defined by the literature. As we previously noted in our theoretical background, the concept of BMI is not yet definitively clarified by scholars, and therefore is appropriate to be studied in an exploratory fashion. Moreover, Saunders et al. (2009)
argue that the goal of an exploratory study is to reach deep understanding of the actual problem, the current situation and to obtain useful insights of the researched phenomena, which ideally aligns with the purpose of this thesis.

Furthermore, case studies can be divided as single case and multiple case studies. Using a single case approach has the disadvantage of considering only one source of data, which undermines the validity of the conclusions made from this data. The multiple case study approach, by contrast, collects data from several organizations or individuals and gives the researchers the opportunity to compare the different cases (Bryman and Bell, 2011). We choose to explore multiple case studies, firstly because this allows us to collect higher amount of rich data, secondly because in this way we can get a broader view of the studied problem from different perspectives, and most importantly because we believe that the phenomenon of BMI is dependent on various actors in the industry and only by interviewing multiple cases of them we can see the true picture of it. By analyzing the process of BMI in multiple cases of EV producers, we also consider that our findings would be applicable in other cases as well and we will be able to contribute to the existing literature.

According to Easterby-Smith et al. (2015), it is important for researchers to clarify what is the unit of analysis they use in their study. Yin (2013) also states that the definition of the unit of analysis should be derived from the research question. Since our question focuses on the BMI process in different companies, the organization as whole would be suitable unit of analysis for our research. This according to Yin (2013) implies using a holistic approach, because we have a single unit of analysis, while in contrast engaging in embedded approach would require us to differentiate multiple units of analysis for every case.

4.4 Case selection

As the purpose of our research is to explore the BMI process in the EV industry, we considered specifically companies, which can be identified as EV producers for suitable in our case study. For the purposes of our research, we consider “Electric Vehicle Producer” as a company that is producing and selling electric vehicles as an end product and/or service, or its main activity is providing charging infrastructure for electric vehicles. In this way, we do not consider companies that produce only parts for electric vehicles, as their business model innovations are not trying to solve the same challenges for electric vehicles, such as increasing customer attractiveness. Other limitation considered in the case selection process, is our focus on organizations located in the Nordic region, namely Norway, Sweden, Denmark and Finland, since we found out that this region is understudied and represents a gap in the literature about BMI in the EV industry. During our research, we identified a limited number of firms answering our description of EV producers in the Nordic region. Therefore, we chose the Ad-hoc sampling method for our case selection. According to Easterby-Smith et al. (2015), the Ad-hoc method is used when the research cases are selected on the base of availability and ease of access, which fully applies to our situation, because of the limited time and resources we can rely on.
The total number of companies considered for the case study was thirteen, two of which located in Norway, six in Sweden, four in Finland and one in Denmark. All of the selected companies were contacted via email in the beginning of February 2018, explaining the purpose of our study and motivation of our interest in the specific company. Initially four companies replied with only one accepting our proposal for collaboration. We further contacted the remaining firms via phone calls or social medias (e.g. LinkedIn, Facebook) and were able to persuade five more to participate in our research. The final list of our research cases can be seen in Table 3.

4.5 Data Collection

We primarily engaged in collecting data through semi-structured interviews. The research question and the structure of this thesis are built in a qualitative way, and therefore we use qualitative methods for gathering the needed empirical data. According to Lofland and Lofland (1986) qualitative interviews are directed conversations evolving around questions and answers about a certain topic. Tracy (2013) additionally states that interviews give opportunity for mutual discovery, understanding reflection and explanation of the researched question. Thus, in-depth interviews allow researchers to explore a particular topic or phenomenon in appropriate context, which otherwise would be impossible to observe (Easterby-Smith et al., 2015). Additionally, through the medium of language, we can get insights about organizational realities, and obtain the views, perceptions and opinions within the company that could contribute to finding answers to our research question.

In order to prepare for our interviews we created an interview guide, containing the main points and questions, we want to explore. We built the questions in the guide in open-minded manner with the possibility to remain flexible during the interviews and to be able to reflect on the answers given by the interviewees. By asking open-ended question, we also increase our chances of gaining more in-depth information about the researched process and the way interviewees are conducting their work for the organization. An interview guide additionally assures that the interview does not lose track and focus on the topic, thus providing the basis of gaining data within the research design. Finally, the developed guide was further modified, depending on the specific type of company and person, which was interviewed. The general interview guide used for our interviews can be found in Appendix 1.

Before conducting the interviews, we send out parts of our interview guide to our respondents in order for them to prepare for some of the questions, which required deep knowledge of the business processes in the companies. The interviews were conducted during the period March 13th to May 3rd. Most of the interviews were done face to face and for that purpose we visited the offices of the selected companies, additionally two interviews were done using the online platform Skype. Each interview lasted between 52 and 115 minutes (see table 3). All of the interviews were audio-recorded and then transcribed into rich textual data for further analysis. Additionally, we made use of secondary data, which included internet websites, press releases, news articles, and reports by
companies, government agencies and other relevant organizations, such as International Energy
Agency’s “Nordic Electrical Vehicle Outlook 2018”.

### Table 3

<table>
<thead>
<tr>
<th>Company</th>
<th>Respondent’s Position</th>
<th>Interview Type</th>
<th>Date</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paxster AS</td>
<td>Sales &amp; Marketing Manager</td>
<td>Personal</td>
<td>March 13th</td>
<td>73 min</td>
</tr>
<tr>
<td>Virta</td>
<td>Marketing Manager</td>
<td>Skype</td>
<td>March 14th</td>
<td>64 min</td>
</tr>
<tr>
<td>Uniti</td>
<td>CEO</td>
<td>Personal</td>
<td>April 10th</td>
<td>112 min</td>
</tr>
<tr>
<td>Buddy Electric AS</td>
<td>Senior consultant and previous chairman of the board</td>
<td>Personal</td>
<td>April 15th</td>
<td>98 min</td>
</tr>
<tr>
<td>Scania</td>
<td>Product Manager E-mobility</td>
<td>Personal</td>
<td>April 12th</td>
<td>115 min</td>
</tr>
<tr>
<td>Clean Motion</td>
<td>Sales &amp; Marketing Manager</td>
<td>Skype</td>
<td>May 3rd</td>
<td>52 min</td>
</tr>
</tbody>
</table>

*Table 3: Overview of conducted interviews*

### 4.6 Data Analysis

A good analysis strategy helps to follow theoretical propositions and focus the research by ignoring
irrelevant data. Eisenhardt (1989) proposes a process for case study approach involving eight steps.
The analysis steps involve two stages where cases are first analyzed individually, and then are
compared among themselves.

Our analysis started by transcribing the conducted interviews and by establishing a case study
database, containing the recorded interviews, the transcriptions and some secondary data, available
for each of our cases.
Next, we got familiar with all of the collected data and started the initial coding process, where we found the first order concepts for each of our cases. For this process, we used the analysis concept of Gioia, Corley and Hamilton (2013). We did the initial coding step individually at first, and then discussed our findings together. Following Eisenhardt (1989) case study analysis approach, each interview was analyzed separately to understand the personal views of each of our respondents. This made it possible to comprehend each interviewee as an individual entity, which made cross-interview comparison more efficient. The next step of our analysis was to group the found concepts into bigger categories and connect them with each other, coming to the overall themes of our data.

After we had determined all the patterns, categories and the connections between the themes, we summarized them into aggregate dimensions. The structure of this coding process can be seen in the following figure:

![Diagram of data analysis process based on Gioia et al. (2013)](image)

**Figure 2** Data analysis process based on Gioia et al. (2013)

### 4.7 Credibility and Trustworthiness

We aim to construct our research in a way, where the findings and conclusion drawn from it have trustworthiness and overall high quality. In order to do that we follow Guba’s (1981) criteria for qualitative research and ensure that our study has credibility (I), transferability (II), dependability (III) and confirmability (IV).

**Credibility (I)** considers the trustworthiness of our results and findings. According to Krefting (1991), credibility can be ensured in several ways. Firstly, our contact with respondents affects greatly our findings. To make sure that our respondents are qualified enough we contacted specifically people in high managerial positions which, have the needed knowledge and experience to explain in detail the Business models and innovation processes in the companies they represent. Secondly, the researchers’ interests and perceptions can harm the credibility of their research. During our study, we aim to stay unbiased, to the subject and our individual perceptions to the EV industry. We additionally used the advantage of working in a team, by regularly discussing our own findings and the possible inconsistencies in them. Finally, the interview process was continuously evaluated and updated, to ensure that we ask the right questions to the right people, by preparing individually for every interview. In this way we were familiar with every company, before visiting them and were able to ask questions specific to the firms, while remaining close to our general interview guide.
Transferability (II) enables the replication of the study by another research while resulting in the same conclusions. As Krefting (1991) states it gives information about the degree to which results could be applied to other cases. In order to ensure the transferability of our study we explained in detail our case selection method and the background information about every one of our cases, showing that despite they are unique, they are still representative to the EV industry. Therefore, readers of our thesis would be able to replicate our findings to their own context, by using the same research methods as ours.

Dependability (III) criterion is for ensuring that the findings are consistent and could be repeated/replicated (Krefting, 1991). The consistency of findings and their replication in different contexts are ensured through measures such as stepwise replication and recording all of the data for a possible audit. In each of the interviews, we used the same interview guide, although we asked interviewees additional clarifying questions for each study case. We list the information about the conducted interviews in Table 3, as well as we store interview recordings and transcriptions available for checking. Further, the analysis of the gathered data is made in the same manner using the same steps for each company case.

Confirmability (IV), according to Guba (1981) represents the level of neutrality or the extent to which the findings are shaped by the respondents’ and researcher’s bias, motivation and interest in the topic. The main way to achieve confirmability is by having an external auditor, who checks the processes used in the research and confirms their credibility (Guba, 1981). Our main source of feedback serving as an external audit are the multiple university seminars in which we discuss the methods and strategies that we use throughout our study with our supervisor and colleagues. Additionally, we continuously reflect on our strategy during the research process, by discussing our approach internally in the team. Later on, when we present our results, it can be seen that they are driven by the purpose of the thesis, rather than our own perceptions of the topic.

During the development of this thesis we also consider the research ethics as highly important and aim to do no harm to our interviewees or case companies. Bell and Bryman (2007) suggest that research in management sciences and research within social sciences confront with different ethical issues and propose eleven principles that are relevant within the context of management research. One of their principles suggest that the research should be both beneficial to researchers and to participants of a research, and collaboration and active participation is important (Bell & Bryman, 2007). As one of the purposes of our research is contributing to the knowledge and the development of EV industry, we think it is important that we consider this principle, as we hope that our interviewed companies would benefit from this collaboration as well.

With regards to these ethical principles, during our research and after its completion, we are making sure that participants have given their consent to participate explicitly, and whatever information they consider sensitive, we do not disclose. We consider for our research only those participants that are eligible to speak for the company, mainly members of the top management team. Before the interview we fully informed the participants about who we are, what is the
purposes of our research, and what questions we are going to ask them. Also, we asked all participants if we can record the interviews, and make notes that we can use for our data analysis. The gathered data is used for academic purposes only, and no part of it is going to be shared with any third parties.
5. Empirical Findings

The empirical findings from our case interviews are presented in this chapter. We start with some general information for each of our cases and then explain how their Business models are structured, what are their main challenges, the external forces which affect their innovation process and finally the results of their BMI.

5.1 Paxster AS

Paxster AS is a company from Norway which produces specially-purposed electric vehicles for postal delivery services. The company is part of the HTS group that controls several other companies, most of which are involved with automobile industry and utility products. Paxster’s origins lie in collaboration between Loyds Industry and Norwegian Post, where the latter suggested to develop together an electric vehicle that would be used for postal delivery and which would help them achieve their plan of reducing CO₂ emissions. Loyds Industry decided to design the vehicle independently, and in 2015 created a separate company Paxster AS that would focus on the electric vehicles solely. As of today, Paxster AS continues to be a part of HTS Group, with its headquarters located in Borgenhaugen, Norway, and they supply Paxster vehicles to postal companies in Norway, New Zealand, Austria, Germany, Portugal and Sweden.

Business Model of Paxster AS

Our respondent described the key activities of Paxster as designing, assembling, realization and after-sales service of their electrical vehicles that are specifically made for postal delivery. Paxster AS offers postal companies a “fit for its purpose” utility vehicle that is optimized for transporting letters, newspapers and small packages to the delivery points. Their main clients are national postal services from different countries, such as Norwegian Post, Postnord of Denmark and Sweden, and New Zealand Post. These national postal companies have been facing a strong competition from international companies such as DPD, UPS, DHL, as well as smaller private companies that make newspaper and post deliveries. National posts have lost to these competitors large portions of the market in post and parcel delivery and are facing many challenges. “In Denmark Postnord lost eighty percent of their volume, are facing problems, challenges are huge, they deliver post only once-twice a week to each letterbox. Smaller private companies are taking over, like the companies that make newspaper deliveries, they take more post also”. Therefore, the national postal services need to increase their distribution speed and efficiency, so they can stay competitive on the market. As it was expressed by our interviewee, Paxster’s main “Business idea is to be a preferred partner for Europe’s most efficient and environmentally friendly solution for delivery post of letters and newspaper”. As in different countries post is delivered in different ways, Paxster is focused to offer an optimal solution for each postal company. They investigate every step in the work of a postman, and make a time study of all operations during the workday, in order to see where the delivery processes could be improved. Then, Paxster offers their clients to test their vehicle for about 4-8 weeks, so that to “get a good impression of the vehicle, how it works, ergonomics, and good quality perspective”

Paxster EV is primarily positioned as a product that has high potential in improving efficiency in distribution of post and small parcels by postal companies. A strength of the company is the quality, reliability and safety of the vehicle, as delivery could involve driving in aggressive conditions. The battery capacity allows to drive 8-9 hours a day that is enough for a postman’s
workday. As a result, employing Paxster can help postal companies optimize their processes, increase their efficiency, save time and costs. Paxster AS is particularly emphasizing to their customers that they can save cost, when compared to ordinary vehicles: smaller cost of using electricity, smaller service maintenance costs, saving cost on working hours and salary of a postman, and finally it is better when considering Paxster’s total operating cost. “Investment itself in a Paxster is only 8% of the total operational costs for a postman – that is what we are trying to sell” Also, the company offers customizability of the EVs so that it addresses better the specific needs of their clients, for example various optional features, such as back and front cargo boxes, additional lights etc. Paxster EV has evolved into second generation that has easier accessible battery, more service-friendly solution, a stronger motor, and offers three main battery pack with different capacity, which defines the drive range of the vehicle.

