Hassle-Free BEV Customer Journey

How Vehicle OEMs Can Enhance the Usage Phase

Master's thesis in Management and Economics of Innovation

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Abstract

The automotive industry is currently transitioning from internal combustion engine vehicles to Battery Electric Vehicles (BEVs). The BEV ecosystem is fast-changing and complex, and the trends of digitalisation and servitisation enable innumerable ways of creating value for users. This implies difficulties for vehicle OEMs regarding what activities to prioritise. Therefore, this study aims at providing vehicle OEMs with valuable insights that can help them understand and enhance the BEV usage phase experience for their customers. This study was conducted in collaboration with one vehicle OEM. Data was collected through semi-structured interviews with stakeholders at the vehicle OEM, BEV users, and external experts. Further, a method called concept mapping was performed together with BEV users. Moreover, a theoretical framework was developed to explore relevant theories related to the research topic and facilitate the analysis and discussion. When researching the current BEV usage phase customer journey, three phases, including their key touchpoints, activities, and actors, were identified and mapped. Moreover, 70 unique BEV user desires were identified and divided into eight clusters, representing areas that BEV users need for a hassle-free experience. Lastly, by analysing the nature of the clusters, three key gaps were derived. To navigate these gaps, the thesis suggests that vehicle OEMs will have to cooperate with actors within and outside of their industry boundaries, but also align interests internally. Further, vehicle OEMs should continually seek to understand the desires of their customers and how they, given their role in the BEV ecosystem, may work to deliver these desires.

Keywords: Battery Electric Vehicles, BEV Ecosystem, Customer Experience, Customer Journey, Service Triads, Service Quality, Technological Improvement, Diffusion of Innovation

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1. Introduction

The following chapter introduces the research. First, relevant background to the researched topic is presented, including an overview of trends within the automotive industry, and what challenges these pose for vehicle Original Equipment Manufacturers (OEMs). Thereafter, the purpose of the report will be presented, together with the research questions that the report aims to answer. Lastly, the limitations of the study will be presented.

1.1 Background

The automotive industry is currently undergoing transformation. Internal Combustion Engine Vehicles (ICEVs) are being phased out by the growth of Electric Vehicles (EVs), most notably Battery Electric Vehicles (BEVs) and Plug-in Hybrid Electric Vehicles (PHEVs). According to Gersdorf et al. (2020), the market for BEVs and PHEVs has seen an annual market penetration growth of 41 per cent between the years 2016 and 2019. In 2020 EV deliveries saw an increase of 43 per cent whereas the global market for light vehicles decreased by 14 per cent. In the same year, EVs accounted for 4.2 per cent of the global light vehicles market (EV-volumes.com, 2020). In line with the Paris Agreement, countries worldwide are setting targets for phasing out ICEVs over the forthcoming years, and new regulations concerning climate change are constantly emerging (Burch & Gilchrist, 2018). Transitioning from ICEVs to EVs thus allows vehicle OEMs to keep up with industry trends, comply with regulations, and tackle environmental challenges.

In parallel with the undergoing electrification trend, other trends are apparent. Companies are shifting from being product-focused to being service-driven, i.e., they are undergoing servitisation. Value-added from services in 2015 represented 74 per cent of high-income countries GDP, which is a 5-percentage point increase from 1997 (Buckley & Majumdar, 2018). Servitisation enables new ways of value creation, from value-in-exchange to value-in-use (Grönroos, 2008), which means that OEMs can create value during the whole ownership rather than just at the point of sales. Further, the undergoing trend of digitalisation has introduced Smart, Connected, Products (SCPs) (Porter & Heppelman, 2015). SCPs on the one hand enable customers to personalise their experiences in

unique ways, and on the other hand enable firms to gather user data, paving the way for customer-firm co-creation.

The transition from ICEVs to EVs, together with the trends of servitisation and digitalisation, has changed the business environment for vehicle OEMs and presented new challenges. Developing and manufacturing EVs instead of ICEVs requires new skills and investments, especially for incumbent firms, as compared to actors entering the automotive market solely as EV producers. Further, since the change is happening so rapidly, vehicle OEMs need to be more agile than ever, to be able to comply with the latest regulations, and utilise technological advancements. Apart from challenges related to developing and manufacturing vehicles, the transition puts new demands on the automotive aftermarket industry.

Traditionally, the automotive aftermarket has supported customers with spare parts and maintenance services after the initial sale of the product, through original equipment services within the warranty period but also independent aftermarket services after the warranty period (Subramoniam, Huisingh, & Chinnam, 2009). According to an employee at the vehicle OEM that this study is conducted in collaboration with, the demand for traditional aftermarket services has declined. One of the reasons is the fact that BEV engines do not have the same need for routine checks as ICEV engines. Thus, the need for scheduled routine checks has declined. Further, people are to a larger extent leasing their vehicles today. As leasing contracts often stretch over three years maximum, the need for services related to declining vehicle status is also diminishing.

However, the introduction of BEVs together with the other above-described trends also presents new possibilities for vehicle OEMs to deliver value-in-use. For instance, some vehicle OEMs have chosen to become providers of BEV chargers, since BEVs cannot utilise the well-established petrol station network which almost exclusively is controlled by oil companies. Further, the introduction of SCPs enables vehicle OEMs to not only tailor customer experiences but also makes it possible to predict what vehicle parts are declining in performance. Therefore, vehicle OEMs can act before something happens, through so-called predictive maintenance. Apart from this, software updates can be performed over-the-air (OTA), and some services can be done by mobile service teams, meaning that customers do not necessarily have to drive to the workshop to perform services. These changes have

increased the complexity of the automotive industry, which has caused a lack of understanding of, and control over, what customers experience in their usage phase. As a result, there are also uncertainties about what activities vehicle OEMs should prioritise to enhance the customer experience in the usage phase.

Finding new ways of delivering value, and managing the customer experience throughout the customer journey, is of interest for companies in all industries. Berry, Carbone, and Haeckel (2002) mean that companies that can combine functional and emotional benefits in their offerings can create hard-to-copy experiences that strengthen customer loyalty. On this topic, Scherpen, Draghici, and Niemann (2018) have investigated how customer experience management can be used in the automotive industry to leverage customer loyalty, focusing on what possibilities digitalisation brings to the sales channels. Stylidis, Wickman, and Söderberg (2015) have looked at perceived value, a concept that arguably is related to customer experience, in the automotive industry, emphasising technical aspects of vehicles in general. However, little or nothing seems to be written about how vehicle OEMs should manage the customer experience in the usage phase, given the transition from ICEVs to BEVs. Investigating this topic would arguably fill a gap within research, and it would also provide vehicle OEMs with an understanding of what enhances the customer experience in the usage phase. This could also provide guidance on how vehicle OEMs should position themselves in the fast-changing and complex industry, focus their resources on the right things, and consequently stay competitive and create customer loyalty.

1.2 Purpose

This study aims to provide Vehicle OEMs with valuable insights that can help them understand and enhance the BEV usage phase experience for their customers. To fulfil this purpose, this master's thesis aims to answer three research questions.

To successfully adapt to the new and complex industry environment, Vehicle OEMs can benefit from understanding the current BEV usage phase customer journey. Therefore, the first research question is:

1. What are the common touchpoints of the BEV usage phase customer journey?

Given all the possibilities for vehicle OEMs to create value-in-use, it is interesting to investigate what BEV users value, i.e. what enhances the customer experience, in the usage phase. Therefore, the second research question is:

2. What do users desire from their BEV usage phase?

When the current BEV usage phase customer journey is mapped, and an understanding of the BEV user desires has been acquired, these findings can be analysed. Through this, potential gaps can be derived and opportunities for navigating these gaps can be investigated. Therefore, the last question is:

3. (a) What key gaps can be derived from the BEV user desires, and (b) how can vehicle OEMs navigate these gaps to enhance the customer experience?

1.3 Limitations and Delimitations

This report will be delimited to the usage phase of the customer journey, i.e the phase between handover and disposal. This means that the pre usage and post usage phases are excluded from the report. Moreover, the report will be delimited to BEV users that have either purchased a car or have a leasing contract. Therefore, experiences from car-sharing, taxi services, or other similar services will not be examined.

Moreover, the study will be performed in collaboration with a vehicle OEM. Thereby, the report will partially be limited to the specific needs of the vehicle OEM. Especially regarding research question one and two, since the underlying data that will be used to answer these questions mainly will be extracted from internal stakeholders and vehicle OEM customers. Another apparent limitation is that the BEV market still is very young, implying that there is a lack of available data on BEV user experiences. Moreover, since the vehicle OEM that the study is done in collaboration with just recently have started to sell BEVs, the available sample size is somewhat limited.

Regarding the first research question, this report aims at creating an overview of the current customer journey. However, this customer journey will not be exhaustive and should instead be viewed as a tool for better understanding the touchpoints that most BEV users go through in their usage phase.

Moreover, regarding the second research question, user desires will be examined through an explorative approach to generate ideas about what BEV users' need for a hassle-free experience. With that being said, the outcome should be viewed as an indication of what BEV users need, rather than a comprehensive list of all BEV user desires. Lastly, as the last research question builds upon the first two research questions, the discussion related to the gaps and how to navigate these should also be seen as a suggestion for what could be done rather than what should be done.

2. Theoretical Framework

In this chapter, the theoretical framework for the thesis will be presented. First, to provide an understanding of a major underlying theme of the research, a section on customer experience will be presented. This is followed by a section on transformation, including electrification, servitisation, and digitalisation. The electrification section includes theories on technological development and innovation diffusion, motivated by the fact that the automotive industry is currently transitioning from ICEVs to BEVs. The section on digitalisation and servitisation provides relevant theories related to how companies can position themselves on the market and adapt their service offerings to create value. Furthermore, an analytical framework will be formulated which will be used for presenting and making sense of the findings.

2.1 Customer Experience

Customer experience is a widely used term in business today. Many companies aim to deliver the best customer experience in their industry, and form strategies to achieve this goal. However, when investigating what customer experience means it becomes evident that the definitions are many. Therefore, to set a foundation for this study, this chapter will start with investigating the term customer experience. This will be followed by a description of the customer journey, and lastly a section on how the customer experience can be managed and improved.

2.1.1 Investigating Customer Experience

Holbrook and Hirschman (1982) were among the first to touch upon the term customer experience when they described the consumption process from what they called *the experiential view*, involving a steady flow of fantasies, feelings, and fun. It was however not until twelve years later customer experience was first mentioned. In the work *Engineering Customer Experiences* (Carbone & Haeckel, 1994), the term *experience* is defined as the take-away impression that is formed in encounters between people and products, services, or businesses. They mean that customers experience what they call context cues in these interactions and that those cues can be either *Mechanics* or *Humanics*. Mechanics could for instance be sights, smells, tastes, sounds, and textures, generated when a customer uses a product or service. Humanic cues on the other hand are formed in customer

interactions with employees, and thereby depend on the employees' skills and knowledge (Carbone & Haeckel, 1994).

A few years after Carbone and Haeckel's article, Schmitt (1999) contributes to the customer experience field. He means that customer experience consists of five types of categories: sensory-, affective-, cognitive-, physical-, and social-identity experiences. Those experiences are in turn created through what he calls experience providers, which could be communications, identity, and product presence. What characterises both these definitions is that they look at experiences as something which is created in interactions a customer has with a company, its products, or services. Around the same time, Pine and Gilmore (1998) write about the experience economy, as an era replacing the old industrial economy. They distinguish experiences from commodities, products, and services, and mean that companies could, instead of just wrapping experiences around their traditional offerings, design complete offerings around experiences. This indicates that customer experience is not only something that is created in a specific interaction but that it also is defined by the complete experience a customer has with a company offering.

Carbone and Haeckel's (1994) definition using context clues, the multidimensional view described by Schmitt (1999), and the experience economy by Pine and Gilmore (1998) laid a good foundation for understanding customers. Nowadays practitioners and scholars agree on the fact that the customer experience is a multidimensional construct that involves cognitive, emotional, behavioural, sensorial, and social components (Lemon & Verhoef, 2016). Even though there is a united understanding that the customer experience is created through interactions between customers and firms, the term is often mixed with other related terms, such as customer journey, user experience or brand experience (Solis, 2015).