Paxster’s customers are primarily national post companies that is why purchase of EVs is done mainly through public tenders, in which the company has to compete with other competitors. The vehicle is sold at a base price, as postal companies are highly transparent and commonly share information between each other and adopt activities of their successful counterparts. Some of the things that define the price range of the vehicle are customizability, capacity of the battery, as well as the volume.

Paxster’s vehicle is mostly designed internally, although some of it is outsourced to other companies, such as EKER, the one creating also the design for Koenigsegg cars. The vehicle itself is assembled in Norway, with its parts sourced from different suppliers internationally. Company also provides after-sales services, such as maintenance, which varies across the countries – in some they cooperate with a company that can provide service network, in others, like Norway and Germany, Paxster tries to develop their own network, or postal companies take care of this with their own staff.

**Competition and Challenges**

Our interviewee told us that there is a number of indirect competitors from several countries that offer similar vehicles for use in postal services. There is no company that produces identical vehicle, but there are companies that produce small-size vehicles modified or adapted for specific purpose, an example would be French automaker Ligier that makes three- and four-wheel vehicles, also electrically powered and with ergonomic features. Others are small commercial vehicles with internal combustion engine from companies such as Volkswagen and Ford. Another concern are Chinese electric automakers with their large-scale production capabilities, and as they are growing at a very high rate. In light of this competition, Paxster has chosen a positioning strategy of “finding niches and working there to develop innovative solutions”, where they could gain competitive advantage mainly through product innovation. Thus, the company is trying to get established in a niche market, as they “are not able to compete with big firms”.

Although, the clients are satisfied with Paxster EV, a significant challenge remains its high price. Paxster addresses this issue, mainly by showing their clients that, although ICE vehicle is cheaper, the lower electricity price for running a Paxster, low maintenance cost, less warranty components, as well as lower salary costs attributed to time-saving and efficiency, in the long-run result in a much smaller total operational cost, that offset the high initial price.

One of the challenges for Paxster is that the amount of the post circulation in postal companies is decreasing, while parcels – increasing, such that Paxster has yet to adapt to these future conditions, as they acknowledge huge potential for this market and its customers. The company is focusing heavily to constantly adapt their product to customer arising needs: there have been two generation
of Paxster built, second one being more powerful and efficient, offering variety in battery and storage capacity, and some optional features. A solution the company is currently interested in is developing vehicles for other types of customers in industries such as home services and elderly care, home deliveries of food, waste disposal or parking services.

Another challenge for Paxster is consumer resistance to new technologies, as in an interviewee’s example of Germany, where government and other subsidies for purchasing EVs at times amount to more than half of the price of these vehicles, however the sales there are only starting to grow, as this challenge has yet to be overcome through making consumer more informed about the long-run financial and other benefits of owning an electric car.

Finally, Paxster is exposed to a threat of getting their original design of the vehicle stolen, as the company owns only some design protections, which are insufficient against vehicle design theft. As respondent has given us example, that during one exhibition Toyota representatives were “enthusiastically” taking pictures of Paxster, so that they had to ask them to stop. Then, Chinese companies have been asking to get to test Paxster, however they were refused, as it would have been too risky to get the design stolen for their market. That is why, it is important for Paxster to keep precautions when considering which companies to make their partners or even customers, as well as which markets they choose to establish themselves in.

**External forces affecting BMI process**

Our respondent did not tell us explicitly were there some particular events that have influenced the developments within company’s business model, however, he mentioned some important events that made the company make certain decisions regarding Paxster’s business model.

During the time when Loyds Industry was collaborating with Norway Post for development of EV, the national postal companies in Europe were continuing to lose monopoly over postal services to smaller private companies, as well as they had to face a lot of competition over parcel delivery with international companies such as DHL, UPS, DPD, etc. Thus, they were facing many challenges and needed to make distribution more efficient. That is where Loyds Industry realized there is a need not only for green electric vehicle, but also for providing solutions that could help the postal companies to become more efficient and quick in their distribution operations – they “saw there is a huge potential for these kinds of improvements globally”.

While developing their approach of working with their customers, Paxster has been receiving different requests regarding their product – such as overhead lights, variations with back and front cargo boxes, side lights etc. That is when the company decided that they should add optional features to their initial value proposition, as each postal company is specific and require different vehicle configurations.

Another external force is the influence of the government on the national post companies. These national postal companies are commonly buying the vehicles through tenders, and the purchases usually take longer time to process, and there is much less freedom to influence the buyer’s decision – for example through negotiation – as state companies’ decisions and strategies are less flexible. To make a difference in tender outcomes, Paxster, first of all is maintaining its “readiness” to participate in the tenders, also the company is actively participating in different related exhibitions along with Norway Post – a successful leader in the industry, which other national posts try to follow, and which has Paxster’s as half of its fleet, thus fueling interest in Paxster. Such is the example of the two biggest international customers of Paxster – New Zealand Post and Austrian post, which approached Paxster themselves, as they were interested in how Norway Post has improved its operations.
Effects of BMI
Paxster has not shifted its main business idea, but has rather focused on the innovation of their product – electric vehicle with specific functionalities made particularly for postal deliveries. Paxster has begun from making compartments for storing post in bicycles, mopeds and other vehicles for postal delivery companies, then it evolved into producing EV that allows delivering post more quickly and efficiently for their clients. The EV has been transformed into second generation and has added various optional features to their offered product that would fit the specific operations of the postal companies. Constant product innovation requires company management board to challenge every department to come up with new ideas for improving the product and present their solutions. They have integrated product and process innovation through observing their customers’ operations, and have received valuable feedback from them that has also contributed to product innovation. The company is planning to increase their fleet and product range, but currently they are focused on optimizing their current product to offer best quality. The electric vehicle has received acknowledgement by many national post companies and Paxster EVs are in high demand, so the company has been lowering its production costs, and has paid back their bank loans for development of the product. Therefore, Paxster is expecting to have positive financial results and soon become profitable. The company is present in quite a lot markets already, but is expecting the biggest sales growth in Germany and Central Europe in the next two years, such that they are investing in building their own after-sales network there for the future demand. In the prospects of large Chinese competitors entering the EU market, the company strategy lies in “finding niches and working there to develop innovative solutions”, and it arises from their past experience in Paxster’s preceding companies. Another achievement that has been attributed to success of their innovations is that new prospective niche markets have been realized, where the company could adapt their vehicle: “we also need to develop vehicles which can be used by other type of customers, for example home services, like elder care, home deliveries of food or other similar things, also parking services, so there are many potential future markets for an EV of the Paxster type”.

Conclusion
Paxster has become a niche company that developed an innovative product that creates value for the postal delivery companies in terms of cost reduction through efficiency and time-saving. The company has been involved more with innovating their products, rather than their business model, mainly through directly working with their customers and integration of product and process innovation. The demand for their product is growing and the company is expecting to become profitable very soon.

5.2 Virta
Virta is a Finnish company providing different solutions for charging electric vehicles. It was established in 2013 by collaboration of 18 energy utility companies in Finland, which aimed at promoting the electrification of future transportation. Nowadays the company is still owned by the other energy utility firms, it has over 30 employees in three offices in Helsinki, Stockholm and Berlin. Virta is currently the market leader for providing charging services in Finland and has
operational clients in 15 countries in total. The main markets for the company are Finland, Sweden and France.

**Business model of Virta**

Our interviewee told us that they clearly distinguish two parts of their business model. The first part involves their service platform and other software solutions, which are mostly targeted at business clients, and it has not changed significantly from the start of their business operation. The second, newer part of their business model is the involvement of selling charging devices for EVs which are targeted more towards individual users.

The main focus of Virta is on three different services that it offers. The first kind of service is called “Virta Mobility” and it provides end users the access to all available charging points and connects them to company’s charging network through their mobile application. This service is described as similar to the one provided by mobile phones operators. The clients of Virta subscribe for their services and in return they have access to all available charging stations in their network, can use smart energy solutions such as optimized charging time and roaming through their mobile app, and the billing is done automatically through a cloud platform.

The next main and most completed service platform offered by Virta is their comprehensive solution called “Virta Bundle”. It is aimed at business clients who want to build a charging EV network of their own. Virta provides their clients with the charging stations needed and with a software managing platform which allows them to monitor all aspects of the charging process. Before installing the network, the clients decide all specifics for the charging process, such as number of active stations charging prices etc., and then they can manage it via Virta’s platform. In this way all the activities connected with building and configuring an EV charging network is done by Virta while their clients do not need to have the skills and resources needed to do it. Virta effectively states that their clients are also their partners, because by working together, both businesses can grow faster and more reliable. The pricing strategy which Virta uses for this service is different, depending on the scale of operation of their clients and the amount of charging stations they want to install. After the initial installment price, the clients also pay subscription fee for using Virta’s managing platform. Because of the high investment needed to build and manage such kind of charging network, Virta also offer trial periods for their clients so they can get to see how everything actually works. As our respondent put it “After the network is already build it would be too hard and expensive for them to give up on it and they will be stuck with the platform...” Therefore, signing deals for this kind of service takes a lot of time and communication between all the different partners. The main partners involved in the process are the manufacturers of the charging stations, the electricity providing companies, roaming companies, which help to connect to different charging networks and others. Finally, Virta connects all the different parts with its software platform solution making the long and sophisticated process easier for their clients.

The third service they offer, which represents the second part of their BM, is selling the actual charging devices for electric vehicles. Virta outsources the manufacturing of the devices to their partners and then preconfigures them in order to be completely compatible with their software platform. In this way the EV owners can use the company’s mobile app and optimize their charging process. The clients of this service also receive access to Virta’s charging network, by paying a monthly subscription fee for using it.
Competition and Challenges
When we asked if there are many other companies who provide the same or similar services, Virta answered us that there are quite a few companies in Europe who offer similar type of platform services, effectively making the market very competitive for its current size and maturity. According to our interviewee, most of their competitors use similar business models, but none is profitable yet, because of the current immaturity of the market. The expectations in the industry, though are very optimistic and everyone expects this business to be growing dramatically in the near future.

The availability of public infrastructure for charging of EVs is undoubtedly a big challenge, but Virta sees the residential charging stations as the biggest challenge right now. Currently most of EV owners have their own house and charge their cars mostly at home. In the near future, however more and more people who live in residential buildings or complexes will start buying electric vehicles. This could become a problem because at very few places people have access to parking slots with a charging point available. Currently owners of such kind of residential buildings or other responsible for the issue people are reluctant to invest in more charging points, because there is still not enough need for them. On the other hand, people considering buying an EV also do some research and come to the conclusion that they should be able to charge at convenient for them points, ideally at their place of living. Therefore, there is a kind of vicious cycle, where both investors and potential EV owners wait for the others to act first.

The way Virta is solving this problem is by trying to offer their clients every kind of service which they might need. This is actually the reason why they started selling charging devices to individual clients. When the company was developed four years ago, their business model and value proposition focused only on the software platform solution and how to make it as reliable as possible. Around a year and a half ago, however the company realized that they need to start selling charging devices too, because that is what people will need in the future. In this way they modified their business model in order to include new kind of service and approach a completely new for them market.

Additionally, Virta is trying to help residential owners who want to install charging points for their buildings too. The biggest problem this kind of owners face is managing accurately the billing and the amount of power consumption for the EV charging process. As a result, Virta has implemented an automatic pinpointing and pricing solution in their platform. With this solution every charging point automatically detects how much power is used, for what time and at what prices, so the end user is billed accurately at the end of the charging process. Additionally, if there are too many EVs charging in the same time at the same place, this might result in a grid overload and malfunction of the power network. Therefore, Virta also enables Load management of the power consumption and if the platform detects that too much power is used it can stop the charging for a period of time, or increase it if there is unused power in the electric grid.

It turned out that Virta is developing their services in a similar way of the Smart electrical grid, which was proposed in some of the literature we used in our theoretical background. In addition to the Load management included on their platform they also work on providing Optimized charging, Bidirectional charging and Frequency containment reserves. Optimized charging aims to choose the best hours for charging the EV, when the electricity prices are lowest and the network is not fully active. This becomes possible because EVs usually stay parked at the charging point for longer time than they actually need to be charged, for example when the owner is at work or is having a dinner at a restaurant. The bidirectional charging enables charging stations to flow energy
in both ways to and from batteries. This would mean that when an EV’s battery is already full, but there is more power needed in the electric grid, the power from the battery can be used to deliver the lacking power, and the vehicle owner can make profit from the provided power. Virta is working on developing this kind of service with the car manufacturer Nissan, but the service is still in demo phase and is not yet commercially available. The last service in development mentioned in the interview was the Frequency containment reserves. It would allow a software platform to detect any frequency signal from the electric grid and regulate the power consumption according to the signals. Hence, the power available in the network will be more effectively used, because currently there is always some unused power which is produced or a need for more power to be quickly produced.

**External forces affecting the BMI process.**

Our respondent could not name some specific events which greatly affected their business model evolution, but said that there are a lot of smaller changes in the industry, which have not gone unnoticed. Some of their competitors for example, have recently announced that they merge with another company, which means that they would acquire new resources and possibly will have new growth strategy. Therefore, it was stated that “...we have to be constantly awake and be able to change directions when needed”.

Since the market is still new and most companies in it are still working on developing their services, it is hard for Virta to clearly identify which of the other companies are competitors and which are partners. Usually many companies work closely with each other for building their solutions, but at the end some partners start offering similar services and compete for the same markets, so it is very hard to be sure which are true industry partners and which are the potential future competitors.