Solis (2015) means that user experiences are created in all interactions a customer has with a product or service offered by a company and that these user experiences result in an overall customer experience. This way of looking at the customer experience is not different from what earlier scholars have said, but it is easier to grasp. Therefore, the term customer experience can be viewed as an aggregation of experiences created in all interactions a customer has with a company, its products, or services, involving cognitive, emotional, behavioural, sensorial, and social components.

2.1.2 Customer Journey

The customer journey was mentioned in section 2.1.1 as one of the terms that sometimes are mixed with customer experience. There is however a difference between the two terms. Lemon and Verhoef (2016) mean that the customer experience is a dynamic process that is created in three different stages of the customer journey: pre-purchase, purchase, and post-purchase. The pre-purchase phase includes all interactions that happen from the moment a customer recognises a need for a product, until considering satisfying that need. The purchase is everything that the customer goes through during the purchase itself. The post-purchase phase consists of everything the customer goes through after the actual purchase, including usage, post-purchase engagements, and service requests (Lemon & Verhoef, 2016).

It is common to use the term *touchpoints* to describe how experiences are created in the customer journey (e.g. Maechler, Neher, & Park, 2016; Richardson, 2010a). According to Richardson (2010a), touchpoints often fall into four categories, those are (1) *products*, which could be either software, hardware, or a service; (2) *two-way interactions*, either in-person, over-the-phone or virtual; (3) *messages*, that is one-way communication including collateral, brand, manuals, packaging, etc.; and (4) *settings*, which is everywhere the product is either seen or used. Even though Richardson (2010a) emphasise that those categories are loosely defined, and something that can be experimented with, the categorisation gives a good understanding of what touchpoints are.

Depending on the type of company and industry, touchpoints can be easier or harder to control and manage by the company (Richardson, 2010a; Lemon & Verhoef, 2016). Lemon and Verhoef (2016) mean that touchpoints are either *brand-owned*, *partner-owned*, *customer-owned*, or *external*. Brand-owned touchpoints are controlled by the company, meaning they can be designed by the company to cater to customer needs. Partner-owned touchpoints are interactions that customers have, that are designed, managed, and controlled by the company together with at least one of its partners. Customer-owned and external touchpoints, on the other hand, are either controlled by the customer themselves, it could be independent choices the customer makes during the journey, or peers influencing the customer to make certain decisions, i.e. external (Lemon and Verhoef, 2016).

2.1.3 Customer Experience Management

Carbone and Haeckel (1994) were early to emphasise that the customer experience is something that can be engineered to cater to customer needs, through what they call experience clue management. They state that Mechanics often are engineered as part of a product design and thereby something that managers have a good grasp of, while Humanics may not be designed at all, or implicitly delegated to employees. However, by actively eliminating negative clues and designing a blueprint with desired context clues, i.e. Mechanics and Humanics, they mean that companies can create a competitive advantage and customer loyalty. Berry, Carbone, and Haeckel (2002) emphasise that it is important that companies not only tweak design elements or focus on the customer experience in isolated pockets of their business, but rather combine functional and emotional benefits in their offerings. By handling the emotional parts of the customer experience with the same accuracy as the functional parts, companies can create hard-to-copy experiences and in turn strengthen customer loyalty (Berry et al., 2002).

2.1.3.1 Customer Journey Mapping

Not all touchpoints throughout the customer journey are under the control of the company, as mentioned in section 2.1.2, which means that the customer journey cannot be completely managed by the firm. To get a better understanding of which touchpoints are manageable by the firm, and which are not, it is suggested by scholars (e.g. Lemon & Verhoef, 2016; Rosenbaum, Otalora, & Ramíres, 2017), to create a customer journey map. The process of creating a customer journey map is referred to as customer journey mapping. Rosenbaum et al. (2017) state that customer journey mapping can be a powerful management tool if it is done correctly since it can result in insights regarding which touchpoints are critical to the customer experience and which are not. According to Maechler et al. (2016), mapping the customer journey may also enable companies to see the experience from the eyes of their customers, and in turn, shift their mindset from individual touchpoints to the end-to-end journey.

A customer journey map can focus on a specific customer-company interaction, or the whole end-to-end customer journey (Richardson, 2010b). In its simplest form, Richardson (2010b) describes the customer journey map as a horizontal timeline illustrating what a customer goes through when

interacting with a company's products or services but clarifies that the journey itself does not need to be linear. Rosenbaum et al. (2017) describe a horizontal axis, where touchpoints are diagrammed and categorised into periods, similar to how Lemon and Verhoef (2016) describe the customer journey using purchase phases. While the horizontal axis gives insights into what touchpoints the customer experience, the vertical axis may be used in different ways. Richardson (2010b) means that mapping customer actions, motivations, questions, and potential barriers in each touchpoint, is a useful way of improving the understanding of customers. Rosenbaum et al. (2017) instead emphasise that the vertical axis should be used to focus on managerial practices that help ensure customer satisfaction in each touchpoint.

2.1.3.2 Utilising the Customer Journey Map

Mapping the customer journey does not automatically lead to improved customer experiences. Rosenbaum et al. (2017) mention that the assumption that all customers experience the same touchpoints, and that the touchpoints are equally important for all customers, prevents managers from improving their service offerings with customer journey mapping. They also state that service innovation may be limited by a lack of real customer journey examples and insufficient instructions for interpreting the customer journey map. Managers are therefore recommended to gather customer information to identify both critical and less important touchpoints and resist trying to develop all-inclusive customer journey maps. Lemon and Verhoef (2016) also suggest involving customers in the mapping process. Specifically, they mention customer self-journey mapping and asking customers to develop ideal customer journeys as ways of improving understanding of the customers and their desired journeys.

The customer journey map can evidently be used for different purposes. Rosenbaum et al. (2017) recommend using the customer journey map as a strategic tool, with cross-functional initiatives linking organisational department initiatives in each touchpoint, to improve the customer experience. Richardson (2010b) mainly highlights the benefits of understanding the customers, in terms of how they think, act, and what they experience in different stages of the journey. Lemon and Verhoef (2016) suggest customer self-mapping, i.e. moving toward personalised journeys, and in turn, being more adaptive in their offerings.

While all these three suggestions offer unique benefits, a fourth way described by Maechler et al. (2016), provides general actions that can help companies manage the customer journey. Firstly, companies need to identify the nature of the journeys the customers take. Then, they should understand how customers navigate across all touchpoints in the journey. In each part of the journey, companies should identify what their customers need, expect, and desire. After this, try understanding what is working and not, to identify and prioritise the most important gaps and possibilities to improve the journey. Lastly, companies should fix root-cause issues and redesign the journey for a better end-to-end experience (Maechler et al., 2016).

2.2 Transformation of the Automotive Industry

The automotive industry has in recent years undergone major transformations in terms of electrification, servitisation, and digitalisation. As a result, the industry boundaries have shifted which has introduced new actors and new ways of creating value. The consequent section will delve deeper into literature within these areas of transformation, to guide vehicle OEMs in how they can adapt their business to create value and in turn enhance the customer experience.

2.2.1 Electrification

Even if EVs have existed for over a century it is only a few years since large scale marketing and production began (Gersdorf et al., 2020). The following section will delve deeper into theories regarding technological improvement as well as innovation diffusion. These theoretical areas provide a background for understanding the current development, and the future evolution of EVs.

2.2.1.1 Technological Improvement

The EV powertrain represents one of the largest technological developments in decades (Gersdorf et al., 2020). Christensen (1992) describes the technological S-curve (see Figure 2.1) as a centrepiece in technological strategy, as it depicts the improvement potential for technologies. He further states that the rate of improvement given a certain engineering effort or time varies as the technology ages. According to this, the rate of performance progression is initially slow but increases with better understanding and control of the technology. Eventually, the performance improvement comes to a halt as the technology reaches a physical or natural limit.

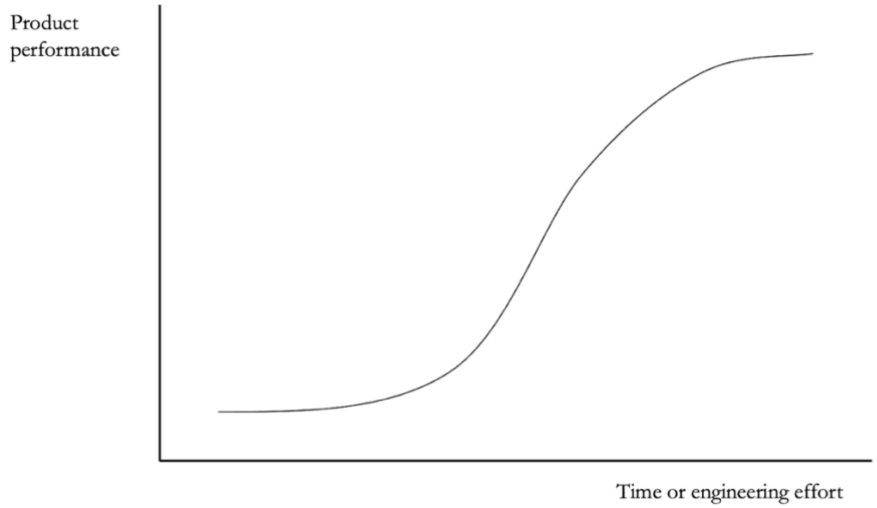

Figure 2.1. Technological S-curve. From "Exploring the limits of the technology S-curve. Part I: component technologies," by C. M. Christensen, 1992, *Production and operations management, 1(4),* P. 335. Copyright 1992 by Production and Operations Management Society

2.2.1.2 Diffusion of Innovation

As innovations spread in society, there is often also a pattern regarding why and when certain people adopt the innovation. To understand the process of innovation diffusion, Rogers (2003) classifies social system members based on their innovativeness into different adopter categories. The categories which are presented in Figure 2.2 consist of innovators, early adopters, early majority, late majority, and laggards. Individuals placed in the same category are seen as similar in terms of their relative innovativeness. This concept can help to understand the process of adoption decision and the related behaviours of each adopter category (Sahin, 2006).

Figure 2.2. Adopter categories based on innovativeness. Adapted from *Diffusion of Innovation,* 5th ed. (p. 281) by E. M. Rogers, 2003, The Free Press: A Division of Simon & Schuster. Copyright 2003 by Everett M. Rogers.

The adopter categories form a normally distributed bell-shaped curve, where for instance the innovators represent the first 2.5 per cent of the total adoption. Adopter categories further to the left in the figure generally have higher technical knowledge. They seek new ideas and experiences and are therefore good at coping with some level of uncertainty. However, the adopter categories further to the right are more sceptical towards the innovation, and generally need to be more certain of the innovation's success before adopting.

Regarding innovation diffusion, Rogers (2003) also discusses the dimension of time, the so-called rate of adoption, which is the relative speed at which social system members adopt an innovation. When the cumulative adoption is plotted based on time, an S-shaped curve can be depicted. Initially, the adoption is quite slow as only the innovators have gained interest in the innovation, but as more individuals adopt eventually the curve begins to take off. Eventually, the rate of adoption declines as the late majority and laggards start to adopt, finally reaching its asymptote. Rogers (2003) explains the reason behind this S-shaped curve of adoption as a result of the uncertainty reduction and information achieved from the process of diffusion.

2.2.2 Servitisation and Digitalisation

Servitisation and digitalisation are trends that are on the rise in many industries, including the automotive industry. The following section will examine literature within the areas of servitisation and digitalisation, which in chapter five will be applied to our empirical findings. The section on value creation provides a background, to gain a better understanding of how the trends have and will affect the automotive industry in the future. The sections on service triads and service quality will on the other hand provide tools for analysing the findings and guide vehicle OEMs in how they can navigate to enhance the customer experience in the usage phase.

2.2.2.1 Value Creation

According to Grönroos (2008), customer value has traditionally been viewed as something solely connected to the suppliers' products. Hence, the value would be transferred to the customer when the product is exchanged between the supplier and the customer in a phenomenon described by Grönroos (2008) as *value-in-exchange*. According to this view, the consumption process would be seen as a black box, i.e. the supplier would have no insight into the actual usage of the product. In

terms of the automotive industry, this implies not being able to measure customer value after the handover of the vehicle. Edvardsson, Gustafsson, and Roos (2005), on the other hand, suggest service as a perspective on value creation. They also mean that the service value differs depending on if it is viewed by the supplier or the customer, and suggest that the customer perspective should be prioritised. In line with this, Grönroos (2006) states that customer value stems from a process of value generation termed *value-in-use*. According to this view, value is created by the customer during consumption, rather than in exchange, which implies that the supplier would merely be seen as a value facilitator.

According to Porter and Heppelmann (2014) *smart, connected, products* (SCPs) can be utilised to enhance the customer experience by allowing companies to gather large amounts of data from their users that in turn can be used to personalise and optimise the user experience. Consequently, SCPs allow companies to become co-creators of value as they to a larger extent are interacting with their users during the value creation process (Grönroos, 2008). Porter and Heppelmann (2014) mean that SCPs expand the boundaries of an industry by moving from a single product to a system of systems. SCPs often include multiple types of services and functionality which introduce new requirements on infrastructure and competencies.

If companies utilise a closed system approach it implies providing the entire SCP on their own. This approach allows for total control which can create a competitive advantage. However, according to Porter and Heppelmann (2014), it also requires large investments. Therefore, a closed system approach is most suitable for manufacturers that have industry dominance. Furthermore, SCPs create new ways for product differentiation which shifts competition focus from price to delivering innovative offerings. This in turn can lead to higher customer loyalty as providers will have more unique offerings.

2.2.2.2 Service Quality

In the work *A service quality model and its marketing implications* (Grönroos, 1984), the *Service Quality Model* was constructed. This theory can be applied to the automotive industry, to understand how vehicle OEMs can create quality in the BEV usage phase, and in turn enhance the BEV customer experience.

According to Grönroos (2015), the model can be used to describe how services are perceived by customers, in terms of quality, and it consists of two dimensions, the expected quality and the experienced quality dimension (see Figure 2.3). The customers' experienced *service quality* has two dimensions, namely technical and functional. The technical quality of a service can be objectively measured and regards what is received by the customer, i.e. what the customer is left with after a certain service interaction. Functional quality is instead more subjective and focuses on *how* the customer receives the service. Thereby, other factors such as accessibility, behaviour, and performance of service providers, are of importance. Grönroos (2015) also relates company image to that of the experienced quality, stating that image works as a filter for the technical and functional quality. As an example, having a good image will make mistakes more tolerable and vice versa. Therefore, the experienced quality is based on the company image together with the technical and functional quality dimensions.

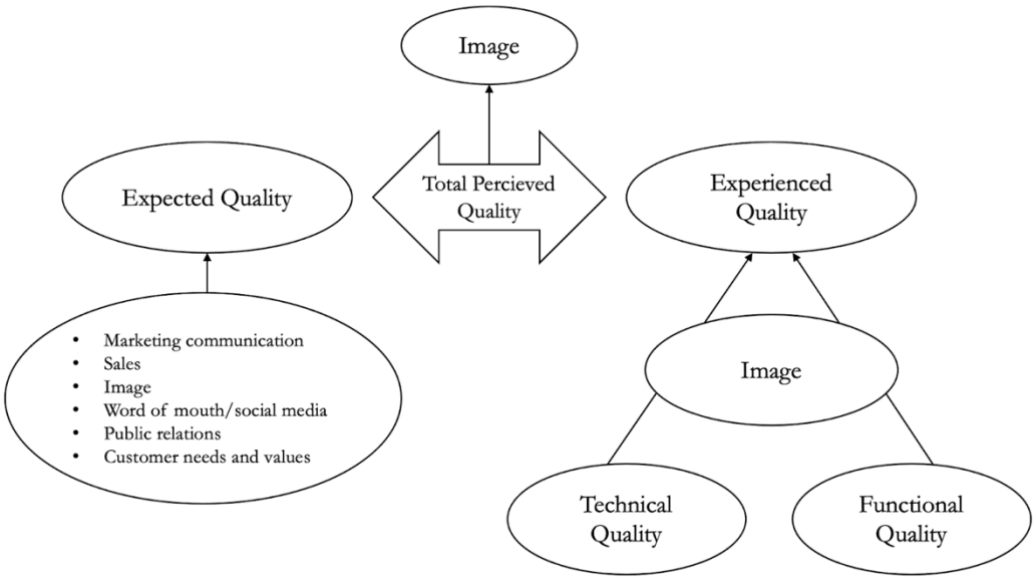

Figure 2.3. The perceived quality of service. Adapted from *Service Management and Marketing: Managing the Service Profit Logic,* 4th ed. (p. 99) by C. Grönroos, 2015, John Wiley & Sons Ltd. Copyright 2015 by C. Grönroos

As can be seen in Figure 2.3 Grönroos (2015) also means that the customer's expected quality, affected by for instance marketing and sales, impacts the total perceived quality. Overpromises from the service provider will lead to too high customer expectations, thus lowering the customers total perceived quality. Objectively the quality may still be high, however, as the experiences do not match what is expected the perceived quality will be considered low. Therefore, to achieve a high total

perceived quality, the customers' expectations must be exceeded or at least met by the experienced quality. In line with this, Grönroos (2015) suggests that organisations can benefit from underpromising as it allows them to at least fulfil the promises that they have made. This also implies that they may even be able to overdeliver and effectively create customer loyalty.

2.2.2.3 Service Triads

A *service triad* is a concept for describing relationships between supplier, buyer, and customer of the buying organisation (Wynstra, Spring, & Schoenherr, 2015). Since the BEV ecosystem is complex in terms of actors involved, the concept of service triads can be used to illustrate industry actor constellations, and how these have evolved.

In the basic form of a service triad (see Figure 2.4), the supplier is contracted by the buyer to provide services to the customer directly (Li & Choi, 2009). The distinguishing factor of a service triad is that there is a direct connection between each actor, occurring either constantly or irregularly (Wynstra et al., 2015). Compared to a two-actor buyer-supplier relationship, a service triad can be difficult to control for the buyer as there is a direct connection between supplier and customer. According to Finne and Holmström (2013) cooperation between customer, supplier, and buyer can improve service quality as well as align capabilities and interests of the actors involved.

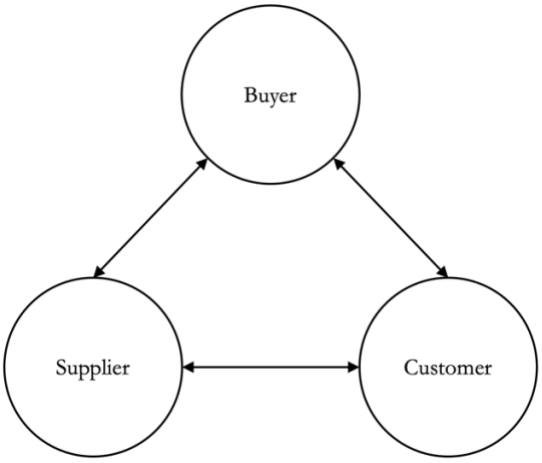

Figure 2.4. The service triad. Adapted from "Service triads: A research agenda for buyer-supplier-customer triads in business services," by F. Wynstra, M. Spring, & T. Schoenherr, 2015, *Journal of Operations Management, 35*, p. 2. Copyright 2014 by Elsevier B.V.

2.3 Frameworks

In the following section, a conceptual framework and an analytical framework will be introduced based on the literature presented in sections 2.1 and 2.2. The conceptual framework will be used to map the findings regarding the current customer journey, and consequently answer research question one. The analytical framework illustrates how the findings from research question one and two will be utilised. More precisely, it shows that potential gaps between the current customer journey and BEV user desires may exist. It also highlights what literature can be used to help vehicle OEMs navigate these gaps, thus, illustrating how research question three will be answered.

2.3.1 Conceptual Framework

Figure 2.5 illustrates a proposed design of the customer journey map. The customer journey map has an overarching timeline divided into an unknown number of sub-phases, in line with the description of the horizontal axis provided by Richardson (2010b) and Rosenbaum et al. (2017). It is deemed appropriate in this research since the BEV users probably will go through different phases during the usage phase. Further, each sub-phase has been divided into touchpoints. The touchpoints probably will be of different characters, e.g. products, two-way interactions, messages, and settings as described by Richardson (2010a). Each touchpoint may also include several dimensions, in terms of what actors are involved (Lemon & Verhoef, 2016), what customers think and experience (Solis, 2015; Richardson, 2010b; Lemon & Verhoef, 2016), and they may also include managerial practices aimed at improving the customer experience (Rosenbaum et al., 2017).

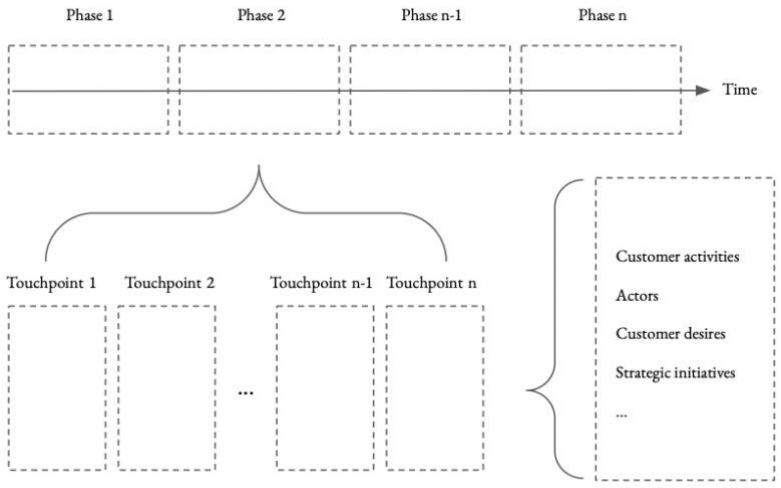

Figure 2.5. Conceptual Framework of the customer journey

2.3.2 Analytical Framework

The framework in Figure 2.6 illustrates the current customer journey and BEV user desires, and potential gaps between these. This framework is deemed appropriate as research question one involves mapping the current customer journey, and research question two focuses on understanding BEV user desires. Moreover, studying the BEV user desires and the current customer journey will hopefully bring to light what gaps exist, which is in line with Maechler et al. (2016), and part of research question three. Applying literature on service triads can guide vehicle OEMs on what role they can take in these gaps, i.e. what relationships they can have with BEV users and other actors. Applying the service quality model by Grönroos (2015) could also highlight how vehicle OEMs can affect the overall perceived quality in each gap and enhance the BEV usage phase customer journey.

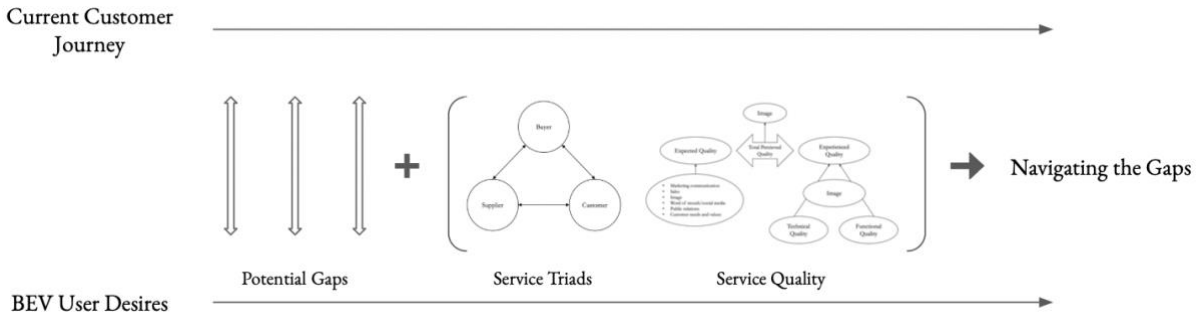

Figure 2.6. Analytical Framework

3. Methodology

To be able to answer the proposed research questions and consequently fulfil the aim of the thesis, the research has been divided into three steps: (1) *Customer Journey Identification*, (2) *User Desires Identification*, (3) *Gap Identification and Navigation*. The first step focuses on identifying and describing the current BEV usage phase customer journey, i.e. answering research question one. This will be done through semi-structured interviews with key stakeholders and BEV users related to the vehicle OEM. In the second step, customer desires will be examined through a method called *Concept Mapping,* which is further described in section 3.2. Thus, this step answers research question two. In the last step, BEV user desires and the current customer journey will be analysed to identify key areas of importance, i.e. gaps, that vehicle OEMs need to navigate to create a hassle-free BEV customer journey. How these gaps can be navigated will be examined through the literature provided in chapter two. This step consequently aims at answering research question three. Table 3.1 provides an overview of the methodology in each research step.