When Virta initially started working, four years ago, the market was still very small and the development of the company has been slow. Around a year ago, however people’s opinion on EVs started to shift and now more and more people believe in the future success of the technology. Therefore, recently the market has been growing significantly, especially in the Nordics and Central Europe, and this has positively affected the growth of Virta.

Another important external factor for the industry are governments and policy makers. The new policies and incentives provided by many European governments have helped for the market growth of EVs and public charging infrastructure. Additionally, our respondent says that they often communicate with lobbyist groups and they have high influence on the industry and the development strategy of Virta, some of them are even considered as important partners. Government supported organizations such as Finland’s Innovation Fund, have also been helping Virta with financing, providing them with innovation grants.

**Effects from BMI**

As a result, from their innovation Virta claims that the services which it offers are future-proof. They look at every possible feature which customers might need in the future and try to develop a solution around it. Essentially most of the services which Virta is currently working on are built for the future EV market, which is expected to be much bigger with many more customers, partners and the need of collaboration between them. One of things which Virta expects to happen in the near future is the integration between EV charging grid and energy system: “I think the biggest thing that is going to change is that vehicle grid, an integration with the energy system. I think this is obviously going to happen, this is going to be a big thing and it is going to be a beneficial thing
for renewable energies production”. With this integration it is expected that the renewable energy which is produced will be much more efficiently used and with much lower prices, so the effect for EV users will be positive. Another increase is expected for the car pool services, or the car sharing and the mass usage of autonomous vehicles. If these expectations actually happen, then a lot less people will actually own a car or drive one, therefore a completely new strategy should be developed for the EV charging and selling services.

An effect which is often expected from BMI is the increase in profitability. Virta is currently not profitable, despite having an increasing revenue from their services. Nonetheless our respondent was positive that they will become profitable in the future, because of the growing market and potential new opportunities it brings.

**Conclusion**

In conclusion Virta is a charging infrastructure provider which uses business model innovation to create the charging services needed for the future. Their market is still small but with the increasing amount of EVs sold throughout all of Europe, the complete charging platform which they offer could become a standard for this kind of services.

**5.3 Uniti**

Uniti is a startup based in Lund, Sweden, which is developing a city electric vehicle targeted as perfect for electric city mobility. The founder and CEO, Lewis Horne, whom we interviewed has a wide technical background and previous experience in entrepreneurship. He wanted to develop something groundbreaking, and after finding that the EV and the car making industry as a whole had many flaws, he decided to create Uniti and revolutionize the modern city car.

Uniti unveiled its first model in the end of 2017 and will start to deliver to customers in 2019. The company aims to sell vehicles globally, to both other business and individual clients.

**Business Model of Uniti**

The business model of Uniti is constantly evolving and according to our respondent every day might have something new included or excluded. The main focus of the company is to disrupt not only how EVs are made and sold but automotive industry as a whole. Lewis said that he finds the current state of the industry having many flaws and too sophisticated processes, which need to be made simpler. For the development of the business, Lewis said that he follows the entrepreneurial principle of effectuation, meaning that they try to attract as many resources as possible and maximize their value. The company is trying to have a proactive attitude towards all its activities and everybody in it learns while working on the specific challenges, without following a concrete plan, but controlling the different activities based on the achieved results. This enables the business model to be very flexible and change according to external and internal challenges and opportunities.

The main value proposition of Uniti is that the vehicle that they will provide is completely redesigned compared to a traditional combustion engine car and even most of the other EVs. The chassis of the Uniti is carbon made, reliable and very light, making the batteries and the electric motor much more efficient since they have to move much less weight. The steering system build by Uniti uses software to navigate the car instead of the traditional mechanical one. This would enable the users to adapt the vehicle to their driving style and to improve the driving experience. The whole car is designed to be operated more like a modern smartphone or tablet, which according to Lewis will simplify the driving experience. The lack of any buttons in the car, which are replaced by a big touch screen device on the “steering joystick” is also expected to make the
operation of the vehicle simpler and more adaptive for modern people accustomed to use smart technologies. The customizability of the driving habits for the different users would additionally enable them to feel like they drive the same car even if they use a different one every day, through a car sharing service for example.

Another part of the business model which Uniti is trying to revolutionize is the production and delivery processes. They do the main part of the product design in house, but then work with numerous partners for the final design and build of the vehicle. Their plan for production process includes working with many partners, such as Siemens who help them build completely automated digital factories. The idea is that they can digitally adjust all the different parts and components of the vehicle, produce them in a main “mother factory” and then assemble the final products in smaller local factories for the different markets. Finally, when a customer orders a vehicle it can easily be delivered to his/her home.

Uniti recognizes two main target groups for their vehicles. The first one is other businesses or public institutions, which can order larger number of vehicles and use them for their purposes. Most of these companies who have contacted Uniti, work with car sharing services or offer other mobility services in different cities. Therefore, they order from Uniti vehicles which are specifically modified for their business purposes, such as added data collecting sensors or other software improvements. “They want extra sensors or data they want to capture for a single customer and then they have whatever they have”. The other customer segment are the individual users, who can order vehicles through an online platform, or consumer electronic stores. In this way the company is trying to disrupt the traditional distribution channels, like dealer stores or distributors. Since Uniti is perceived more as a modern smart technology product, it makes sense that it can be found and tested in an electronics stores. “Our direct sales to customers are more of a brand establishment thing”. Recently the company had showroom installed in two MediaMarkt stores in Sweden, where people could see the vehicle and test it using Virtual Reality tools. These tests resulted in more than two thousand individual preorders of the vehicle for the company. When sells have begun Uniti will provide a home charging device for their vehicles and they will be also compatible with all other available charging options, but the company will not provide battery swapping options.

The firm also has different strategies regarding the different geographical markets it aims to enter. While the plan for the most part of the world is to control the whole production and supply chain cycle, the approach for the Chinese market will be completely different. The company realized that there are too big restriction barriers to produce and sell directly EVs in China, therefore it plans to license its brand and platform. Then the license for both the hardware and the software comprising the vehicle are provided to local manufacturers who build and sell the final product on the Chinese market, while Uniti ensures quality control and earns license fees from the sold vehicles.

**Competition and Challenges**

Uniti targets the lightweight electric vehicle market and therefore perceives this kind of vehicles as their main competitors: “... primarily the second family car not the first family but the second family car or the commuter vehicle and so forth the likes of maybe Renault Twizy or possibly even Renault Zoe”. However, since they try to disrupt every aspect of the modern car experience, their main goal is to create a whole new market. Because of the rising trend of offering more and more mobility services, they try to position themselves uniquely in the market, or as Lewis said it “... we are effectively trying to create a new market which is designed for usage patterns and not
designed for car culture values like a Tesla”. Uniti’s innovative features included in the vehicle and its digital customizability are their main advantages against the above mention competitors. As a startup, Uniti still faces a lot of challenges, mainly for scaling their operation and raising enough capital. As Lewis said the EV industry is very capital intensive, and one of their major challenges is raising enough money both from capital ventures and different governments which want to include some of Uniti’s technology in their public services. The harder part for the company, though is not finding enough investors, but choosing the right ones. Since every different investor expects something in return Uniti is very careful to choose only investments which align with their goals and strategy. Since the company is currently building its first vehicle, it is very important for them everything to be done right and the end product is safe. If otherwise their first deliveries have to be recalled, it will be a major problem for Uniti. Finally, choosing the right strategy, was pointed out as a big challenge for the startup. Usually all employees of Uniti are welcome to come up with ideas and propositions for the development of the company. At the end, however mostly the CEO along with other higher managers discuss and decide on the strategic questions. The regular and quick changes, dependent on the changing environment, is what according to our respondent, keeps the company flexible and gives it advantage against other bigger vehicle manufacturers.

External forces affecting the BMI process
Unity has many external partners which affect their business model innovation. Because the final design and the production of the vehicle is going to be completed by some of their partners, they need to closely collaborate with them and innovate their future strategy together. An interesting example, which Lewis gave us was when some of their external advisors have recently told them that they can now develop a vehicle for a new regulatory class, which was initially deem impossible by all of the investors. Now when they are starting to develop the new regulatory class vehicle their strategy and financial plans changed significantly.

Other forces which affect greatly the BMI process are the potential customers of the company. Uniti relies heavily on feedback to see what are the people’s needs and how they can be satisfied. Uniti has been in contact with an Australian insurance company as a potential client. Uniti has initially offered them to sell them vehicle with specific additional sensors installed, but their answer has been that they prefer to instead purchase big amount of their vehicles, around 50 000, and then they would install their own data collectors and offer the cars to their clients. In this way, depending on what the customer wants the business model and the production strategy had to be modified.

Finally, different government agencies also have effect on the business model development of Uniti. Some public agencies from several countries have shown interest in using Uniti’s vehicles for providing various mobility services, and also have helped the company with financial grants for their development. As long as incentives are given by governments for purchasing EVs, Uniti recognizes that this is an important factor for a lot of their potential clients, but Lewis said that he prefers if there were not incentives for buying cars and instead the usage of above mentioned mobility services is promoted, or free parking and charging infrastructure is enabled.

Effects from BMI
Since the company has not started selling products or service yet, it is not profitable and no financial results are available. Nonetheless Lewis said that being profitable is one of their main
goals, because none other EV producer has yet been profitable and they want to set an example. The current plan for Uniti is to become operationally profitable in 2021 and have first net profit in 2022.

One of the other achieved effects from their business model innovations is decreasing their riskiness. By always looking at what the customers want and modify their business model accordingly, Uniti ensures that it will be successful on the market and has easier access to venture capital.

**Conclusion**

In general, Uniti is trying to involve innovative new approach to every step of developing, building and selling modern EVs. The company has introduced a number of new smart functionalities in its vehicle and is trying to create a new market for smart electric mobility. There is still a long way until Uniti becomes a successful firm, but their attempts to revolutionize the ever so big and sophisticated car making industry is definitely worth the attention from both theoretical and practical point of view.

**5.4 Scania**

Scania is well known truck and bus producer based in Sweden. The company has more than 125 years of experience in the automotive industry and is currently present in around 100 countries globally. The company has a wide range of sustainable transport solutions, and recently has started production and testing of completely electric and hybrid city buses. We visited Scania’s headquarters in Södertalje, Sweden and made an interview with the Product Manager for E-mobility in the company.

**Business model of Scania**

The traditional business model of Scania involves the sale or lease of their products and services to other business or individual clients. In our interview, we focused mainly on the business model for hybrid and fully electric buses and how it differs from their traditional one. It turned out that for the hybrid buses which have been commercially available for several years already, the business model is the same as the usual one. Scania has many different entities for the different countries it operates in, for example Scania Norway. The clients usually contact these local distributors, when they need to buy new vehicles. The main customers for this kind of products are local public transport operators, who provide transportation services in different cities. These operators participate in public tenders, where they bid with other companies for receiving the rights for their services. When a tender is won and they decide to purchase buses from Scania, there are usually two options for them – directly buy the buses or lease them. In both ways Scania offers wide range of warranties and after sales services for their products, such as maintenance. With the wide variety of after sale services Scania aims at reducing the risks for their clients, it turns out this is a very important part of Scania’s business model, because it brings them the most revenue.

When it comes to the fully electric buses, which Scania is developing, it turns out that they do not have a complete business model ready, but are working on several different options. Currently Scania’s electric buses are operational only in a test field project in the city of Östersund, where 6 buses complete a 14-kilometer bus line around 100 times every day. It is not yet sure when the EVs will be commercially available, since there is more development needed both regarding the product and the business model around it.

The first major difference with the traditional business model, is that the EVs have much less need for after sale maintenance and it is much easier. Therefore, Scania would lose a big part of its
revenue model. In order to solve this problem, the company would have to make more revenue from just selling the EVs “So either the revenue on the vehicle itself might go up a little bit... but that depends on what the market tolerates or not”. Another solution might be a guarantee in the contracts that the clients will use Scania’s services when they need it. Our respondent proposed that they may start offering new special after sale services which they do not currently, such as selling the driven distance per kilometer instead of the EV itself.

The batteries for EVs also demand an innovation in the current business model. Scania does not produce battery cells, but buys them from Samsung and then optimizes them with battery management systems. The battery development for EVs is still an ongoing process and every year there are new improvements on the market. Therefore, if Scania sells EV buses with a warranty for 10 years, after some period the battery technology in the buses will be old and ineffective compared to newer products. That is why it is also considered that Scania may offer a battery improvement as an additional service to their clients in the future, where the older batteries could be changed with newer. If this is the case, however then the older batteries are still usable and could be put to work for something else. This calls for battery reusage sales and services, which can help with additional income and is more environmentally friendly solution.

The charging infrastructure for the electric buses is currently in the form of power polls, located near bus stations and the buses charge from them while waiting for the next course. It is unclear however, what could be the final charging solution for the market. Scania does not provide the charging infrastructure and relies on collaboration with partners, such as Siemens or Heilux. The final decision could also depend on the clients and their business models. Therefore, the only sure thing for now is that the development and maintenance of such an infrastructure will include working with many new partners and possibly public institutions.

Challenges and Competition
Scania’s biggest challenge regarding the development of their electric vehicles, is actually their current success with traditional ICE vehicles. Basically, they need to cannibalize on their successful business model, in order to advance to the new one.

“I think we still have a very good business at the moment that is existing. So our main challenge is to really understand how complicated and difficult the new world is, I mean change that new world but still continue with the things that actually bring a lot of money today.”

Interestingly, though, the way Scania is trying to solve this challenge is again by using their history, key competences and brand. They have realized that the change to electric mobility is coming, but it is approaching gradually over time and is a very complex process. Scania claims to have the widest range of different transport solutions, including gas, diesel, hybrid and alternative fuel vehicles, and they have made sustainability a main factor for them, so while the transition is in process they can still offer their clients the biggest variety of sustainable solutions. Additionally, during the transition they intend to figure out the missing parts for their future strategy involving electric mobility and catch up on the EV development. “...hopefully during the transition phase, we will also learn and become better. Get up to speed with the ones that have only focused on EVs. We know that the customer will have different demands from today, since we are very active on the market today.”

The challenge of changing the current business model and strategy, intensifies from the fact that, historically the product development and product innovation in Scania have had the leading role, while business development has been of secondary importance. Our interviewee expressed hope
for this to change, and he sees that the innovation focus is gradually shifting, but it needs to come faster, because “...one sure thing is that the business becomes more and more sophisticated today...”

We found out during our literature review that usually companies like Scania, which have been involved with producing traditional vehicles, tend to follow their original business model, and only implement minor changes for their EV business. Therefore, we asked our respondent if they have thought of developing a completely new independent BM, for the electric buses approach. The answer was, that they have not, and it would be really hard to make something from scratch, without connecting it to their current business, because it would mean to change their business completely. They have too many partners and sophisticated value chains, that it would be impossible to create a new business model exclusively for EV buses.

When entering the EV buses market, Scania realizes that now they have to compete not only with their usual competitors, such as Volvo or Mercedes, but also with many new actors which have not been a threat until now. Therefore, the approach of the company towards competition should change in order to understand the new market forces and act accordingly, “...now new players come in that doesn't have to think in the same way we have to think because we have been built up in a way that has been very successful for diesel development and manufacture of these kind of vehicles so I think that's the main domain which needs to be changed.” A good example of such a competitor, in the eyes of Scania, is the Chinese company BYD, which originally started as a battery producer, recently though they have started producing EVs, and have received big governmental support in order to become the world's leading producer of electric vehicles. Companies like these do not have the experience and history in the car industry, like Scania has, but are developing quickly electric vehicles aimed at the new consumer’s needs, and will play a key role in the future EV market.

Another type of competitors, for Scania are firms that have been producing and selling trucks or buses before, but only by assembling together the different parts of the products, and not involved in the whole manufacturing process. Our interviewee states for them: “Such players that normally buy components and put them together, are quite quick and flexible and can work with different suppliers and don’t do all the development themselves. They tend to have been really successful in the beginning phase of this electrification journey”.

External factors affecting the BMI process
Currently more and more public transportation providers in big European cities, tend to catch up with the shift and require zero emission electric or hybrid buses. This customer need is pressuring Scania to speed up the development process, and increases the threat from Scania competitors who already have similar solutions on the market.
Since Scania’s project for electric buses is still in trials period, big effect on the BMI process have their partners in the project and the local public institutions. A lot of the future decisions which the company has to take depend on the partners who are responsible to build and maintain the charging infrastructure, and the potential government authorities who are willing to invest in such charging networks. As it became clear in our interview, everything is yet to be decided in the future: “No, nothing is sure or what’s sure is more complicated than expected. Just today more stakeholders, more players are involved in the whole process”.

The government authorities also play important role for Scania’s clients which can apply for some of the incentives or tax reductions available for purchasing electric or hybrid vehicles. Scania,
however as part of the Volkswagen Group, does not receive financial grants or benefits from public organizations.

**Effects from the BMI process**

Similar to our other cases there are not yet clear outcomes from the BMI process for Scania. In result of their innovation process Scania is now closer to an electrified future, where the internal combustion engines in their trucks and buses are replaced with electrical power, but is still at a very early stage of the business development process.

One other potential outcome, on which Scania is currently working, is developing electrified roads. The idea behind these roads is that the vehicles will able to charge their batteries while driving on them. This would allow continuous access to more power and less need for batteries with big capacities. The trials for this project have been going from 2016 on a 2-kilometer part of a motorway close to the city of Gävle. There Scania’s trucks connect to an overhead power lines, similar to those for city trams, and use the power from them to charge their batteries. The trucks powered by electricity are capable of reducing fossil fuel emissions by 80% to 90%. By working on this other type of electrification of their vehicles, Scania is making sure that it is prepared for different outcomes in the future, depending on which type of charging becomes dominant in the industry.

**Conclusion**

In conclusion Scania is trying to transition both its business model and products to more sustainable solutions like hybrids and EVs, but it is still largely relying on its traditional business model based on internal combustion engines. It will take the company a lot more time to figure everything out regarding their successful transition, since all of their current projects are in trial phases. It is obvious that Scania will have to rely on many new partners in the future and contest with many new for them competitors.

**5.5 Buddy Electric**

Buddy Electric is a Norwegian Producer of small electric cars called “Buddy”, formerly known as a Danish electric vehicle brand “Kewet” which first appeared on the market as early as in 1991. Buddy Electric, formerly known as “Pure Mobility AS” and “Elbil Norge AS”, has been involved in the automobile industry since 1992 and is one of the oldest electric vehicle manufacturers, with an experience of more than 25 years. After acquiring all rights to “Kewet”, and developing the electric vehicle for several years, in 2005 it started producing a new model called “Buddy”. In 2011 Pure Mobility went bankrupt, and was taken over by different investors and became “Buddy Electric”. As of 2012, Buddy EVs were one of the most popular EVs sold in Norway, with more than 1000 EVs registered there (Norwegian Electric Vehicle Association, 2012).

**Business Model of Electric Buddy**

In 2005, Elbil Norge As invested around 12 million NOK to increase their factory in Økern, in Oslo, and started producing the redesigned Kewet electric car under the new name “Kewet Buddy City Jet 6” or simply “Buddy”. This is a simple and compact electric vehicle, created specifically for the intercity use, with 40-80 km driving range on one charge. Its small size allows the driver to park sideways – with front or rear towards the curb that is particularly useful in city centers
where parking spaces are limited. The car is simplistic and functional, with minimal required
comforts and is easy to drive. It was designed to be lightweight and economical as it has low
running and maintenance costs. The EV body is made of durable Telene material with a high-
strength safety frame, fitting a 13kW engine that allows to reach maximum speed of 80 km/h.
Buddy is aimed to be used by consumers as a second family car or a commuter car. The company
has intended from the start to produce and sell a low-price electric vehicle, such that their primary
customers are environmentally- and price-conscious city-dwellers. Important aspect is that the
company offers a 10-year or 10,000 km warranty on the car batteries.
The primary intended market was the country of production – Norway – and it has stayed its main
market with a few exports to Denmark and other countries, mostly major European cities with
limited space. Buddy EVs were sold mainly from the company directly, although there have been
attempts to sell through “ordinary” dealers network. However, that has not been very successful,
and the company eventually decided to stick to selling their cars directly from the factory.
Our interviewee stated that their company innovation was focused mostly on the product
innovation and to the lesser extent – towards business model modernizing, such that their primary
focus is: “developing and upgrading a small electric low-cost car”. In 2010 the company released
a newer version of Buddy M9, with primarily its appearance and exteriors changed, and also lately
it has introduced a higher-performing Lithium-Ion battery to their cars that allowed to expand the
range up to 120 km. Also, Buddy electric introduced several modified EV versions – Buddy Cab
with a folding roof, as well as Buddy FlexiVan – a version with an open van, targeted for
commercial use.
However, the launch of M9 model was unsuccessful, and in late 2011, the company Pure Mobility
has gone bankrupt. But soon, in 2012 the company was taken over by other investors and renamed
to Buddy Electric that continued receiving orders and production of new EVs, as well as providing
service to the existing owners of Buddy EV. Then again, recently the company ceased the
production of their EVs, and to this day the company is actually engaged in resale of used electric
vehicles of different brands, such as Smart, Citroen, Fiat, BMW, Volkswagen and Kia. Another
part of their business constitutes manufacturing and sales of electric bicycles – called “Buddy
Bike”. They offer a range of models with different capabilities, mainly through a chain of retailers,
as well as online sales from their website.
Designing different Buddy models has been an essential part of Buddy Electric business activities,
but for their newer M9 they partnered with Portuguese Center for Excellence and Innovation in
the Automotive Industry, that has developed the full design and engineering part. To this day they
continue the conceptual development of Buddy EV with the help of some of their partners. For the
design of the future models Buddy Electric has been working with a famous design studio “Eker
Design” that designed luxury sport cars “Koenigsegg”. Also, Buddy Electric is a minor shareholder
in a company that is “studying and working on a more technologically advanced path towards
wholly or partly “self-driven” vehicle and car sharing” projects, such that Buddy Electric is
continuing developing its EV concept and building-up knowledge about the industry.

**Competition and challenges**

There were several competitors that have been in the same market as Buddy Electric. In the
beginning of 2010’s, the market for EVs with the governmental support and incentives has led to
entry of many competitors of Buddy Electric, such as EV Th!nk City by another Norwegian
producer Think Global. In 2011 Buddy Electric has gone bankrupt, and when it was resold in 2012
and again started production – much larger competitor companies with known brands, higher
production capabilities and economies of scale, were already fast redistributing the market, in which it was hard for the Buddy to compete, such that company has ceased production of EVs again.

When asked about the company’s challenges, the interviewee told us that they had quite a few challenges, of which the most serious was the overinvestment into their latest model Buddy M9, released in the end of 2009. The expectations of higher returns from launching their modernized Buddy were unfulfilled, primarily because “The development of the M9 model took too long time and became much more expensive than planned and calculated”. At the same time the company ceased the production of a previous model, which resulted in lost revenues. Also, the produced model had several defects, because of the faulty production, that had resulted from its premature release, as well as some parts used in production delivered by their Chinese suppliers were of poor quality and thus, unfit for use. The produced EVs had to be returned to the factory and repaired if they were to be sold to customers. The whole production had to be reorganized and different suppliers were needed, that took a lot of time and resources.

Another setback was relying for the sales on the dealers, whose “salespeople may have had limited knowledge about the Buddy” as well as “probably did not have sufficient motivation”, and delivered low product sales. The company had to turn back to selling the Buddy directly from their factory.

Another identified challenge was “limited production volumes” – the company was producing at their factory in Økern about five to six vehicles a week. In 2008 they were planning to scale up production to 5000 vehicles and opening production site in Portugal, however this did not work out. Low production capabilities meant lower revenues, and coupled with unsuccessful launch of M9 model, has lead the company to halt the production of EVs.

**External factors affecting BMI process**

Buddy Electric was quite successful with their electric car “Buddy” in the past, particularly in their main market – Norway, however, there were several events that have affected the innovations within Buddy Electric’s business model. First, Buddy electric has tried to expand their distribution channels through involving a chain of dealers that would help to boost company’s EV sales. Despite the big expectations, the dealers were ineffective when it comes to sales, particularly our interviewee has mentioned that salespeople had limited knowledge about the Buddy EV’s as well as lacked sufficient motivation to promote and sell the car. Buddy electric had to close this distribution channel, and shift to selling their cars exclusively directly from their factory.

Another event that had important implications in Buddy Electric BMI was relying on suppliers for the production of a new M9 model of Buddy, during which those suppliers turned out to be unscrupulous in supplying some essential parts for the car. Buddy Electric, while trying to build a car that would be of a lower price and more affordable than other EVs on the market, has established relationship with some Chinese suppliers of regenerative brakes. These essential parts of the safety of the car that turned out to be of a poor quality in practice, when the large amount of the cars was already assembled. The new model had to be recalled from the dealers and the faulty parts to be replaced. This has resulted in a much delayed and much more expensive launch of the new model than it was originally planned, as well as in a damaged reputation. The company had to rethink their policies regarding suppliers and had to switch to more reliable, at the same time more expensive suppliers. Also, since the new model “first cars were of bad quality”, which has resulted in poor quality and the reputation of the EV has been damaged, such that the relationship with their distributors had also been affected.
Next important event in the Buddy Electric BMI was that Norwegian Government has introduced many incentives for consumers to purchase EVs as early as 1990’s that has made Norway a “world leader in electric cars” (Milne, 2017). Our interviewee has mentioned such incentives for electric cars: the sales tax and VAT are zero “that makes electric cars cheaper in Norway than ordinary cars”, along with “other incentives such as free parking in many places and access to bus and taxi lanes and also for the time being toll-free” and small annual tax. Buddy Electric has halted the production of Buddy EVs currently, at the same time, their main market – Norway – has been quickly filling up with many other similar small EVs, such as Mitsubishi, Citroen, Renault, Hyundai, Kia and Peugeot. They have taken large shares of the market, such that for Buddy Electric to re-enter the market and to compete with others requires substantial technological and conceptual development of their business, which company continues with the help of their partners.

**Effects from BMI**
During its implementing of innovation to business, the company has had an unsuccessful launch of a new model of Buddy EV, at the same time ceasing production of the previous EV model that has affected company financially. It took more time to develop the new model and was much more expensive than it was planned, also it took much time to start actual production, which was undermined with unethical suppliers. Company management overinvested into a new model, which was first produced with a low quality, and has not been successful being sold through dealers. Buddy Electric had to return to their initial distribution channel – directly from the factory, but has produced around 300 EVs, which was much less than predicted. All of this contributed to low revenues and led the company into bankruptcy in 2011.

The company has been sold to different investors that reorganized the company and launched production in Spireaveien, Refstad. They had new production capacity of 500 EVs/year, however they were aiming on order-based production that was “more adapted to reality”, and at the same time they were also providing repair service to Buddy EV car owners. This way the company has altered its production towards the actual demand on the market, as opposed to previous “in-advance” production. But yet, again, the production was halted due to insufficient revenues, and the company shifted to reselling used EV online, and manufacturing and selling electric bicycles “BuddyBike”. Currently, the company has diminished to a small size and there is no production of the electrical vehicles. At the same time, the company continues working on the conceptual design of the EV for the future. Buddy Electric is also a minor shareholder in another company that is engaged with technologically advanced projects of autonomous driving and car-sharing, therefore the company continues studying and development of EV concept, especially through accumulating knowledge about the EV industry from other players. As our interviewee revealed the company hopes to continue their initial business idea of a compact, light and affordable EV, and they plan further developing the EV and launching production when the company finds new partners/investors.