Research step	**Key Concepts**	**Data Needed**	**Data Collecting Methods**
1. Customer Journey Identification	- Customer Experience - Customer Journey Mapping	- Usage phase touchpoints - Usage phase activities - Usage phase actors	- Semi-structured interviews with stakeholders related to vehicle OEM and BEV users
2. User Desires Identification	- Concept Mapping - Clusters	- BEV user desires - BEV user categorisation	- Concept mapping with BEV users
3. Gap Identification and Navigation	- Customer Experience - Service Triads - Service Quality	- Clusters of BEV user desires - Customer Experience theory - Transformation theory	- Semi-structured interviews with stakeholders at vehicle OEM and industry experts - Academic articles - Industry articles

Table 3.1. Overview of Methodology

3.1. Sampling

In this section, the sampling methods and techniques utilised in the research will be described. Furthermore, this section will include a discussion regarding the sample size and its feasibility in answering the research questions.

3.1.1 Sampling Method

Different sampling techniques were utilised to get the desired primary data. The sampling techniques deemed appropriate for the research were non-random sampling methods, meaning that subjects are drawn on a subjective basis (Etikan, Musa, & Alkassim, 2016). According to Etikan et al. (2016), this form of sampling technique is time- and cost-effective and allows researchers to choose a sample based on their own needs. It is thereby often useful when undergoing qualitative and exploratory research. Two forms of non-random sampling techniques were applied in this research, namely *Purposive Sampling* and *Snowball Sampling*.

According to Etikan et. al. (2016), purposive sampling allows the researcher to choose subjects that are expected to fulfil a predefined purpose. This method was useful when finding the sample for concept mapping since the method required a selection of BEV users who could contribute with interesting insights on desired BEV user experiences. Regarding snowball sampling, the aim is to reach subjects that are difficult to reach first-hand, and it can be done in several ways (Handcock & Gile, 2011). In this study, it was an appropriate method to use when investigating the current BEV customer journey, as this information was accessible in different departments within the vehicle OEM. Therefore, at the end of each interview, the interview subject was asked to recommend other subjects which they believed could contribute with interesting insights.

3.1.2 Sampling Size

To reach a sufficient sample size, the concept of saturation can be used. According to Morse (2015), saturation is the most frequently used criteria for ensuring rigour in qualitative research. Saunders et al. (2017) uses the questions of “what?”, “where and why?” and “when and how?”, to explain the concept of saturation. They mean that saturation should be viewed differently depending on the type of research, for what purpose saturation is sought, in what stage in the research it is desired, and by what means it can be assessed if it is achieved.

In this qualitative research, saturation was desired when investigating the research question regarding the current customer journey. Here, the researchers sought to explore what touchpoints occurred in the journey, and what activities and actors were involved in these. When the interviews no longer contributed with sufficiently new insights regarding the customer journey, and the interviewees were

starting to refer to each other, the researchers deemed that saturation was reached. This occurred after 13 interviews. See Appendix A for an overview of the interview subjects.

Regarding the second research question, saturation was not of interest since the idea of concept mapping is to generate ideas. Instead, the desired sample size was initially set between 20 and 25 respondents. This was deemed sufficient for two reasons. Firstly, because each respondent is responsible for generating between 5 and 10 answers, implying a total of 100 to 250 unique answers. Secondly, since the nature of the research question is explorative, meaning that representativeness is not of priority. In this case, a total of 26 respondents generated 183 answers.

3.2. Data Collection

In this section, the data collection utilised for this research will be explained. This includes how data has been collected for the respective research questions. This study aims at investigating a topic, i.e. the BEV customer journey, which is relatively unexplored. Moreover, the study aims at understanding the perceptions and views of BEV users and vehicle OEM employees. Therefore, fulfilling the research purpose calls for an exploratory research design. Since the perception of the BEV customer journey will differ depending on the individual, and the nature of the study is exploratory, a qualitative research approach deemed appropriate. The data used in this report consist of both primary- and secondary data. Primary data was mainly used in the first and second research steps, that is the customer journey identification, and the identification of BEV user desires. Secondary data was on the other hand used to construct a suitable theoretical framework that was utilised in the analysis process.

To answer the first research question, semi-structured interviews with relevant stakeholders and BEV users were held to generate an understanding of the current BEV customer journey. According to McIntosh and Morse (2015, p. 1), "It [semi-structured interviews] employs a relatively detailed interview guide or schedule, and may be used when there is sufficient objective knowledge about an experience or phenomenon, but the subjective knowledge is lacking". In line with this, the researchers prepared an interview guide (see Appendix A) including some predefined interview topics related to the BEV customer journey, with a few guiding questions on each topic. Before each interview, this guide was emailed to the interviewee to allow them to prepare. Moreover, the use of semi-structured

interviews was deemed appropriate for the study as some areas to cover were specified beforehand, but there was still some flexibility as each interview could bring to light new interesting aspects.

Due to the ongoing pandemic, the interviews were held digitally via Microsoft Teams. During the interviews, one researcher was responsible for asking questions and the other researcher primarily focused on taking notes. At the beginning of each interview, the researchers explained the background of their research. Moreover, a PowerPoint presentation was used to visualise the timeline of the usage phase to help guide discussions. To ensure the collected data was correct and extensive the interviews were also recorded to allow for easy comparison in the analysis process.

After the initial interview, the interview questions were revised as the researchers realised that the number of questions was too extensive. Moreover, the initial questions regarding the usage phase of the customer journey were considered too open and extensive and were therefore revised into smaller sub-questions to avoid overwhelming the interviewee. Hence, during the consequent interviews, the usage phase was divided into three sub-phases which helped facilitate deeper discussions.

To answer the second research question, user desires were identified using concept mapping, which was first described by Trochim and Linton (1986). Trochim (1989) describes concept mapping as a process that can be used to help a group describe its ideas on any topic of interest. The process is deemed relevant for this research step as it can highlight various experiences and perspectives of BEV users. This study builds upon concept mapping as utilised by Bäckstrand and Halldórsson (2019), who conducted the following six steps: (1) Define community and develop prompt, (2) Brainstorm ideas to prompt, (3) Sort the ideas, (4) Apply multidimensional scaling to map the ideas, (5) Apply cluster analysis to group ideas, (6) review the process. How the first and second steps were conducted will be described in this section as they regard data collection, and step three to six will be described in section 3.3. Concept mapping was considered suitable since it not only identifies BEV user desires but also groups together desires of a similar kind, creating clusters. Moreover, concept mapping offers unique insights as the respondents are responsible for not only generating ideas through their responses but also for analysing the received data by categorising responses. Hence, concept mapping also removes certain uncertainties related to researcher bias.

The community chosen for this study was BEV users, mainly from the vehicle OEM since they were easily accessible. Moreover, this community was deemed to represent the vehicle OEMs customer segment, and able to provide insights on the latest BEV models and related services. Initially, the researchers brainstormed ten prompt suggestions, inspired by previous concept mapping studies (e.g. Bäckstrand & Halldórsson, 2019; Vaughn & McLinden, 2016). These ten suggestions were compared and the option which was believed to generate the best answers was picked, i.e. the answers that best describe what BEV users desire from their usage phase customer journey. This resulted in the following prompt: "One thing I need to have a hassle-free and enjoyable BEV experience is...". The reason for using both "hassle-free" and "enjoyable" in the prompt was to emphasise options that make the BEV experience not only easy but also delightful. However, in this report, the term "hassle-free" represents both ease and delight.

Based on the prompt, a google form was constructed in both English and Swedish. The google form asked the respondents to brainstorm between four and ten answers to the prompt. The two versions were tested on two independent individuals to assess if the instructions were clear, and some minor changes were made to both versions. As all participants had Swedish as their mother tongue, it was decided that the study would be performed in Swedish, since that would minimise the risk of misunderstanding.

Initially, the form was sent to two respondents to allow for possible changes to be made before it was sent to the rest. As the first answers were not sufficiently customer journey specific the form was revised and it was specified that the whole usage phase customer journey, from handover to disposal, was of interest. Important to note here is however that the respondents have limited knowledge about what they desire regarding disposal, as most respondents are first-time BEV users. Furthermore, after receiving two more survey responses the researchers realised that some answers were very similar, therefore the instructions were revised to clarify that each answer should be unique. Moreover, the number of mandatory answers was increased from four to five to force the respondents to come up with more novel ideas. Lastly, to be able to answer the third research question, the theoretical framework presented in chapter two was applied to the empirical findings, to examine suitable ways of enhancing the BEV usage phase customer journey.

3.3. Data Analysis

In this section, the methods used for analysing the data will be explained and justified with the use of literature. To derive conclusions from the data collection phase several analysis techniques and tools were of importance. Maxwell (2005) describes qualitative research as an iterative process, i.e. as new knowledge is obtained the research should respond and adapt. In line with this, the qualitative data obtained were systematically coded and analysed, therefore data analysis was conducted in parallel to data collection.

Regarding the interviews, the researchers initially retrieved the notes from the performed interviews and compared these to the recordings to complement the notes with any additional information that could have been missed. This step also ensured the reliability of the collected notes and allowed the researchers to review the collected data. This is in line with Burnard (1991), who believes that an important part of the initial qualitative data analysis is to review all field notes. In the next step, the researchers reviewed the notes and highlighted sentences that were seen as important for the study. According to Bernard (2017), this is useful as the highlighted sentences often can serve as potential themes or categories. Similar categories from different interviews can in this way be linked together and the researchers can more easily create an overview of the performed interviews.

After the initial data collection from concept mapping had been conducted the 183 responses were reviewed by the researchers and reduced to 70 unique answers before letting the respondents start the sorting process. This reduction was considered necessary as too many answers would be overwhelming for the respondents to sort which could lead to incomplete sortings. The reduction was performed by first identifying and highlighting irrelevant answers, similar answers, and answers including more than one suggestion. Similar answers were then reviewed and the most representable and clear answer was chosen. Moreover, answers with several suggestions were split into a suitable number of answers. This resulted in 70 unique answers that later were revised for spelling mistakes and simple formulation errors.

After having identified 70 unique answers, respondents from the previous step were asked to sort the answers using an online tool named *Optimal Sort*, where respondents were asked to create groups of similar answers and label them. This sorting activity was first tested on two independent individuals

outside of the study to verify that the instructions were clear. After this, it was sent to two respondents from the actual study that managed to complete the sorting desirably. Therefore, the sorting activity was sent to five more subjects. One of these respondents quickly responded that the instructions were unclear. The researchers were able to revise the instructions before any more answers were obtained. After ensuring that the changes to the instructions solved the previous issue, the sorting was sent to the remaining respondents.

After 19 respondents had performed the sorting, the results were analysed through a multidimensional scaling using the analysis program *R*, and the package *concept map R*. This has been proven to work in a previous study with a similar purpose (see Bäckstrand & Halldórsson, 2019). This step was facilitated by the researchers' supervisor as he had previous knowledge of performing this type of study. This resulted in cluster solutions varying from 5 to 15 clusters. The different cluster solutions were reviewed in Excel to identify how many clusters were needed to ensure a suitable categorisation with enough homogenous answers in each group. This was done by working down from 15 clusters to a suitable number of clusters by reviewing how the removal of a cluster affected the overall homogeneousness of the categorisation. This method resulted in an 8-cluster solution and from this, R generated label suggestions for each cluster based on the included answers. When deciding suitable names for each cluster the generated labels were used as inspiration. However, some label suggestions were considered to only represent certain answers in each cluster, and therefore the researchers deemed it appropriate to revise these.

3.4 Research Outcome

The main research outcome of this study has been to provide Vehicle OEMs with valuable insights that can help them understand and enhance the BEV usage phase experience for their customers. In doing so the researchers have firstly provided a current customer journey map that can be used as a tool for understanding what touchpoints BEV users experience. Moreover, this map can be used to facilitate improvement discussions at vehicle OEMs as it provides an overview of what touchpoints and activities exist and what actors are involved in these. Secondly, this study has also contributed to a closer understanding of what BEV users desire. On one hand, concept mapping has offered individual suggestions from BEV users which could be incorporated into the customer journey to

enhance the BEV experience. On the other hand, it has also through a cluster analysis offered an overview of the main areas of importance for enhancing the BEV usage phase customer journey. Lastly, the researchers have contributed to the research outcome by identifying three key gaps regarding what BEV users desire. Moreover, the researchers have elaborated on how vehicle OEMs can navigate these gaps to enhance the BEV usage phase.

3.5 Research Quality

In a qualitative research study ensuring high research quality can be difficult. To support the quality of a case study, Halldórsson, Vural, and Wehner (2019) state the importance of a clearly described research process. This way the reader can assess the rigour of the chosen research approach. In line with Halldórsson and Aastrup (2003), trustworthiness has been used to guide research quality assurance. Trustworthiness is composed of *credibility*, *transferability*, *dependability,* and *confirmability*. The quality of this thesis will be examined through each of these components.

Regarding the first component, credibility, Halldórsson and Aastrup (2003) state "It is the degree of match between the respondents' constructions and researchers' representation of these that determines credibility" (p. 327). Therefore, credibility in this thesis was ensured by trying to understand the constructed realities of the respondents. During the interviews, data collection and analysis was used iteratively by relistening to interviews and highlighting areas of interest in the notes. The insights from the interviews were then used in consequent interviews to increase the understanding of the respondents constructed realities. During concept mapping, the respondents were responsible for both data generation and data analysis which reduced the risk of misunderstanding, further assuring the credibility of the study.

The second component of trustworthiness, transferability, is described by Halldórsson and Aastrup (2003) as "the extent to which the study is able to make general claims about the world." (p. 327). This has been ensured by being fully transparent regarding how the methodology has been performed. The process from data sampling to data analysis has been thoroughly described, including revisions that have been made during the process. Moreover, the interview guides used for facilitating the interviews have been included in the appendix (see Appendix A) to ensure full

disclosure of how they were performed. All this is believed to increase the overall transferability of the thesis allowing similar studies to be conducted again in the future.

Further on transferability, one could argue that the sample chosen for research question two seems to be relatively homogeneous, as many of the BEV users are employed by the vehicle OEM, and since they all live in Sweden. Nonetheless, the market for BEVs is not very mature and the costs related to purchasing or leasing a BEV are high. Thereby, sampling from a vehicle OEM that is offering BEVs with lower economical risks to employees, could allow insights from individuals who under other circumstances would not drive a BEV. Thereby, this sample may provide a broader representation of the different adopter categories described by Rogers (2003), section 2.2.1.2. The fact that all respondents live in Sweden can indeed be seen as problematic. However, Sweden has relatively harsh conditions for BEVs in terms of long distances and extreme temperatures. Therefore, the user desires generated from this group are believed to cater to the extremes, and hence, probably exceed the desires of other users.

The third component of trustworthiness, dependability, also referred to as reliability, regards the data stability over time (Guba and Lincoln, 1989). According to Halldórsson and Aastrup (2003) achieving reliability implies receiving similar results from a replicated study. Moreover, they state that dependability can be ensured through documentation. In line with this, the performed study has utilised several tools to facilitate the data collection. Tools used in the data collection consist of conceptual models, notes, and video recordings. These tools have helped ensure the dependability of this thesis by facilitating empirical findings documentation.

The last component, confirmability, is according to Halldórsson and Aastrup (2003) "...seen as being parallel to the conventional view on objectivity i.e. the findings represent the results of the inquiry and not the researchers' biases." (p. 328). The sampling selection depended on references from initial interviews who suggested different individuals and departments which they believed could contribute with new insights for the research. Moreover, concept mapping also let the respondents perform large parts of the analysis themselves. Both these factors reduced the overall risk of researcher bias and hence enabled confirmability.

4. Empirical Findings

In the following chapter, two main findings will be presented. First, a map of the current customer journey, which is derived from interviews with internal stakeholders at the vehicle OEM, and BEV users. Secondly, input from BEV users regarding what they need for a hassle-free experience will be presented in the form of clusters, derived from concept mapping. Both these outcomes are of importance since they will facilitate the identification of gaps between the current customer journey and BEV user desires, hence allowing the researchers to answer the last research question.

4.1 Current Customer Journey

Initially, when looking into the BEV customer journey it can be overwhelming. Even though this report focuses explicitly on the usage phase of the customer journey, it quickly became clear that further sub-categories were needed to make sense of the journey. During the initial interviews, a conceptual model, consisting of an empty timeline was used to guide discussions regarding BEV user touchpoints. The findings from the interviews were continuously mapped onto the usage phase timeline. Shortly, it became evident that the usage phase could be divided into three overarching sub-phases, as seen in Figure 4.1. After analysing the key touchpoints of these phases, the phases could be named accordingly: (1) *Learning Phase*, (2) *Routine Phase*, and (3) *End Phase*.

Early in the usage phase users mainly seek information, and learn about their new BEV, therefore this phase is named the learning phase. Thereafter users establish routines based on these learnings. These routines can be disrupted, leading to the creation of new routines, but in general the touchpoints in this routine phase all regard routines in some sense. Lastly, in the end phase, users can choose different paths. Unique for this phase is that all touchpoints regard a choice of either keeping or getting rid of the car. The three identified sub-phases include overarching touchpoints, that in turn include customer activities, actors associated with the touchpoint, and key insights. Many activities are unique for each user, but some are reoccurring, and those have been brought forward. Regarding actors, these are many and constantly evolving, and therefore the role of the vehicle OEMs in each touchpoint is undecided and differs among vehicle OEMs. The identified sub-phases will be further explained below.

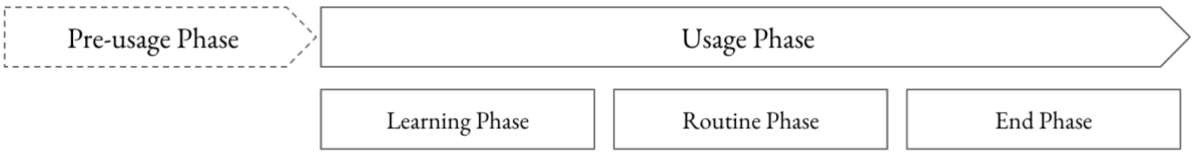

Figure 4.1. Overview of the customer journey

4.1.1 Learning Phase

The learning phase is the first of the usage phases. Learning often starts before the usage phase, since users may set up home charging stations, download relevant apps, and gather relevant information to prepare for their new car experiences. Depending on how new the BEV experience is for the user may spend more or less time in the learning phase. However, there are a few touchpoints that are apparent in most customer journeys. These are presented in more detail below, and a brief overview of the learning phase can be seen in Figure 4.2. Notice how the actor constellations change.

Learning Phase			
	Handover	Setup	First driving experience	Acclimatisation
Activities	- Visit car dealership - Receive information and ask questions	- Install wallbox - Enroll in public charging memberships	- Test in-car apps and features - Experience new power-train	- Figuring out how and where to charge - Figuring out how to drive energy efficiently
Actors	- User - Vehicle OEM - Dealership	- User - Dealership - Wallbox companies - Public charging actors	- User - Vehicle OEM - Dealership	- User - Third-party (Youtube, forums, Facebook groups, etc.)
Key insights	- Both users and dealerships experience a lack of information	- Home-charging installation can be problematic	- Generally people are amazed by the new driving experience	- Users gather information through multiple channels - Information overload experienced by users

Figure 4.2. Overview of the Learning Phase

4.1.1.1 Handover

As the name of this touchpoint suggests, the handover consists of activities related to the BEV pick up. During handover, the user often visits a dealership where they can ask questions and receive information about their new BEV. Therefore, the main actors involved in this touchpoint are the

user and the dealerships. Arguably, the vehicle OEM is also involved as they both provide the product and are responsible for informing the dealerships about the BEV offering.

From a user perspective, the handover touchpoint is generally filled with user excitement, but also uncertainties and questions. Users often read about their BEV before delivery and almost always have questions that they want to be answered. From the interviews, it was clear that certain questions could not be answered by the handover personnel. According to an interviewee "... the car industry has historically been undergoing constant development affecting vehicle OEMs and dealerships [...] now with BEVs it is a completely new world". Information is quickly rendered obsolete, which leaves the dealership personnel in a tricky situation, "... BEV customers expect answers to everything by everyone". Here, there seems to be an information gap, not only for users but also for dealerships making it difficult to meet user expectations.

4.1.1.2 Setup

When choosing to get a BEV, you enter a world that differs from the traditional ICEV experience. One of the most notable differences between BEVs and ICEVs is that BEVs run on electricity, and thereby need to be charged instead of filled with gasoline or diesel. Charging can be done at home, i.e. home charging, or through public charging. No matter what method the user chooses, preparation is needed. Therefore, in this touchpoint activities related to preparing users for their future BEV experience has been categorised. The actors involved in this touchpoint depend on what solutions users wish to have, and the experience very much depends on users' digital as well as physical interactions with external actors.

If users want to be able to charge at home and live in a house, a wallbox is recommended. Here, it has been found that some users feel that they are not supported enough when investigating possibilities for home charging. Looking at BEV users renting or owning apartments, the situation differs. Some may have no, or very limited possibilities, to charge their BEV nearby their home, while some housing associations do offer possibilities for installing home charging. Often it is up to the user to investigate possibilities for home charging, something that has been expressed as a hassle. Regarding charging in public, most users need to rely on external charging providers. Charging providers often have unique payment systems, and users generally need to set up accounts for each of these providers. There are

however actors today that enable cross-provider payment solutions, which according to an interviewee "... at least eliminates the problem with payment methods".

4.1.1.3 First Driving Experience

This touchpoint regards activities related to the first driving experience with the BEV. It involves experiencing the new powertrain in terms of for instance acceleration, regenerative braking, and soundless drive. It also involves testing in-car apps and features for the first time. The actors involved in this touchpoint are foremost the users as they are actively experiencing the driving, but also the dealerships as they are sometimes involved in the first in-car experience. The vehicle OEM also has an important role in this touchpoint as they provide the actual car, including in-car features that further enhance the first driving experience.

The interviews show that this touchpoint is generally experienced very positively. One of the interviewees describes this touchpoint as a "... euphoric experience where everything you do is so interesting [...] the car breaks and accelerates in a whole new way". However, according to the interviews, this feeling seems to disappear after users have had their BEVs for a while as they quickly become accustomed to the new driving experience.

4.1.1.4 Acclimatisation

The acclimatisation touchpoint involves becoming accustomed to the BEV. This touchpoint is characterised by the activities revolving around how the user identifies and utilises information to maximise their BEV experience. It includes figuring out how and where to charge, how to drive energy efficiently, what charging memberships are relevant, etc. The actors involved in this touchpoint are, except for the users themselves, different third-party actors that provide information regarding BEVs or provide a forum for meeting and discussing BEV related topics with other BEV users.

Based on the interviews it seems as though BEV users gather information from numerous sources including YouTube, Facebook, academic journals, and articles, as well as through word of mouth. BEV users describe this information overload as problematic as it is difficult to navigate among all the information. BEVs are also a widely debated subject among non-BEV users and one interviewee

means that the effect of this debate creates a situation where "... the negative becomes very negative and the positive becomes very positive".

4.1.2 Routine Phase

Once the user has acclimatised with their new car experience, they enter the routine phase. This phase is characterised by daily life activities such as commuting to work, getting groceries, and a charging routine. Some users will stick to their routines, and some may continuously look for ways to get the most out of their experience. Routines can however be disrupted by certain events, such as new regulations, car updates, or road trips. These disruptions may lead to new learnings which change the routine. The touchpoints of the routine phase are presented in more detail below, and a brief overview of this phase can be seen in Figure 4.3.