**Conclusion**
Norwegian Buddy Electric, together with its preceding companies, has been one of the first-movers of producing EVs. The company has designed and produced a small and low-cost EV that became one among of the most popular EVs in some years. However, Buddy Electric has spent most of the time innovating the EV and struggling with establishing its production, without significant
change in their business model. Consequently, the company has not conducted sufficient sales and has ceased the manufacturing of their EV. Nevertheless, the company is still continuing to this day to design some new EV models and is searching for financing to restore the EV production.

### 5.6 Clean Motion

Clean motion is company based in Lerum, Sweden, which produces and sells small three-wheeled EVs called “Zbee”, but often referred as electric auto rickshaws in their main market – India. The company was founded in 2010, in 2011 developed its first prototype of the Zbee and in 2013 started selling it on market. We had an interview with a Sales & Marketing manager at the company, where we discussed the business model of the company and the innovations, they have introduced.

**Business Model of Clean Motion**

The initial BM of the company, which is still in use involves the production and sales of the main product – the Zbee. These EVs are currently assembled in a factory in India, but the company controls the process and realizes the sales from its headquarters in Sweden, where also the R&D, designing and testing is done. The main advantage of the Zbee is that it has a unique design and body constructed of fiberglass. This makes the vehicle extremely lightweight – only 280 kg, and energy efficient. In this way the Zbee does not require a big battery, making it more economical and sustainable than other similar products. When the company was created, the main idea was that usually all the cars, even most of the EVs are produced with the intent to have as big as possible driving range, while people in the cities travel not more than 10 kilometers per day. Therefore, the company wanted to develop a vehicle that is intended for every-day city commute and helps decrease the negative effect of transportation on the climate. Currently the main market of the company is India, where the EVs were the first officially licensed electric rickshaws, back in 2016. The company also have smaller clients in Indonesia and some European countries, including Sweden, Germany and Switzerland.

The biggest clients of the company in India are other businesses, which provide transportation taxi-like services or vehicle sharing and hailing services. Clean Motion sees a big opportunity in this market, because it has been growing in recent years, not only in India, but worldwide. Our respondent said that they also offer after sale services to such transportation companies, like maintenance, warranty and leasing. With its leasing strategy the company offers to rebuy the vehicles from their clients after the leasing period expires, and deliver them new ones while using important parts of the old vehicle, especially the fiberglass body, which is quite expensive to build. In this way the company makes their vehicle even more sustainable with recycling and reusing most parts of it.

So far, we described the current BM of Clean Motion, the company however is developing another long-term plan that would dramatically change their business model. The plan involves building many micro factories close to big cities and customers, where the vehicles will be assembled. The company will then franchise these micro factories to other businesses which will be responsible for the manufacturing process and selling the end products at their markets. Essentially Clean Motion will have the rights on the design of the vehicle, an international logistic organization which supplies the parts to the factories, and will receive license fees from the realized sale: “We have a broad supply chain for different components from all around the world [...] we will develop a central logistic organization for the factories, so they can order parts when they need them”.

Therefore, the company does not plan to continue manufacturing and selling EVs, as they do now, but to manage and control an international franchise chain for small efficient EVs. The first micro
factories are planned to be built in India, the main current market of the company, with capacity of 3000 vehicles per year, but after that the business is expected to grow to other markets globally. In order to complete this plan, Clean Motion has acquired financing from many different entities, including venture capital, bank loans and government subsidies. Our respondent also shared that, in 2016 Clean Motion has become a publicly traded company on the NASDAQ stock exchange market, and has received investments from there too.

**Competition and Challenges**

Our respondent said that they perceive many different types of competition, depending on the intended use of their product: “There are competitors in every sector”. “In Sweden, there is a big market for second hand cars and people who are not environmentally concerned, have difficulties seeing the advantages of the EVs”, and this is a problem which the company is trying to affect. “In India there are conventional auto Rickshaws, which are big competitors”. The company is also active on the market of facility management vehicles on a small scale, so they have different competition there too, such as modified golf carts. Clean Motion is trying to leverage the main advantages of its vehicle, in order to compete on the market. Additionally, in India the Zbee is considered not only clean and efficient, but also a premium product, which makes it more attractive on the market.

In terms of challenges our respondent had difficulties in choosing a main one, since there are different kind of challenges for every aspect of the development of the company. Nonetheless, he expressed that probably the cultural and market differences between Sweden and India have played a big role so far, and even for the future it is very hard to choose the right competence, partners and companies which they will work with in establishing their new strategy. The difference in the market perceptions in India, in regard to the expected quality of the products, respect for timeliness and even credibility of company’s partners and clients have made the work of Clean Motion harder than expected on the market.

Furthermore, the infrastructure for EVs in India is not as well developed as in Europe, and there is no easy access to electricity everywhere, such that the company has to find solutions for their customers to use their product. One example is that Clean Motion has partnered with some shopping malls, where there is access to electricity and sufficient space for the parking EVs for charging, thus shopping center parking lots are convenient spots for their customers to charge EVs. Another way the company is intending to address the lacking infrastructure is that their partner – battery power supplier Fortum – will establish battery swapping and charging stations where their customers could charge their batteries as well as replace with a fully-charged one. This will be first tested within “clusters” – areas with already existing Zbee customers, but these service later will be available for all other manufacturers of light electric vehicles.

As it was mentioned before, Clean Motion sees a big opportunity on the market for leasing and rental of EVs, and therefore is trying to expand in this sector. For this to happen, however the company needs additional finance, and it has been a challenge to acquire it, since banks consider it too risky. Our interviewee said, that the company needs to prove that their strategy is working over a certain period of time, and this would allow them to get access to the needed finance, and try expanding to more markets.
External forces affecting the BMI process
Along with the cultural differences discussed above, there are also other external factors affecting Clean Motion’s BM. In our interview it became clear that the company is working with many different partners in development and manufacturing their EVs, mainly different types of suppliers, which are sometimes involved in the innovation processes too. However, our respondent refused to comment further on which are their main partners or how exactly are they involved in the BMI. The business clients of the company, such as the taxi services in India also have affected the BMI. When the company was launching its services in India it planned to start in New Delhi, but some of the taxi operators did not follow the government instructions and were left without license. Therefore, Clean Motion had to relocate its operations in another city and this slowed down their market development.
When we asked about the role of the governments for the company, our respondent answer: “They do not necessarily affect our business model”. He also states that the subsidies and incentives which are provided by public authorities are not enough, compared to the benefits received from using an EV, and he thinks they need to be increased. Clean motion has received previously some government financial grants to help its product development.

Effects of BMI
Similar to most of our other cases, the company does not have clear results from its BMI yet, since their development is still work in progress.
In result of company’s product innovation, it has developed one of the most popular electric auto rickshaws for the Indian market. The company also have come up with innovative long-term market strategy, based on franchising the production and sales of their EV. An effect expected from the ongoing new business development is mostly scaling company’s operation globally and accessing new markets. By achieving an international franchise chain, Clean Motion also expects the amount of the EVs produced and sold worldwide to increase significantly.
In terms of financial results, the company is not yet profitable, but in 2016 it became publicly traded and its stocks are currently available for investors at the NASDAQ stock exchange.

Conclusion
Clean Motion has designed and launched a lightweight three-wheeler electric vehicle called “Zbee” that became successful in the Indian market, and on a smaller scale – in several other markets, such as Indonesia, Germany, Sweden and Switzerland. The initial BM of the company has not been changed much, however, the company has developed a long-term market strategy that would transform their BM significantly – the company will shift its focus from manufacturing and selling to managing and controlling a franchises chain that will be conducting production and realization. For this, however, the company needs to acquire more financial resources. Moreover, the company is considering opportunities within ride-hailing and ride-sharing services, as well as new customer segments. In order to reach those opportunities Clean Motion again, needs external financing.
6. Analysis

In this section we are combining our empirical findings with our theoretical background in order to come to deeper understanding of how does the BMI process develop in our cases. We attempt to approach our analysis from various points of view and find the true meaning of the events in focus.

For the purposes of our analysis, we structure the themes according to codes which emerged from our data, a representation of which can be seen in the figure below. We will begin by exploring what were the different antecedents of the BMI in our cases, then analyze the types and novelty of the introduced innovations. Further on we continue with the internal and external moderators and factors affecting the BMI and finish with the outcomes of the process for our cases.
6.1 Antecedents of the BMI process

In order to understand better why and how BMI process is developing in our cases, we first take a deeper look at what were the reasons for the innovation to begin. Often in the literature BMI is seen as a result from changing environment, disruptions, competitive pressure or strategic discontinuities, (e.g. Doz & Kosonen, 2010; Johnson, Christensen & Kagermann, 2008) which can be described as external or internal for the firm challenges provoking the innovation process. Another popular opinion is that the reason for BMI is the potential to seize new opportunities, discovered through communication, sharing and connecting new information (Foss & Saebi, 2017a). The following table summarizes the reasons for engaging in BMI in the EV industry for our cases.
<table>
<thead>
<tr>
<th>Company</th>
<th>Antecedent for BMI</th>
<th>Quotes from interviews</th>
</tr>
</thead>
</table>
| Paxster AS      | Challenge & Opportunity | “Board of Loyds Industry had challenged us, while Paxster was still a part of Loyds, to develop a new product line...”  
“Norway post, asked if we want work with them on e-vehicle development, which was interesting to us.” |
| Virta           | Opportunity         | “In 2013 Finnish energy utilities discussed the future of transportation. It quickly became clear that the future of transportation is electric.” |
| Uniti           | Challenge & Opportunity | “I wanted to create something big...”; “So I did a lot of exploratory research and engaged in a lot of researches and then when it was ready to spin off to a startup, that's how we started” |
| Scania          | Challenge           | “Our main challenge is to really understand how complicated difficult new world is...while still continue with the things that bring a lot of money today.” |
| Buddy Electric  | Opportunity         | “Our goal was developing and upgrading a small electric low-cost car.”  
“We have recognized that we need to think differently and more efficiently. Our vision is to develop and manufacture sustainable products which the majority of the world’s population can afford.” |
| Clean Motion    | Opportunity         |                                                                                                                                                       |

Table 4: Antecedents of the BMI for EV producers in the Nordics

As it can be seen, our findings show no single right answer of the question why EV producers engage in BMI. The different companies have different access to information and reasons to start developing new strategies for the EV industry. One conclusion which can be made, though is that companies which were created specifically for the purpose of the EV industry, such as Virta, Uniti, Buddy electric, Clean Motion and Paxster, followed an opportunity which their founders discovered.
Virta’s founders were representing Finnish electric utilities and shared information among them, coming to the conclusion that there is need for such a company that would offer various EV charging services. The market for this kind of services was and still is very young, so they used the opportunity to be one of the first entrants, and now have become the local market leader. When Virta, changed its business model and started selling individual charging devices that was a result from yet another spotted opportunity which was acted upon. Buddy Electric were one of the first to develop an electric city car, back in 2005 and their innovation was also resulting from spotting a market opportunity.

Clean Motion’s plan to start developing EVs worldwide, by developing a franchise organization is another innovation resulted from recognized market opportunity. The company has been thinking of ways to scale up its production and sales to more markets, and have come up with a solution, which lowers their risks, while increasing their potential profits.

In the cases of Uniti, and Paxster to some extent, however, we find that the companies initially acted on found market opportunities, but some of their later business model innovations were reactions to external pressures. Paxster resulted from clients who looked for new solutions, requiring development in the EV industry, and the company saw the opportunity to create a unique product targeted at postal and other delivery companies. Uniti’s founder, on the other hand saw the opportunity to redesign the EV industry and started with a very basic initial business plan. The current BM of Uniti is still constantly evolving depending on changes and pressures from their partners, investors or the environment.

Scania, was our only case, in which BMI started because of external challenges. The company saw the new market developments and the gradual shift towards electrified vehicles, therefore could not afford to fall behind its competitors. For Scania another major antecedent for the innovation was their goal of becoming more environmentally friendly.

6.1.1 Innovation Approach

Our case companies also differ in their approach towards the innovation process. Our analysis shows that the cases created as new entrepreneurial companies, (Virta, Uniti, and Clean Motion) tend to use effectuation approach, maximizing the value of their available resources and acting quickly on market changes. While our three cases originating from other initial industries, Paxster, Buddy and Scania, have chosen the causation approach. These companies have focused on deep market analysis and plan ahead how their products should improve in the future. A recent research by Futterer et al. (2017), where the authors test whether effectuation or causation have positive effect on the BMI process, shows that both approaches have their advantages for companies and improve the results of business model innovation. The industry growth, however shows the differences between the two approaches. In fast growing industries, such as the EV industry, Futterer et al. (2017) found that effectuation has much bigger effect on the BMI process, while the causation is more appropriate for industries with lower growth, since there are less changes and
surprises. Therefore, the effectuation orientation is better suited for EV producers in the current market conditions, and it is expected to bring better results of their BMI processes.

6.1.2 BMI for Industry challenges

When developing the purpose of this thesis, we stated that we want to explore how EV companies in the Nordics try to overcome the main challenges for the industry, and if they use BMI for that purpose. We believe that attempts to overcome such problems might be a prominent prerequisite for BMI.

Most case companies stated that they face different challenges than those mentioned in our theoretical background, but all of them acknowledge that these are the biggest industry challenges and some target them specifically in their business strategy. Virta’s purpose, for example is to solve the problems with both public and private charging infrastructure. Uniti even uses the main challenges to come up with innovative solutions for them and flip people’s perception of electric vehicles.

If we look at every case individually, we see, starting with Paxster that the challenges for the company are not the same as those mentioned in the literature, however with their BMI they are trying to increase customers’ trust in EV technology and show them that it is reliable and efficient: “Biggest challenge is to convince people that EV is not anymore a new development [...] consumers need to become more confident in EV’s”. Therefore, with its product development and selling strategy, Paxster is contributing to solving the problem with people’s trust in EVs and their anxiety towards the shift to electrification.