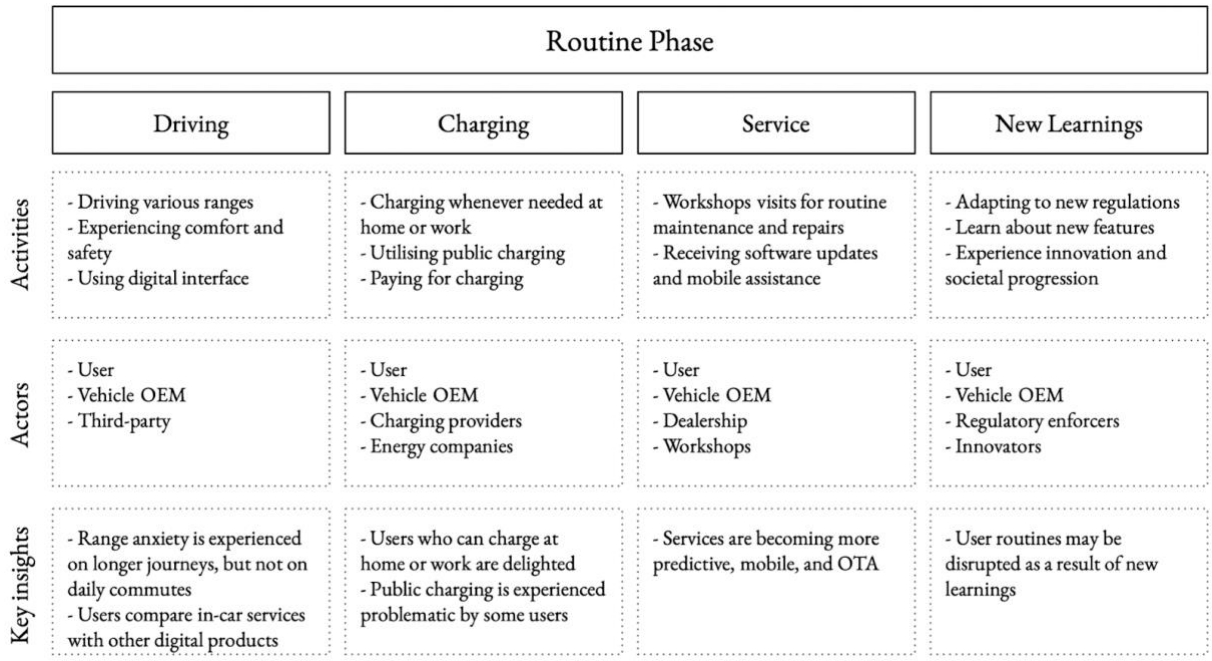

Figure 4.3. Overview of the Routine Phase

4.1.2.1 Driving

In the routine phase, driving is a prominent activity, and it is thereby natural to regard it as a touchpoint. It involves both daily commutes, such as driving to and from work, but also longer journeys. This touchpoint can for instance include driving various ranges, using the BEVs car features, and experiencing the driving in terms of comfort and safety. The driving touchpoint mainly involves the BEV users as they are responsible for the activities. The vehicle OEM, and in some cases

third-party service providers, are also involved through providing the car and different in-car services that allow them to interact with the users.

The interviews indicate that range is not an issue for daily commutes but could however become an issue for longer journeys. It is also found that the range of BEVs is affected by climate conditions, where for instance lower temperatures could lead to a performance decline. Moreover, the interviews show that BEV users, and users of a digital product in general, are comparing their digital products with products from other contexts, such as their smartphones. For BEV users this means that the expectations on in-car services and digital interfaces are increasing.

4.1.2.2 Charging

As mentioned in the setup touchpoint, users may have a hassle preparing for their future charging routines. For some users, the hassle ends there, while some experience problems regarding the charging routine as well. As of today, the main actors involved in the charging touchpoint are external public charging providers, home charging providers, and the user who is responsible for deciding where, how, and when to charge.

One of the interviewees expressed that "... charging could be the biggest or smallest of your problems [...] if you can charge your BEV at home, or at work, you will never think about charging". This seems to be the general view, if you can plug in your car in a wallbox daily, charging will likely not be one of your main problems. For people utilising public charging, there are however mixed views. Some find it very problematic, and some users mean that charging in public is no issue.

The satisfaction in this touchpoint seems to relate to the expectations that the user has. People who are used to charging in public create routines around this and may thereby charge their car while doing something else, e.g. looking through work emails, watching a TV show, or grocery shopping. However, people who normally do not charge in public, but for some reason have to do it, can find it problematic for a few reasons. First, as mentioned in section 4.1.1.2, many actors provide public charging and have their own price and payment solutions. Secondly, there may be a waiting line, and users may not have the possibility to drive to another charging station. Thirdly, it takes much longer than filling up an ICEV, and if the user has no plan of what to do when waiting, it will feel like a long wait.

4.1.2.3 Service

Services, whether it be routine inspections, repairs, or software updates, are an important part of the routine phase as they ensure the continuation of the already established routines. The service touchpoint includes both maintenance and customer care. Further, it regards both scheduled and non-scheduled activities. In this touchpoint several actors may be involved as this type of service may be delivered by the vehicle OEM, their dealerships, or a workshop.

Vehicle OEMs have started to deliver OTA updates. However, workshops are still being used in many cases for inspections and repairs. An interviewee mentions that their vehicle OEM has recently started providing smart batteries in their BEVs allowing for more predictive battery services. Therefore, they can know beforehand what battery component has malfunctioned or declined in performance and can have this component ready when the user delivers their car for repair, allowing for shorter repair time. To reduce this hassle even more some vehicle OEMs are starting to offer mobile services such as pick-up and delivery when performing different maintenance services. This has raised the question of whether you need to visit a workshop or dealership for service at all in the future.

4.1.2.4 New Learnings

This touchpoint was identified since several interviewees mention that things may happen along the customer journey that disrupts the daily routines. Road trips usually lead to new learnings for the user, because of region-specific regulations and charging methods that need to be adapted to. New regulations may also be introduced by governments and municipalities that enforce changes in the daily routines.

Technical innovations, as well as major OTA updates, can also lead to changes in the daily routines, as they enable new ways of using the BEV. Interviews suggest that new learnings can be a hassle if users need to adapt their behaviour too much, but if new learnings mean that life with a BEV gets easier, they are considered positive. Actors involved in this touchpoint are mainly enforcers of regulations, e.g. governments and municipalities, innovators that bring new smart solutions forward, and vehicle OEMs who provide updates to their cars.

4.1.3 End Phase

The last phase of the usage phases, the end phase, can be reached for different reasons. The user may have a lease that is reaching the end of its contract, the performance of the battery may have declined to the extent that a refurbishment of the car is needed, or the user can simply be disappointed with their overall experience and choose to look for new options. In this stage, the user is faced with three choices: keep the car, get a new car, or not get a car at all. The touchpoints of the end phase are presented in more detail below, and a brief overview of this phase can be seen in Figure 4.4.

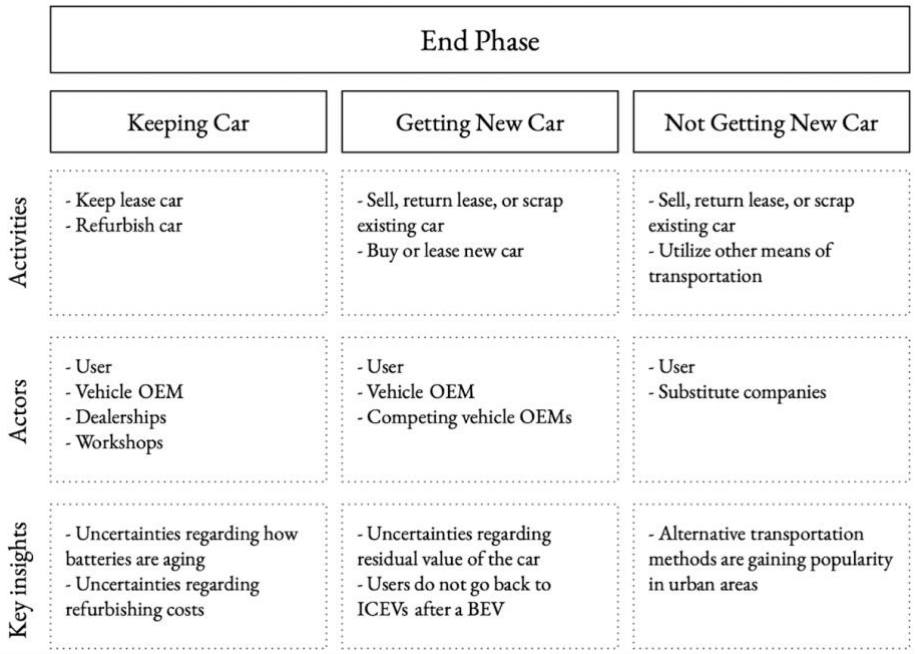

Figure 4.4. Overview of the End Phase

4.1.3.1 Keeping Car

Keeping the car would imply that the user returns to the routine phase. If a user decides to keep the car, it can be done in different ways. In the case of a lease contract, the user can simply renew their current lease. However, if they own the car they must instead refurbish the car to keep it functional. When the warranty is active the vehicle OEM will often provide a refurbishment of some sort, replacing for instance the battery. However, if the warranty is not active then it is currently very costly to replace the battery. Therefore, OEMs are looking into providing affordable options for the customer to replace or renew batteries.

This touchpoint includes actors such as the users as they are responsible for the decision, but also vehicle OEMs together with their dealers and workshops as they are responsible for either renewing the lease or refurbishing the BEV. Related to this touchpoint BEV users express uncertainties regarding both how batteries are ageing, but also how much it will cost to refurbish a battery after the warranty has run out. Through the interviews, it becomes clear that the car is more and more becoming a computer on wheels. Therefore, as long as it stays updated, it can feel as good as new, indicating that keeping the car may become a more common choice.

4.1.3.2 Getting New Car

When a user decides to get a new car, there are a few steps that need to be taken. First, depending on if the car is a lease or a bought car it needs to be either returned, sold, or scrapped. The car could be kept even if the user decides to get a new car, but in that case, the customer journey related to the existing car continues. Apart from getting rid of the existing car, the user also gets a new car through purchasing or leasing. In this touchpoint, the user has a strong influence, but other actors are for instance potential buyers of the old BEV, and both current and competing vehicle OEMs, who wish to provide the new car.

While there are ways of estimating the residual value of ICEVs today, the residual value of a second-hand BEV is tougher to decide, which leads to uncertainties for both sellers and buyers of used BEVs. This is however a non-issue if the user has a lease. As BEVusers look to get a new car, interviews suggest that they generally want to continue driving BEVs. A BEV user stated that "... driving an ICEV after driving my BEV feels like Stone Age". Further, the many issues that non-BEV users worry about when considering a BEV have been described by BEV users as non-problematic.

It is not always the case that vehicle OEMs retain their customers in this stage. Interviews suggest that car customers historically have tied strong relationships with dealerships, in contrast to vehicle OEMs, which has implied low switching barriers to other car brands. However, vehicle OEMs are now taking a more prominent role in the sales process, mainly through online sales channels, which suggests that the trend of strong customer-dealership bonds may decrease. An interviewee states that the choice of whether to get a new car from the same vehicle OEM, or a competing actor, depends on the overall satisfaction, and potential lock-in effects.

4.1.3.3 Not Getting New Car

The last touchpoint in the current customer journey regards not getting a car at all, and the main actors here are the users as well as substitute companies supplying alternative transportation methods. Just as with the previous touchpoint this implies first getting rid of the car, i.e. selling the car, ending the car lease, or scraping the car. Again, regarding the activity of selling the vehicle, the interviewees have expressed difficulties regarding estimating the value of their car. The interviews suggest that from an OEM perspective exactly what to do with used batteries is still not certain as there are various options available. Further activities in this touchpoint are finding and utilising other means of transportation such as public transport and car-sharing. Car sharing services are on the rise and alternative transportation methods, such as electric scooters, are gaining popularity in urban areas. New services such as food delivery have also decreased the need for a car in everyday life.

4.2 BEV User Desires for a Hassle-Free Customer Journey

Even though overarching touchpoints can be seen in the current customer journey, the customer journey is considered unique for each user and under constant change. Therefore, when investigating the BEV user desires an exploratory approach was deemed appropriate. Through concept mapping, 70 unique answers to the prompt: "One thing I need to have a hassle-free and enjoyable BEV experience is..." could be derived. These were then divided into eight clusters (see Figure 4.5), which are the result of the aggregation of all BEV user categorisations.

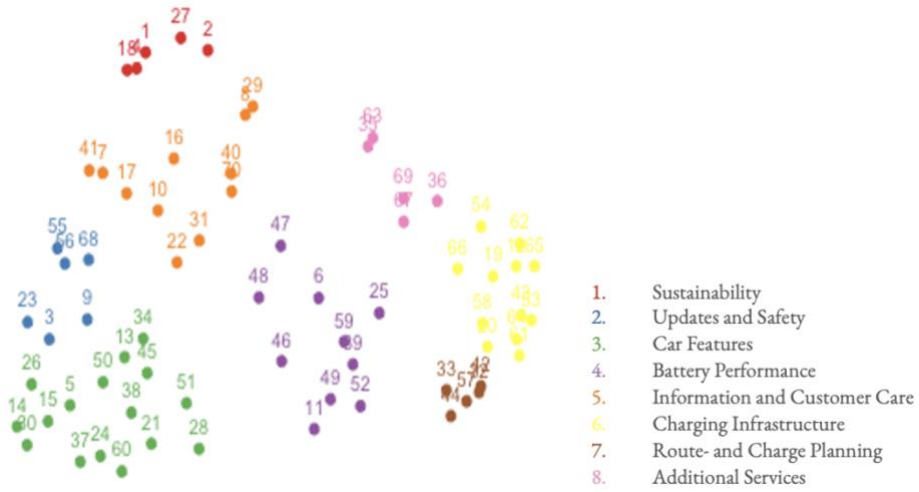

Figure 4.5. Overview of the eight clusters

The choice of categorisation criteria was solely up to the participants and hence their judgments have been present. Therefore, answers may be more, or less, associated with their cluster and can perhaps even be more suitable in other clusters. In the following sections, each cluster will be described in more detail.

4.2.1. Sustainability

The first cluster has been labelled sustainability as the included answers all regard sustainability in some sense. As could be seen in Figure 4.5 this cluster, found in the top corner, is relatively separated from the rest of the answers and this is also clear when viewing the answers in table 4.1. This cluster includes answers related to for instance environmental impact, ethics, and renewability.

Item number	One thing I need to have a hassle-free and enjoyable BEV experience is...
1	That the battery can be recycled
2	That the car runs on renewable electricity
4	That the car and the battery is produced with minimal environmental impact
18	Knowing that the company I buy the vehicle from has control over the whole supply chain, from raw material to delivery
27	An accurate calculation of how the total environmental impact differs between a BEV and an ICEV

Table 4.1. Answers related to Sustainability

4.2.2 Updates and Safety

In the second cluster, two groups of answers can be seen, one with answers related to safety, item 3, 9, and 23, and one regarding OTA, item 55, 56, and 68. Thereby this cluster has been named updates and safety. Looking at Figure 4.5 again, the answers regarding safety seem to be closely related to some of the answers in cluster 3, Car Features, which makes sense since the safety alternatives also have to do with car features.

Item number	One thing I need to have a hassle-free and enjoyable BEV experience is...
3	That the car is top-performing in terms of road safety
9	That I feel safe washing the car as usual
23	A car that is fully developed and not cluttered with technical problems

55	Over-the-air improvements, and not just bug fixes
56	Over-the-air updates to avoid visiting a workshop
68	Clear information about which fixes or new features are included in over-the-air updates

Table 4.2. Answers related to Updates and Safety

4.2.3 Car Features

In the third cluster answers related to both digital features as well as physical features can be seen. This cluster is found in the bottom left corner in Figure 4.5. Answers related to digital features involve features regarding the digital interface such as different applications and infotainment options. On the other hand, answers related to physical features involve more practical solutions such as comfortable seating, storage options, and towing capacity. Physical features can also involve answers related to esthetics such as premium design.

Item number	**One thing I need to have a hassle-free and enjoyable BEV experience is...**
5	That the car quickly warms up during a remote start (~5 min)
13	That my BEV clearly differs from a PHEV outwardly to convey that it is fully electric
14	Avoid interior noise in the cabin
15	That aesthetics and performance are associated with a modern car in the premium segment
21	Good storage option for charging cable in the car
24	A centre display that responds to commands without latency
26	A comfortable sitting environment
28	A charging cable that allows me to park the car in both directions
30	A quiet car without disturbing wind- and road noise
34	More entertainment apps (eg Netflix) that can be used while I charge the car
37	First-class infotainment
38	Confidence that the car works in all climates (cold, heat, snow, rain, etc.)
45	Be able to set a driving mode with less performance and limited power for inexperienced drivers
50	Possibility to tow heavy loads
51	Possibility to control the car through the phone (see charge status, start heater, condition battery, access driver's log, etc.)
60	Fast and stable connection of services (Spotify etc.)

Table 4.3. Answers related to Car Features

4.2.4 Battery Performance

The fourth cluster is widely spread out, as can be seen in Figure 4.5. This also becomes apparent when reading through the answers, which consist of both hardware-related features, information, technical software solutions, and functions affecting battery performance and status. What can be derived from these findings is that customers do care about range, and want to be able to influence the battery performance in different ways. Apart from the battery itself, a few alternatives related to charging are also included in this cluster.

Item number	One thing I need to have a hassle-free and enjoyable BEV experience is...
6	That the car's battery lasts for at least 8 hours
11	That charging speed does not vary with outdoor temperature
25	A function that gives me the possibility to reach my destination by different requirements (as fast as possible, as cheap as possible, etc.)
39	Information in the app about range and charge status
46	Be able to set reduced power to increase mileage on a charge
47	Low and reliable energy consumption
48	Easily accessible information on how I as a driver can influence the car's range
49	At least 80% battery capacity in the car every morning
52	Possibility to schedule when charging will start
59	Smarter pre-heating of the High-voltage battery, for faster charging

Table 4.4. Answers related to Battery Performance

4.2.5 Information and Customer Care

The fifth cluster regards both information and customer care and can be found at the top of Figure 4.5 below the first cluster. On one hand, this cluster regards the user's desire for information and willingness to have control over their BEV and be able to make informed decisions. On the other hand, it also involves answers related to convenient customer care options. Item number 10 stands out in this cluster as it does not quite regard information or customer care but rather is more related to cluster eight, additional services.

Item number	One thing I need to have a hassle-free and enjoyable BEV experience is...
7	That simpler services are performed mobile (maintenance service, change to winter tires, etc.)
8	To have full control over the total cost of ownership
10	To be able to use the car's battery as energy storage, and to be able to use this energy at home when the energy tax is high
16	To be sure that there are no dangerous levels of electromagnetic radiation when I use the car
17	Knowing that there is a service network with trained technicians with knowledge about BEVs
22	Good warranties from the manufacturer if something happens to the car battery
29	An official website with the possibility to ask questions and read answers
31	Simple, convenient and affordable access to battery capacity upgrade
40	Information on how I can affect the state-of-health of the battery
41	No need for service or repairs for my car
70	Knowledge of my battery's state-of-health

Table 4.5. Answers related to Information and Customer Care

4.2.6 Charging Infrastructure

The answers found in cluster six all regards charging, so in that sense, this cluster is very homogenous. However, the alternatives can be categorised further. Users are concerned about both accessibility of chargers, charging speed, and price. Two answers stand out in this cluster, items 20 and 58. Those indeed regard charging, as the cluster name suggests, but the nature of the answers would make them suitable for cluster 7, Route- and charge planning, which is described in section 4.2.7.

Item number	One thing I need to have a hassle-free and enjoyable BEV experience is...
12	That charging is not more expensive than justified by the charging speed
19	Attractive and price-competitive offer for charging network subscriptions
20	Better organisation at charging stations to avoid queuing
43	Be able to charge smoothly when I need to, regardless of whether I'm at home or on the road
53	Possibility to fast charge during longer journeys
54	Possibility to charge the car at home
58	See on the map in real-time which public charging stations are available
61	Faster chargers
62	A more stable price between charging stations

64	Access to destination chargers at e.g. department stores and workplace
65	Access to a charging network where I can charge quickly, easily, and at an affordable price
66	Access to charging station adjacent to inner-city apartment

Table 4.6. Answers related to Charging Infrastructure

4.2.7 Route- and Charge Planning

The seventh cluster can be found in the bottom right corner of Figure 4.5 and include answers related to route- and charge planning. This cluster regards public charging and the desire of creating a seamless charging experience, especially for long-distance journeys.

Item number	**One thing I need to have a hassle-free and enjoyable BEV experience is...**
32	An easy way to know if there is a free charging station when I arrive
33	A way to know in advance how long it will take from the time I arrive at a charging station until I can leave
42	I want a range estimation to be able to make assessments of my planned charging stops when I travel far
44	Be able to trust that my planned charging stops work when I travel far
57	Route-planner connected to the navigation that suggests charging stops

Table 4.7. Answers related to Route- and Charge Planning

4.2.8 Additional Services

The eighth cluster also consists of answers regarding charging. Looking at Figure 4.5 again, those answers can be seen as a vertical extension to cluster six, Charging Infrastructure. These answers do however mainly seem to concern softer values, such as understanding and knowledge, in contrast to the answers in cluster six. If these soft values are the only categorisation criteria, item 67 could be considered an outlier. However, given that knowledge and understanding comes from a provided service, then all answers in cluster eight can be seen as additional services.

Item number	**One thing I need to have a hassle-free and enjoyable BEV experience is...**
35	Understanding of how my infrastructure around home charging should look like
36	Understanding of what it costs to drive my BEV as I charge in public
63	Support from the company when assembling home charging
67	Wireless charging at home

69	The Knowledge that I can get support with charging if I am stranded somewhere with an empty battery

Table 4.8. Answers related to Additional Services

4.3 Empirical Findings Review and Analysis Outlook

The first research step resulted in a map of the current BEV usage phase customer journey, based on interviews with stakeholders and BEV users. Here it was seen that BEV users go through three phases: the learning phase, the routine phase, and the end phase. In each phase, three to four main touchpoints could be seen, including activities controlled by different actors. The second step of the research focused on BEV user desires, and from this step, 70 unique desires were identified. These were later analysed and grouped into eight clusters. Figure 4.6 visualises the empirical findings in the analytical framework presented in section 2.3.2.

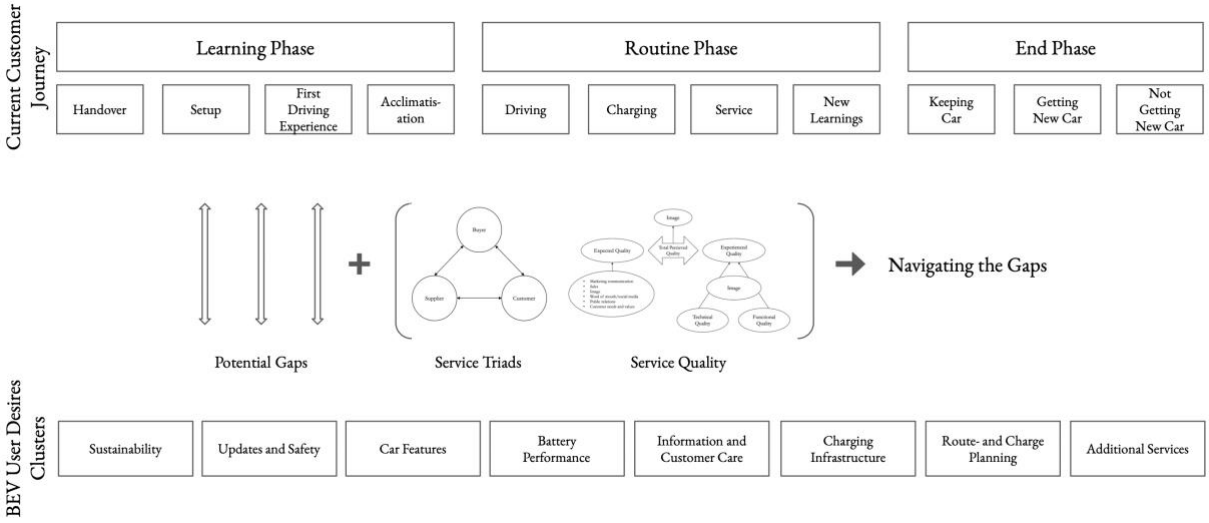

Figure 4.6. Analytical Framework including Current Customer Journey and BEV User Desires

After having identified the customer journey and customer desires, Maechler et al. (2016) suggest that companies should identify and prioritise the most important gaps, and possibilities to improve the journey. The individual desires in each cluster can to an extent already be viewed as gaps as they represent what BEV users need for a hassle-free experience. However, to provide vehicle OEMs with valuable insights on how to enhance the BEV usage phase, focusing on solving individual desires related to one vehicle OEM is considered too specific. The clusters on the other hand, which are categories of the BEV user desires, arguably represent gaps that all vehicle OEMs can address. The next chapter will investigate the nature of the clusters, to see what key gaps can be derived from these.

5. Analysis and Discussion

The following chapter is divided into three sections. First, to answer research question 3a, the clusters derived in section 4.2 will be further synthesised into three key gaps. To answer research question 3a, the second section focuses on how vehicle OEMs can navigate these gaps, utilising theory on service triads and service quality. Lastly, the significance of the research outcome will be discussed.