Virta’s challenges align closely with some of those of the industry, and as mentioned above, their purpose is to enable charging infrastructure for everyone. In result we see that solving their challenges has played a role of a prerequisite for their innovation and the company is actively developing and expanding the available charging infrastructure in their markets. Additionally, Virta is working on the “Smart grid” mentioned as requirement for the future, by the literature.

Uniti’s challenges as a startup are mostly connected with acquiring capital, smoothing out the strategy and starting manufacturing. With its value proposition, however the company is trying to change people’s perceptions and trust in EVs. By using these challenges as starting point of their innovation, Uniti is effectively trying to convince their customers in the effectiveness of the EV technology and its superiority over the ICE. The perception of low travel range is also being solved, by using lightweight body, additional removable auxiliary batteries and power management software in order to ensure 300 km driving range of their vehicle. Consequently, we see that targeting those challenges can be described as one of the antecedents for the BMI in the company.

Scania’s main challenges in regard to their EV development differ from those in the theory, but the company posed its concern for the lack of enough charging infrastructure, while there is increasing number of clients who are thinking of switching to EV buses. Our interviewee said that in future Scania will have to work with partners on solving this challenge, but currently is not
involved in developing such solution. Therefore, as reason for their innovation, we see their goal of increasing company’s sustainability, which despite that is often mentioned as antecedent of BMI in the literature (Foss & Saebi, 2017a), is not a challenge particularly for the EV industry.

For the case of Buddy Electric, all of the industry challenges, mentioned in our theoretical background were present for the company too, because at the time they entered the market, the technology was at early stage of development. Therefore, they tried through their innovation to develop an EV which is energy efficient and compact for easy city commute. The company was quite successful in Norway and served as an early promoter of the technology, which might be one of the reasons behind the country’s position as current leader in EV market.

Clean Motion has found solutions to the lack of infrastructure and the high initial cost of setting it up by launching their product into limited geographical area “clusters” where the infrastructure is already available, and the infrastructure would be developing from there. Also, Clean Motion together with their partner Fortum, are developing a battery swapping station system that would extend the charging infrastructure in India, and as a result would increase both driving range and customer attractiveness. Most importantly, it would help advancement in transition to electric vehicles.

In conclusion through our analysis we find that most of our cases have used a market opportunity as a reason to enter the EV industry and bring new innovations. Later on, BMI has been initiated mostly by external challenges and access to new information. The entrepreneurial cases have used effectuation as their innovation approach, while incumbents have preferred causation. Finally, most of the EV producers in the Nordics, try to tackle at least one or several of the main challenges for the industry and have included changes in their BMs to do so.

6.2 Dimensions of BMI

In our theoretical background we found out that literature distinguishes several kinds of BMI, depending on the dimensions of the business model it affects. With differentiating the BMI processes in our cases by level of complexity, we are able to determine how big and influential the innovation has been for each company. The BMI construct can also be divided by its level of novelty to the industry (Foss & Saebi, 2017a). Depending on the newness of the innovation some authors differentiate BMI which is new for the company, (e.g. Bock et al., 2010; Osterwalder et al., 2005) while others do so for BMI new not only for the company but, for the whole industry or even the world (Santos et al., 2009). The following table shows the dimensionalization of the BMI in our cases.
<table>
<thead>
<tr>
<th>Company</th>
<th>Scope</th>
<th>Novelty</th>
<th>Type of BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paxster</td>
<td>Modular</td>
<td>New to industry</td>
<td>Focused BMI</td>
</tr>
<tr>
<td>Virta</td>
<td>Architectural</td>
<td>New for firm</td>
<td>Adaptive BMI</td>
</tr>
<tr>
<td>Uniti</td>
<td>Architectural</td>
<td>New for industry</td>
<td>Complex BMI</td>
</tr>
<tr>
<td>Scania</td>
<td>Modular</td>
<td>New for firm</td>
<td>Evolutionary BMI</td>
</tr>
<tr>
<td>Buddy Electric</td>
<td>Modular</td>
<td>New for firm</td>
<td>Evolutionary BMI</td>
</tr>
<tr>
<td>Clean Motion</td>
<td>Architectural</td>
<td>New to firm</td>
<td>Adaptive BMI</td>
</tr>
</tbody>
</table>

Table 5: Scope, Novelty and Typology of BMI by EV producers in the Nordics

Accordingly, four types of BMI can be divided from the scope and level of novelty of the innovation. For Paxster, the BMI resembled mostly product innovation, but the general architecture of the BM has not changed and the scope of the BMI is therefore modular, the novelty of their value proposition, however, was new for the whole EV industry. This type of BMI, which presents new products or markets for the industry by changing small part of the BM is described as Focused BMI (Foss & Saebi, 2017a). In the case of Uniti, the BMI introduced in the company have changed significant parts of the architecture of their BM, while the product and business innovations they are developing would be new for the whole EV industry. Therefore, according to Foss and Saebi’s (2017a) categorization, their BMI can be described as complex, since the complexity of their innovation resulted in business model entirely different from the usual case for this industry. In the example of Virta, the BMI has changed the architecture of their BM, with introducing new products, services and solutions, but those innovation are not entirely new for the industry, since there are other companies offering similar charging solutions. Accordingly, this type of BMI is called Adaptive, because the company adapts to external changes in order to improve its value proposition (Teece, 2010). Evolutionary BMI, according to Demil and Lecocq (2010) is fine tuning process, which involves voluntary or emergent changes in parts of the firm’s BM, often occurring naturally over time. Since Scania’s and Buddy’s BMI was focused particularly on product innovation and resulted from external competition and changes in the market, but their new products were not entirely new to the industry, we recognize their BMI as Evolutionary. Finally, Clean Motion’s future strategy would require completely new business model, in order to establish the franchise production chain. The solution they are developing, though is not unique for the automotive and EV industry as franchising the production process of the vehicles is an often-used practice. Therefore, the BMI in Clean Motion’s case is adaptive and helps the company to reshape its BM, according to the internal goals.
In summary, Scania, Paxster and Buddy have used BMI to improve only a small part of their business models, or only their value proposition, the other cases however, have used BMI to introduce big changes to their BM and modify the whole architecture of it. Only two companies (Paxster and Uniti) are working on innovative products/services which are new to the whole industry. This comes to show that for most firms it has been difficult to come up with something, entirely new and they have rather innovated in the scope of something already familiar and used in other companies. As literature suggests, (e.g. Barney, 1991; Peteraf & Barney, 2003) those companies, who have competitive advantages, such as their innovative business strategy or products/services are expected to achieve better results on the market.

6.3 Internal and External factors affecting the BMI

As it was highlighted in the findings for our cases, there are multiple variables and factors which can have great effect on the BMI process. In order to answer our research question of how EV producers innovate their BMs, we should analyze how important are those factors for the innovation and what is their effect. We separate the variables into internal and external to the company, because of the different level of control which companies have over them. In the internal factors we include the company’s values, goals, general business logic, resources and complementary assets, while the external involve the partners of the company, competitors, government authorities, as well as contingency events.

6.3.1 Internal factors

The main values and goals posed for the company have played an important role for each one of our cases. For many of them, they can even be described as the main motivator or antecedent for the innovation process. For Scania the goal of becoming more sustainable is one of the key factors on which they emphasize their current work. Uniti’s mission to revolutionize the automobile industry and create the modern sustainable city car is also their main reason to innovate in the way that they do. The main values also play big role in the development of the core business logic of the companies, which as it has been posed by Bohnsack et al. (2014) affect in what direction will the company innovate. Companies like Scania and Paxster, which are part of bigger holding groups, and have had previous experience with producing traditional ICE vehicles or parts for them (Buddy), have stayed close to their core business model and have instead focused more on product innovation in order to bring value for their customers. The new entrepreneurial companies, on the other hand (Uniti, Clean Motion and Virta) had to build their business logic, depending on their goals and the current market conditions, therefore they have been more flexible in their innovation and have introduced significant changes to both their business models and products/services. This is in line with the conclusion of Bohnsack et al. (2014) that incumbent firms and entrepreneurial companies in the EV industry approach BMI differently, because the incumbents are constrained closely to their core business strategy, while the latter had to tackle their disadvantages with innovation.
Availability of complementary assets, such as production facilities, industry experience, internal financing, customer base etc., is another factor, which is posed as affecting differently the BMI (Bohnsack et al., 2014). Only one of the companies we researched – Uniti, did not have access to such complementary assets, because it was developed as an entrepreneurial startup. In result they had to seek many external investors, initiate a crowdfunding campaign and develop many partnerships with other companies, in order to accomplish their goals. Uniti had to build its vehicle, combining different technologies, which helped them make it unique and attract potential customers. Therefore, their BMI, became open to all these external sources of finance, experience and feedback, which is why their BM was the most flexible one from all of our cases.

The other companies, on the other hand had access to at least some of the mentioned complementary assets. Clean motion makes use of its existing production facilities, internal financing and customer base, while developing its new expansion strategy. Paxster, had the support, experience and production plant from the HTS Holding, Virta also had financial support and experience from its utility owners, Scania as one of the biggest truck and buses manufacturer, and as a part of the Volkswagen group relies almost entirely on internal resources. Finally, Buddy had the experience in automotive industry and a production plant as their complementary assets. All the available complementary assets helped the companies in their innovation process, by making it either more financially stable or faster in development. In result these companies, relied less on external financing and partnerships, but were more dependent on their owners and the BMI was less open to external feedback.

In summary our findings mostly align with the conclusions of Bohnsack et al. (2014), that incumbent firms have access to more complementary assets which makes their innovation more stable and constrained, while entrepreneurial companies had to seek collaboration with external sources, which increased their level of innovation, but their future is more unpredictable. The only exception was Clean Motion which is a new entrant in the EV sector, but was able to acquire complementary assets and use them for its BMI. We did not get any significant results, which could show us which type of innovation will be more successful, since none of our cases is yet profitable in their EV projects, or have dominance in their market.

6.3.2 External factors

All of the researched cases in this thesis, stated that they collaborate with and rely on many different partners in their innovation and accomplishing their goals. Virta even considers many of its clients as partners, because they work together towards common goals. Uniti will rely almost entirely on their partners, for building their digital factories and assembling the vehicle. Scania stated that the future EV environment will consist of a lot more players than now, and the partners that they choose to work with, will have big impact on their BM and strategy.
The most prominent kind of partnerships among our case companies are with different suppliers of battery cells (mostly from China), because none of our cases produce the battery cells they need, but most of them engage in battery optimizing before using the batteries in their products. These suppliers represent key partnerships for every company, because the quality of the batteries in EVs are of major importance for the performance and durability of their products. Therefore, it is recommended that these partners are chosen carefully. The other often mentioned partnership was with design companies, which have helped with the final design of the end products.

Part of the BMI introduced in Uniti and Virta is actually working closely with many partners and involving them in their BMs, for processes which otherwise would have been impossible to do alone. By working intensively with their partners our cases have involved them in their business model, while mutually creating ongoing value for their customers, and revenue for themselves. The literature recognizes this type of innovation, where information and technology is shared with multiple partners as open innovation (Chesbrough, 2003). According to West and Bogers (2011), increased knowledge flows from different external partners, especially in uncertain environment, lead to improved innovation outcomes.

Our other respondents from Scania, Paxster and Buddy shared that they have partnered mostly with suppliers of different parts for their vehicles, and design partners. Their innovation has not been so open, and they have used mostly internal resources in completing them. Scania, however insisted that they would probably change the way they work with partners in the future, because they realize the new environment will involve a lot more different actors, requiring more collaborations with various partners.

Literature has often recognized the part of government authorities for the development of the EV industry (Thoma & O’Sullivan, 2011; Li, Zhan, de Jong & Lukszo, 2016; Wang, Sperling, Tal & Fang, 2017). All of our cases stated that the governments in many countries provide incentives and tax reductions for buying EVs and this is helping in the market growth. Uniti, Clean Motion and Virta have additionally received some financial grants from public institutions, which has helped their development process. These findings are in contrast with the conclusion of Bohnsack et al. (2014), that incumbent firms have easier access to government financing and incentives, as none of our cases with previous experience in automobile industry has received public financing, while the two entrepreneurial companies have. This could have been a result from the fact that Scania and Paxster, as parts of corporate holdings, could rely on internal financing or bank loans, while the entrepreneurial cases did not have access to such resources. Uniti even stated, that according to Swedish law, since they do not yet have any revenue they could not apply for any bank loans.

Our respondents also agree that governments in Europe, do not do enough to promote the shift to electric mobility. Some of them mentioned that China should be taken as an example, with their strong support for both manufacturers and electric mobility service providers. During our literature review, we found confirmation of this statement in the researches of Wang et al. (2017) and Li et
al., (2016), who conclude that the policies introduced by Chinese government have succeeded in their goals of increasing the domestic EV market.

Additionally, the public authorities sometimes play the role of a client in the cases of Scania, Paxster and even Uniti. Paxster often participates in public tenders, because a big part of their target market are national postal agencies. For the company this means that they should always be ready with an offer, whenever the next tender is published, but then the deals take too much time to be finished. This slows down their development and decreases their flexibility in decision making. Further, Uniti has been careful with accepting public contracts for supplying vehicles for public transport services, because according to them some governments try to shift the company’s focus only to their local markets, while this is not in line with Uniti’s strategy.

Virta stated that they are often working with lobbyist groups, attempting to promote more public charging infrastructure. Scania also insisted that the government will and should have bigger role in supporting public transport services, while Uniti’s CEO actually believes, that governments, should not support buying EVs, but promote more car sharing or hailing services. As it can be seen governments have significantly affected the industry already, but are expected to have even bigger role in the future. All of the companies in our research have collaborated to some degree with governments, and have adjusted their BMs accordingly. However, because of the different goals and strategies our cases are following, there is no simple answer to how exactly the policy makers should continue supporting the shift towards electric mobility.

Contingent events, according to Bohnsack et al. (2014) have big impact on the BMI process for new entrants in the EV industry, while incumbents’ BMs are more resilient and are less affected by them. Our findings support this conclusion, with Uniti and Virta having changed significantly their business model because of the changing environment, while Scania and Paxster being less influenced by unexpected events.

Virta’s respondent could not remember a contingent event, which has affected the company in a big way, but since the market they are in is growing quickly, there have been many new developments which have required a reaction from them. The big change in their BM, when they started offering charging devices, has been a result of the market development, and the need which they realized the clients had. There have been also some news of their competitors merging with another company or getting new investors, which required to change their strategy in some of the markets where those competitors were active. For the case of Uniti, our respondent described contingent events as “new information that comes in and changes your picture” and added that this is happening all the time. A significant contingent effect for them was when one of their investors acknowledged that they can start developing a vehicle for bigger regulatory class, and this changed their strategy considerably. Additionally, they receive a lot feedback and suggestions from their potential customers, so when one of them came back with an offer for buying 50 000 vehicles, this again affected greatly their plans for production and reduced the riskiness of their BM. The explanation of Bohnsack et al. (2014) that new entrants were affected more by contingent
events, is because of their limited resources and financial power. In our analysis however, we see also that entrepreneurial firms use some of the contingent events as new opportunities to develop additionally their BMs and involve new products and services to their portfolio.

For Clean Motion there have also been numerous unexpected events, resulting from their work with partners and clients from India: “There has been everything from challenges with suppliers to cultural differences and everything in between”. In contrast with the other entrepreneurial companies discussed above, Clean Motion have not used the unexpected events as opportunities, and they have only slowed down the progress of the company and made its expansion harder.

Considering our incumbent firms, Buddy Electric experienced significant contingent events in regard of overinvesting in the development of their M9 model, and the fact that some of their suppliers delivered parts with poor quality, which ultimately resulted in recalling of the vehicles from the dealers. These unexpected events had big impact on the business development of the company, and its reputation, with a final result of filing for bankruptcy in 2011. The company got new investors after that and had started production again, but the process took too much time and the company had already lost its position as one of the leading innovators and EV producers in the Nordics. The case of Buddy Electric, though cannot be adequately compared with the incumbents in Bohnsack’s et al. (2014) research, because the authors studied big multinational automobile producers with extensive financial power, while Buddy Electric was active only on the Norwegian market and possessed much less resources. Therefore, a contingent event of such scale had enormous effect on their business development and the results were in line with those, expected for new entrepreneurial companies.

For the case of Paxster the most challenging unexpected event included the change of requirements from the postal companies. As it was mentioned in our findings the postal companies have experienced big decrease in their letter volumes, while the amount of their need for parcels increased. Therefore, their needs shifted for vehicles with more storage capacity and bigger range for longer routes. This affected Paxster, by requiring them to make significant changes to their initial prototype model. The new model which they developed solved successfully the new needs of their clients and was well accepted by them. The effect of this contingent effect was not critical for the development of Paxster, and even can be described as positive for their innovation, because it resulted in, better value proposition. Paxster’s reaction to this event shows that they have followed closely their client’s needs and have reacted quickly to the changing environment, improving both their product and customer relationships.

In conclusion, in our analysis we see that external factors have had significant effect for almost all cases, except Scania. The results show that the partners of our cases and the government authorities play important roles in the BMI process of the EV producers, and their involvement in the future is only expected to increase. The contingent events, as suggested by the theory, lead to bigger changes in the new EV entrants, while their effect for the incumbent companies have been smaller.
6.4 Outcomes from BMI

Outcomes from business model innovation within our interviewed companies are varying in terms of their scale and impact on the company’s performance and further development. Not all of the respondents answered explicitly whether there were concrete results that were directly associated with improving their business models, provided that not all of them acknowledged that their companies actually changed their business models significantly. However, the deeper interview analysis gave us some useful insights about the effects of business model evolution on the company’s financial performance, strategic positioning, competition, and achievements of some specific goals that company strived to achieve, such as growth, innovation, social and environmental impact. Schneider and Spieth (2013) distinguish three types of such effects resulting from BMI: first type, the consequences on the industry and market structures; second, the effects on the individual company performance, such as financial and sustainability; and third – the effects on the firm strategic flexibility, or capabilities to respond to predictable external changes and contingencies. The last type of BMI effect – effects on strategic flexibility – will be omitted, as it has been found that only certain elements of business model innovation influence several parts of strategic flexibility (Schneider & Spieth, 2014), and we do not have relevant findings for this type of effect, as this exceeds the scope of our study. Thus, we present in the table below distribution of outcomes for each of our cases for the two first types of the effect form BMI:
Table 6: Outcomes (Effects) from BMI by type

<table>
<thead>
<tr>
<th>Company</th>
<th>Effects on industry and market structures</th>
<th>Effects on individual firm performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paxster</td>
<td>Unique solution that could be applied to the whole postal delivery industry.</td>
<td>Company Growth.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increasing sales.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Entering new markets.</td>
</tr>
<tr>
<td>Virta</td>
<td>Contribution to market development and future growth.</td>
<td>Increasing sales.</td>
</tr>
<tr>
<td></td>
<td>Market leader in Finland.</td>
<td>Entering new markets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Diversification of activities and services portfolio.</td>
</tr>
<tr>
<td>Uniti</td>
<td>Increasing recognition.</td>
<td>Attracting attention.</td>
</tr>
<tr>
<td></td>
<td>Creating premises for disrupting industry and redefining value chain.</td>
<td>Brand promotion.</td>
</tr>
<tr>
<td></td>
<td>Contribution to development of EV market.</td>
<td>Raising Capital.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Risk-Aversion.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Building customer base.</td>
</tr>
<tr>
<td>Scania</td>
<td>Increased competition.</td>
<td>Increased sustainability of products and services.</td>
</tr>
<tr>
<td></td>
<td>Development of new solutions.</td>
<td>Diversification of product portfolio.</td>
</tr>
<tr>
<td>Buddy Electric</td>
<td>Pioneering in the early EV technology.</td>
<td>Developed new EV models/designs.</td>
</tr>
<tr>
<td></td>
<td>Contribution to the development of EV market.</td>
<td>Insufficient sales.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ceasing Production of EV.</td>
</tr>
<tr>
<td>Clean Motion</td>
<td>Successfully entering the Indian market.</td>
<td>Publicly traded company.</td>
</tr>
<tr>
<td></td>
<td>Contribute to the development of lightweight, small EVs.</td>
<td>No profit from current operation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Success in Indian market.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increasing sales.</td>
</tr>
</tbody>
</table>

Next, we present and compare the consequences of implementing BMI of all case companies’ according to the same typology.
Effect of company’s BMI on the industry and market structures:

Paxster from its beginning has been engaged in innovating their EVs and other products, and, as a result of this innovation, the company has developed a unique solution for improving the efficiency and cost-saving for operations of postal companies, which could be enacted by using their EV for their operations. As a consequence, the postal companies of many countries are interested in implementing those solutions in their operations, therefore Paxster’s contribution to shaping the postal delivery industry is evident, whereas Paxster’s competitors that have similar products, have not delivered such effect on this industry. The company has realized a “huge potential for such improvements on a global scale” and has acted accordingly.

Another company that is pioneering to shape the whole industry is Uniti. The startup has not disrupted the EV industry yet, since it has not started delivering their vehicles, but it has gotten a lot of recognition from industry partners, future clients and media, showing that they are an important player in the industry. The company is expecting to redefine the whole value chain of the car industry and personal transportation into the direction of lightweight EVs and shared economy. If successful, Uniti might become one of the leading EV producers globally and they can show the way for modernizing the automotive industry as a whole, which they described as one of their main goals: “We’ll prove that it can be done, so that other car makers start to change their approach and compete. Which is what we want: competitors to come in, we want to force them to, so that everyone has to make energy efficient green cool cars”.

Next, Scania has not created a strong impact on the EV industry at this point of time, since they are still in process of testing their EV buses. However, they have received positive feedback for the quality and performance of their vehicles, and also the company has developed several innovative solutions (such as electrified roads) that might be applicable in the future. Considering the international success and capabilities of the company, if an innovative BM is developed in the future, Scania might have a role in shaping the market of electric trucks and buses, and would be an important competitor to the new entrants to EV industry.

In the case of Virta the company has not developed unique services that could disrupt the industry or market structures, as the company is mostly delivering similar solutions that already exist. However, Virta is an important player in the European market, and has been adding weight to the overall development of EV-charging industry, especially with regards to integration between EV charging grid and energy system, as well as to the advance of EV technology, which still needs “critical mass to become profitable”. The company is currently addressing the need to develop a network similar to what the literature calls “Smart grid”, (e.g. Johnson & Suskewicz, 2009; Dijk, Wells & Kemp, 2016; Verdecchia, Ricchiuti, Hankel, Lago & Procaccianti, 2017) which would dramatically increase efficiency of power distribution.

Buddy Electric, being one of the first producers of EV at an early stage, has contributed largely to the development and bringing EV technology to the market, especially in Norway. However, their difficulties in keeping up with the increasing competition, and their problems in development and
producing new models, have resulted in ceasing the production. On the other hand, the company is still intending to return to the market with their renewed EV models when they will find new investors and partners.

In the example of Clean Motion, there were no evident consequences for the overall EV industry resulting from the BMI by the company. An exception would be that their EV “Zbee” has contributed to the advancement of the lightweight electric vehicles that require small and light batteries which make such EV more efficient, as opposed to the EVs that are designed similarly to conventional cars and are heavy and run with large batteries. Battery size affects the price significantly, and the lighter weight would allow to make EVs more affordable. With regards to the outcomes for the market structures, one of the effects that could be mentioned is that the company was one of the first EV companies in India to disrupt the significant lightweight vehicle market in the country, when they introduced a new kind of product that is perceived as more modern, ecologically clean and premium-level.

**Effect of company’s BMI on company performance:**

For our first case company, Paxster, the effects of innovations on the company’s performance have been first of all established in the form of the company growth — “in Germany we expect to have the biggest growth in next 2 years”. Their developed solution could potentially improve the efficiency of postal companies, and has raised a lot of attention: “We’ve been approached by postal companies and newspaper companies and we are now working with international post companies [...] interest from other companies towards us is growing”. Thus, Paxster has entered new markets and increased their customer base, and also there have been important improvements of the financial situation of the company, which could be attributed to “higher demand for product and also the costs will be lower”, such that they “expect to have positive financial results this year […] and expect to become profitable”.

Virta, as a result of their BMI has achieved some financial performance in terms of increasing revenue, although has not been profitable yet. Nevertheless, the company is expecting to attain profitability in the future because the market is growing, their user numbers are rising and many opportunities are appearing along with it. Virta has The other important achievement is that the company has become a market leader in Finland, as well as it has gained customers in many other European countries, thus the company has started competing on an international scale.

Uniti is still in the stage of a startup, however, their unique EV and approach to urban transportation and smart mobility has attracted a lot of media and industry attention, such that the company has been approached by a great number of investors and has received great financial support from venture investors, public organizations and crowdfunding event. Uniti is choosing among these only the “most hard-to-get investors”, which would offer great conditions as well as that would have the same vision as Uniti has – to redefine the whole value chain of personal transportation. The company has not been profitable, as they have not started actual EV production. However, a large number of customers have done a deposit to buy Uniti EV in the future – this has
served Uniti in brand building and promotion. Another important achievement for Uniti’s performance from BMI, is risk-aversion: the actual customers that would buy fleets of Uniti cars will be various companies, such as car-rental, urban transportation, ride-hailing, and ride-sharing etc., which then will handle market-risk, associated with demand for the EV. These many positive outcomes for Uniti, once again, support the theory that modifying company’s business model repeatedly, has positive effects on the company to be able to perform well over time, especially when these modifications are more innovative, and investing into intangibles of the company increases the effect (Cucculelli & Bettinelli, 2015; Zott & Amit, 2007).

Scania, as a big and well-established company has significant revenues from the internal combustion engine production, at which they are some of the best experts. But even bigger part of their revenues comes from after-sales services and parts for their products, such that replacing their current product range with electric vehicles would require much less maintenance, and would mean to cannibalize their current BM. Although they are offering in their vast product portfolio trucks and buses with hybrid engines, replacing them with EVs is currently neither possible nor viable solution for Scania.

Buddy Electric, in contrast to some of our other cases, has not been successful from their BMI, to a large extent due to the unexpected events during the production, as well as betting all their financial strength on the new model that has led to company bankruptcy in 2011. The production was eventually restarted later, but yet the company halted it again. Nevertheless, the company is still developing concepts of new models, and is expecting to start its production again in the future.

Clean Motion, a producer of a lightweight three-wheeler EV, as a result of their BMI has become quite successful in their first market – India – where their EV became distinguished as a premium-level product. The company has also delivered their EVs on a smaller scale to other markets – Indonesia, Switzerland, Germany and Sweden. Although the company is not yet profitable, Clean Motion is focusing on scaling their business via new strategy to establish itself on new markets, and benefit from an international value chain.

6.5 Summary of Analysis

In result of our analysis, and in response to the purpose of this thesis, we come to the conclusion that there is a clear distinction between the BMI processes in new entrepreneurial firms and EV producers with experience in the automotive industry. Therefore, we propose two research models for BMI in the EV sector, which were inspired mainly from the model proposed by Foss and Saebi (2017a) in their review of the BMI concept.
Figure 4 BMI process in new entrants in the EV sector, based on Foss & Saebi (2017a)

Figure 5 BMI process in Incumbents in the EV sector, based on Foss & Saebi (2017a)
The entrepreneurial companies in the face of Uniti, Virta and Clean Motion have acted on discovered market opportunities in developing their innovations. Additionally, during the BMI process they have changed significantly their business models, with introducing new products, services and changes to their general business strategies. Their development has been more flexible and affected by their external partners and the market. Uniti and Virta, have also been able to turn the external threats and contingency events, they were facing into potential opportunities, and in this way, create additional value for their customers. The limited access to complementary assets of our entrepreneurial cases, have made them use open innovation, utilizing the help, knowledge and additional resources of their partners.

On the other hand, incumbent companies – Paxster, Scania and Buddy Electric have introduced changes in their BM mainly as a response for the arising challenges that were either from growing competition or from company’s internal problems. An exception would be Paxster, since the company’s BMI was driven by both opportunity to provide a global solution to postal companies, as well as by a challenge to develop new products from the mother company Loyds Industries. As a result of their BMI, incumbent companies have implemented only modular changes to their BM, such as product innovation, modification of their value proposition or distribution channels. These changes were bounded by main values and goals that the incumbent had prior to BMI, as well as by complementary assets, such as internal financing, production facilities, brand recognition, and past experience. Although, these complementary assets are what made them resistant to the adverse market developments, they also limited the choices and the BMI that could be undertaken by an incumbent.

In regard to the outcomes of the BMI – we could not find significant differences between the outcomes for the entrepreneurial and the incumbent companies during the course of this study. Since the BMI is a still an ongoing process for most of our cases, the full results of it are not yet present. We know that through their innovations, the companies have affected the EV market to a certain degree, and have increased some of their capabilities, but none of them have reached profitability at this point.
7. Discussion

In this chapter we compare our empirical findings and analysis with theoretical views, connected to the concepts of BM and BMI. By discussing them we advance our analysis and come to the final insights of our thesis.

As it can be seen above our main part of analysis consists of researching the antecedents, moderators and outcomes of BMI in the context of the EV sector. Following the analysis we will discuss how our findings advance the literature of BMI.

The antecedents of BMI are pointed out by many scholars (e.g. Schneider & Spieth, 2013; Foss & Saebi, 2017a; Chesbrough, 2010) as an important field which needs to be researched in order to be understood why firms begin to innovate their BMs and how this affects their work. We find in our cases different reasons for the BMI, which are all argued by the literature as possible antecedents of the concept. Ferreira, Proenca, Spencer and Cova (2013) for example state that changing demands of stakeholders and the external environment could lead to change in the BM of a company. Our findings support this argument to a high degree, as it is relevant for all of our cases. Additionally, we argue in our analysis that entrepreneurial firms and incumbents have used different approaches and reasons to start their BMI processes, and thus have achieved different results. Foss and Saebi (2017a) proposed that the antecedents of the BMI might differ also depending on the scope and novelty of the innovation results. Through our analysis we come to the conclusion that this is true, by seeing that the entrepreneurial cases which acted upon market opportunities made significant architectural changes in their business models. While since incumbents’ BMI resulted mostly from changes in the environment and competition, they reacted to this challenges with fewer alterations in their BMs, resulting in modular BMI. Moreover Chesbrough (2010) argues that when effectuation and experimentation with business models are used as prerequisites of BMI, they help companies overcome certain barriers of the process. Our study is in favor of this argument too, by showing how entrepreneurial firms (mostly Uniti) have used the approach of effectuation to turn external changes into opportunities, and in this way create unique value propositions. Especially in a fast changing environment such as the EV sector, reacting quickly to the changes and experimenting with new BMs is highly recommended, compared to making long term plans and market analyses.

The moderators of BMI as proposed by Foss and Saebi (2017a) have significant effect on the whole process, and can play a key role in the decision making process of companies. Bohnsack et al. (2014) were among the first who argued that different factors such as dominant business logic, complementary assets and contingent events have contrasting effects for the BMI of entrepreneurial and incumbent firms in the EV sector. Our research supports their conclusion that incumbents make fewer changes in their BMs, following their core business logic, while new entrants have made bigger changes, affected by the external environment. Nonetheless, our
findings that the entrepreneurial companies have had more access to public support and have entered more partnerships than the incumbents are in contrast with Bohnsack et al. (2014) conclusion of the opposite, and presents new viewpoint to the topic, suggesting that newer companies might have changed their strategies, engaging in open innovation. Additionally, we found that despite entrepreneurial firms have been affected more by unexpected events, Uniti and Virta have used them as new opportunities and in this way advanced their BMI processes. Finally, the dominant business logic also plays important role for the BMI of all firms as Chesbrough (2010) suggests. The logic, however differs dramatically among entrepreneurial and incumbent companies, because the first have developed their logic to be open towards the new changes in the EV sector and even try to create these changes, while the latter (especially in the case of Scania) have so far been reluctant to implement big changes in their BM and rely on their current value propositions.

The outcomes resulting from BMI in our case companies are two-fold: first, the impact on the overall EV industry and the market structures, second, the effects on the performance of the company. The first type of outcomes comprises the effects on the industry logics, disruptive potentials of BMI, and competitive reactions from BMI, while the second represents effects on the firm performance, especially impact on firm financial achievements. The outcomes for the first type are varying, but in general, companies that were initially established as EV producers, have contributed more to the development of the EV industry and promotion of EVs. Whereas companies that started within conventional vehicle industry have had less impact on the current EV market. Entrepreneurial companies have generated a larger impact in terms of creating disruptions, leading transformation, and creating trends within EV industry and certain markets (e.g. Clean Motion in India). Those companies have identified certain problems of EVs, such as efficiency, cost and range – which they could address and improve through technology – and market-driven BMI. These findings are in alignment with Bohnsack et al. (2014) conclusions that entrepreneurial companies are primarily producing the key innovations in business models that later become significant in the industry as they find creative solutions to the shortcomings of electric vehicles. These include advances introduced by Uniti and Clean Motion with making EV’s lighter and smaller, integrating them into the infrastructure and making them a part of shared economy, designing EVs to be durable and reconfigurable for different kinds of servitizing. Such solutions are increasingly adopted in their BMs by many firms of this industry (Nieuwenhuis, 2018), and although they are still in early stage of development, they are growing trends that will shape the future of transportation. Despite the fewer outcomes for the development of a sector, incumbent companies, such as Scania and Paxster, are also developing innovative solutions, such as electrified roads and efficient delivery EVs, which shows that they have recognized potential solutions for the future, and are gradually introducing them in the EV industry.

For the second type of outcomes – BMI outcomes for the performance of a company – none of the studied companies have become very successful or profitable on the EV market yet, which is in alignment with the statement that firms producing Electric Vehicles are not yet enjoying
profitability above the mainstream automotive sector, and EVs are not a “money-maker” (Dijk, et al., 2016). However, most of our cases currently are focusing on scaling their business operations in order to start producing on a larger scale and reach more markets, therefore profitability is a secondary goal for them at this point. Nevertheless, except for Scania and Buddy Electric which currently do not have operating BMs in EV sector, other companies have achieved beneficial outcomes like increase in sales, building customer base, attracting investments, entering new markets and developing risk-aversive entry strategies. Finally, comparing performance outcomes between incumbent and new entrant companies that resulted from their BMI, could not be attained. This is mainly because their innovations have affected different scopes of BMI, because of the different goals that they strived to achieve through BMI, and also because the companies are at different stages of implementing their innovations.
8. Conclusion

In this chapter we summarize our main insights from the thesis. We discuss our contributions to the literature of BMI and the practical implications of this study. We conclude by showing the limitations of our thesis and recommend possible new directions for further research.

The goal of this thesis was to explore how EV firms use innovation to make changes in their business models, introduce novel products and services and in this way overcome challenges and advance the development of the EV industry. For that purpose, we interviewed six companies involved in the EV sector in the Nordic region. The findings of these interviews allowed us to get valuable insights about how those companies have approached their business strategies, how are they trying to overcome their challenges and what innovations are they preparing for the market. We used our case analysis to explore the most common antecedents of the BMI processes in the companies, categorize the type of their BMI, find out what internal and external factors played the biggest role in this process, and finally what are some of the outcomes of their BMI.

The main antecedents of the BMI in our case companies turned out to be different for new entrants in the EV market, and incumbent automotive companies, with the first using market opportunities revealed from combining new information, while the latter mostly reacting to challenges and threats. Consequently, the two types of companies used different approaches towards their BMI, with entrepreneurial firms relying more on their flexibility and quick reactions to external changes, while incumbents have focused on extensive planning and market analysis. A common antecedent for all of our companies was their goal of solving current sustainability issues, and at least one of the most frequently mentioned challenges for the EV industry as a whole. Our case companies also differ in terms of the type and scope of their BMI. The entrepreneurial cases have introduced, or are working on changes in the BMs which modify its whole structure, while in the meantime the incumbents have made only modular changes to their BMs. Additionally, only two firms (Uniti, Paxster) are developing solutions unique for the market, which shows the limited novelty in the sector. Our findings support the argument of Bohnsack et al. (2014) that internal firm factors such as complementary assets and core business logic have played bigger role for incumbent companies, while the BMI of the new entrants have been affected more by external variables, including partnerships, contingent events and government decisions. Finally, for most of our case companies the complete outcomes of their BMI are not recognizable yet, since a lot of their projects are still in development. Through the innovation processes, however some companies have advanced the growth of the EV market in several geographic regions, have built stronger capabilities, and are on the way of becoming profitable in the future.
8.1 Theoretical and Practical contributions

Our research advances the literature on BMI, specifically in the context of electric vehicles development in the Nordics.

Firstly, we answer the call of Foss & Saebi (2017a) and Schneider & Spieth (2013) for more research on the antecedents, typology and outcomes from the BMI. At the conclusion of our analysis, through utilizing the main part of the model created by Foss and Saebi (2017a), we propose two modified research models for Entrepreneurial and Incumbent companies in the EV sector. We additionally adapted the contingency and moderating factors affecting the BMI, by including the internal and external factors proposed by Bohnsack et al. (2014), and in this way contributed to the literature about the differences in the BMI between entrepreneurial and incumbent companies (Bohnsack et a., 2014; Foss & Saebi, 2017a). Secondly, our research sheds light on the understudied field of new producers of electric vehicles and how they use the BM and BMI concepts to advance the industry, solve challenges and grow the overall market. Finally, we also contribute to the literature on BMI for the specific region of the Nordics, as we found it was previously understudied by scholars interested in the general topics of BMI or the EV industry.

In addition to the theoretical implications, with this thesis we try to present the current development of the EV sector, through our firm cases. Practitioners can gain better understanding of the concepts of BM and BMI process and their importance for surviving in the dynamic EV market. The study could be especially useful for managers who are interested in modifying the BMs of their company and in this way improve its performance. We also give suggestions on how different approaches and theoretical foundations, such as effectuation, causation and experimentation might be used for the BMI process. Finally, in addition to the practical implications of our study, there is also valuable inputs for governmental and public authorities, who can use the data in our thesis for further developing and promoting the transition to electric mobility.

8.2 Limitations and Further Research

This thesis has several limitations which need to be considered, and therefore we are going to discuss them and propose how further researches could build on the topic of BMI, particularly in the EV sector.

Firstly, in our study we researched EV firms which were chosen based on the geographic region of the Nordics, which represents a small part of the world. Additionally, companies in other parts of the world might have significantly different approaches to the process of BMI, because of cultural, environmental or political reasons, therefore it would be useful if similar researches are done in other geographic locations. Secondly, during our research we had limited access to case companies and in result we collected empirical data from only six firms. Studies based on data from more sources with different backgrounds could result in new, more generalized conclusions. Thirdly, in most of the studied companies the BMI process was still ongoing, and there were no
complete and evident results from it. Accordingly, our findings and conclusions on the topic of BMI outcomes are limited, and further researches would shed more light on the particular topic. For example, one direction of study could be studying outcomes of BMI on strategic flexibility of a company that we did not reach during this study. Moreover, only firms providing final products and services for the EV sector, were studied. However, their numerous suppliers and partners from other industries, would certainly have to adapt their business models for the new environment, and future studies on their BMI would provide constructive benefits to the topic. Finally, we could rely on limited time and resources to complete this thesis, according to the regulated terms.

The overall literature for the concept of BMI still lacks clear theoretical grounding and there is no universal definition for it, as we examined in our theoretical background. More researches focusing on the characteristics of the BMI are needed in order to advance the understanding of the concept. In our thesis we did not give much attention to the role of management and leadership of a firm for BMI, but we do realize it is of high importance. Accordingly more research needs to be done on this topic. Further research is needed also in the context of the EV sector. Another field of interest recognized by previous literature that also emerged during this study is exploring the effects of BMI on firm performance, not only financial, but also regarding competitive advantages and innovativeness. The EVs as a topic is still quite new, and need further research, not only from producers’ point of view, but also from the point of clients, government structures, transport services and infrastructure providers.
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Appendices

Appendix 1: Interview Guide

Questions:

● For start, tell us something about you, the firm and what is your work at the company. How big is the company?

● What are the main goals and the motto of the company?

● What is unique about your products? Main Value of the product/service? Do you provide charging infrastructure? After sale services?

● Which are the main markets for the company? What are the distribution channels?

● Who do you perceive as your main competitors? What are your main advantages when dealing with them?

● How do the customers pay for the product/service? Do you have different options?
● What do you think are the biggest challenges for the EV industry as a whole? Can you name them?

● Are they the same specifically in your case? If not, how?

● Are the EV expensive from your point of view? In what way? Why?

● What do customers like and do not like about EVs?

● How do you try to overcome them? Why in this way?

● Our aim is to explore the innovations in this industry, so we wonder how you are looking towards innovation. Could you explain the process in the company? Is everyone involved, or only management? Can you give examples of some of your innovations in the BM?
• During the innovations process, were there some unexpected events, which affected your decisions? Was there disagreement among people in the company?

• How did your business model evolve in time? Did you change a lot from the initial idea? Why? What is the result of the change?

• Who are the partners in the industry, are they involved in the BMI process? In what way do you collaborate with them?

• Do you design the products yourself or use other company for that? Do you develop the batteries, or buy from another supplier?
- Some researchers say that standardization of some elements of the product is needed, for example for easier charging. What is your view on the topic?

- What do you think about the role of the government for the industry? Is it helping, how?

- How does the firm finance its operation? (Internal finance, venture capital, government, bank loans etc.)?

- Can you show us some financial results / do you think the company is successful so far/ do you expect a significant return on investment)?

- What are the customer perceptions about EV that are not true? How do you intend to address those concerns?

- What do you think about the future of the EV industry (both globally and locally)?