5.1 Gap Identification

As mentioned above, this section aims at identifying key gaps in the BEV usage phase customer journey. One way of undertaking this task would be to identify which of the user desires do not exist today and their importance to the users. With this information, the desires could later be prioritised, and managerial practices aimed at providing each of the important desires in isolation could be formed. This approach would be in line with how Rosenbaum et al. (2017) suggest that the customer journey map should be used. However, it does not provide guidance on how to fix the root causes of the gaps, which Maechler et al. (2016) means is an important factor when looking to redesign the customer journey. Therefore, instead of highlighting specific user desires and measuring the importance of these, key gaps will be derived by analysing the nature of the eight clusters further (see Figure 5.1).

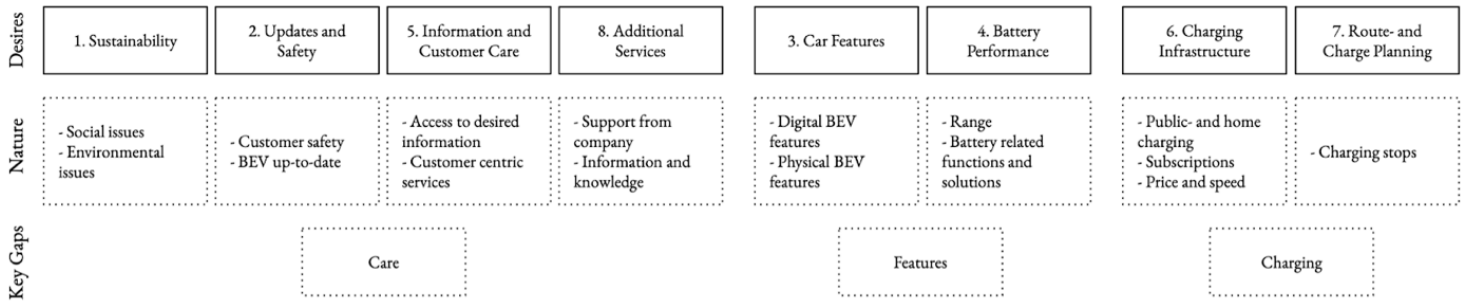

Figure 5.1. Key gap identification

By looking at the individual answers in each cluster and analysing the nature of these it is found that clusters Sustainability, Updates and Safety, Information and Customer Care, Additional Services, all regard *Care* in some sense. Therefore, it is evident that there seems to be a gap regarding care. Moreover, the clusters Car Features, and Battery Performance, both regard physical and digital features related to the BEV, and therefore *Features* can be seen as an overarching gap. Lastly, the

clusters Charging Infrastructure and Route- and Charge Planning both regard charging. Consequently, *Charging* can also be seen as an overarching gap. The clusters that form the gaps can arguably be placed in several gaps, however, these three gaps are still seen to represent the 70 desires presented in section 4.2. Therefore, they are gaps that need to be addressed to create a hassle-free BEV customer journey. Below a brief discussion on each gap is presented.

5.1.1 Charging

Based on the BEV user desires in section 4.2, several improvement areas related to charging are suggested such as, subscription services that offer convenient charging at a stable and affordable price, and an extensive charging network making charging easily accessible, and without long queues. These suggestions indicate the importance of charging as a parameter for enabling a hassle-free BEV experience. When comparing the suggestions from the performed concept mapping to the current customer journey, as presented in section 4.1, many suggestions do not exist today. Specifically, in section 4.1.2.2 several charging implications are lifted related to the above-mentioned suggestions which further strengthens the conclusion that charging is an overarching gap.

5.1.2 Features

The desires also indicate that features in all their forms represent another major parameter that BEV users need for a hassle-free BEV experience. More is desired regarding the digital interface with an improved selection of apps and infotainment options, aesthetics in terms of a design that signals that the vehicle is fully electric, comfort that is at least at par with that of an ICEV, and lastly battery performance in the form of energy consumption and range. Just as in the above-mentioned gap, when comparing these suggestions to the current customer journey as presented in section 4.1 some suggestions regarding for instance comfort have not been brought up as a problem and could therefore be features that already are sufficient. On the other hand, section 4.1.2.1 indicates that users expect a digital interface at par with that of smartphones and that is not necessarily true as of today even if the number of apps available is constantly increasing. Moreover, the current customer journey shows that battery performance is considered lacking when driving longer journeys, indicating that range is an area of development. Consequently, both physical and digital features can be seen as an area of improvement and this suggests that features could be deemed as a key gap as well.

5.1.3 Care

The last major parameter for obtaining a hassle-free BEV experience derived from section 4.2 is Care. Care represents several desires within for instance information and knowledge availability, customer care and maintenance, car updates, safety, and sustainability. In short, these desires represent different services that allow the user to stay informed and make sure the car remains safe and functioning without affecting the users' routines. This implies to a large extent providing service OTA or at the convenience of the user through for instance mobile services when the car is not being used. When comparing this to the current customer journey several insights indicate that many of these options are well on their way. However, many services require users to visit a workshop and many users still experience problems finding the right information due to an information overload as well as a lack of knowledge from dealerships. Hence, this strengthens the assumption that care can be seen as a gap that needs to be addressed.

5.2 Navigating the Gaps

This chapter will investigate how vehicle OEMs can navigate the above-mentioned gaps to create a hassle-free BEV customer journey. By applying the theories of Rogers (2003) to EV adoption it is apparent that EVs are still in the very beginning of the adoption curve as only 4.2 per cent of the global light vehicles sold represent EVs. Rogers's theories also imply that current BEV users can be considered innovators or early adopters but also that the market as such is still relatively small. The fact that the above-mentioned gaps exist can therefore possibly be explained by the fact that the BEV market only represents a small portion of the total vehicle sales. Therefore, there have been low economic incentives to invest in for instance an extensive charging infrastructure, or BEV specific features and care as it is not feasible in the short run.

Considering the S-curve effect as described by Rogers (2003), it can be expected that BEVs soon will reach a point in time where the adoption rate will take off, as the innovation reaches mainstream adoption and the early majority start to transition towards BEVs. This, together with increased regulation of ICEVs, will probably increase the incentives to invest in the BEV ecosystem. However, questions remain about who will be responsible for this development, whether it be vehicle OEMs or other third-party providers. In the following section, service triad theory will be applied to

investigate what actor constellations that exist in each gap, and what role the Vehicle OEM can take. Moreover, service quality theory will be applied to understand how a high total perceived quality within each gap can be achieved. Figure 5.2 shows an adaption of the analytical framework constructed in section 2.3.2, including the identified gaps.

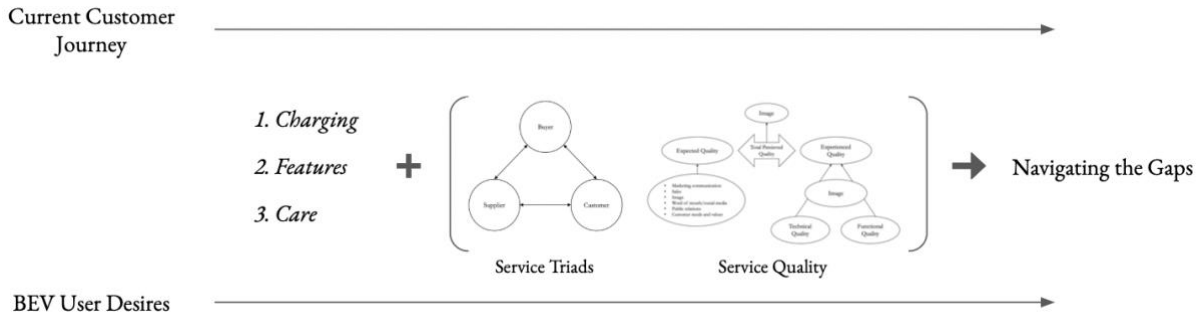

Figure 5.2. Analytical Framework including identified gaps

5.2.1 Navigating Charging

As can be seen in Figure 5.3 the introduction of BEVs has led to a shift in the automotive industry. Traditionally, vehicle OEMs have not been active in the fuel sector as this has been supplied by gas stations, typically owned by large oil companies. Since BEVs run on electricity, the fuel sector is also transforming alongside BEV diffusion. Charging stations for BEVs can be considered a completely new market and this opens new opportunities for entering an otherwise closed sector. As mentioned previously the short-term economic return from entering this market is however quite low, and therefore, some vehicle OEMs have chosen to enter the fuel sector themselves to speed up BEV diffusion.

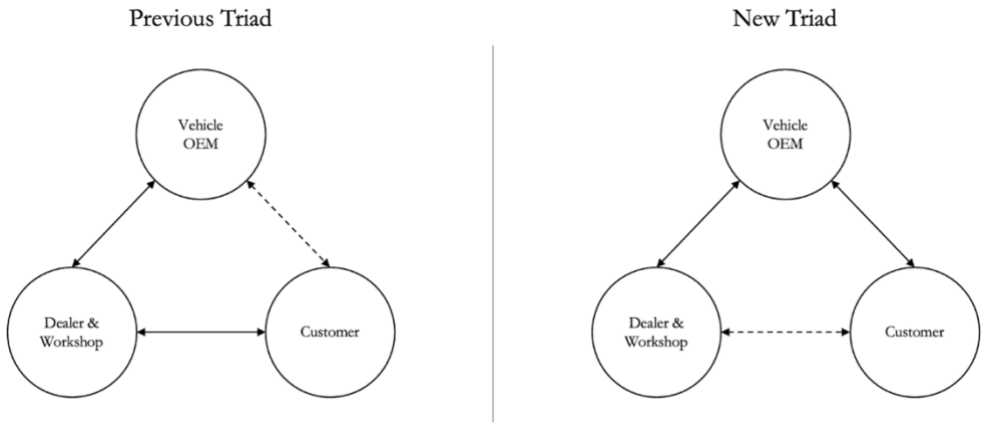

Figure 5.3. Vehicle OEMs enter the fuel sector (the dashed line represents a relationship opportunity)

Entering the fuel sector allows vehicle OEMs more control over the charging touchpoint in the customer journey. Seeing as charging today is seen as a gap, more control could allow Vehicle OEMs to take a more active role in closing the gaps related to charging. Alternatively, a more passive role could be taken where the market eventually would create incentives for other third-party actors to invest in charging infrastructure. This approach allows for less control but could be seen as less of a risk short term. In this scenario, to ensure alignment between BEV user desires and the charging development, strategic alliances and partnerships between vehicle OEMs and other actors interested in entering the market can be beneficial. This would lower the individual economical risk for the involved actors, and at the same time increase the amount and quality of charging options for BEV users.

In terms of service quality, what role Vehicle OEMs choose to take regarding charging will affect their control over the total perceived quality as described by Grönroos (2015). Regarding charging, the empirical findings showed that new BEV users expect public charging to be at least at par with that of an ICEV, which naturally is difficult as these two vehicles have different charging patterns. On the other hand, users that are accustomed to BEVs seem to realise these differences and instead focus on how to make charging as enjoyable as possible. Therefore, to have a high total perceived quality it seems to be important for vehicle OEMs to manage the BEV users' expectations. This could be done by helping them create suitable charging routines and giving them accurate information, explaining the differences between an ICEV and a BEV, preferably early in the customer journey.

Vehicle OEMs who take an active role in the charging gap should also seek to increase the technical and functional quality. Increasing technical quality related to charging could be done through for instance extending the number of public chargers, implying that the user is left with more charging options. Another thing would be to focus on decreasing the time spent related to charging stops. This could be done by for instance increasing the speed of chargers or providing applications that suggest optimal routes and charging stops, decreasing the overall time of longer journeys. Functional quality on the other hand could be increased by improving how the overall charging experience is received. Therefore, decreasing the time spent charging can also be seen as a way of enhancing the functional quality as the service is delivered quickly.

5.2.2 Navigating Features

The features gap is derived from the clusters regarding car features and battery performance. Thereby, the touchpoints in the customer journey that this gap affects are mainly the ones related to driving since the BEV is at the centre. To an extent, it also regards charging, due to the facts that users may utilise in-car applications while charging. Regarding features, vehicle OEMs have always played an important part since they are responsible for developing and producing the vehicle. Historically, vehicle OEMs have been the sole provider of vehicle-related features, but as vehicles are becoming more connected, third party actors can play an important part in providing the users with in-car features, such as infotainment systems and applications. As third-party actors begin developing features that can bring value to BEV users, vehicle OEMs have the option to form partnerships with them. This evolution is visualised in Figure 5.4.

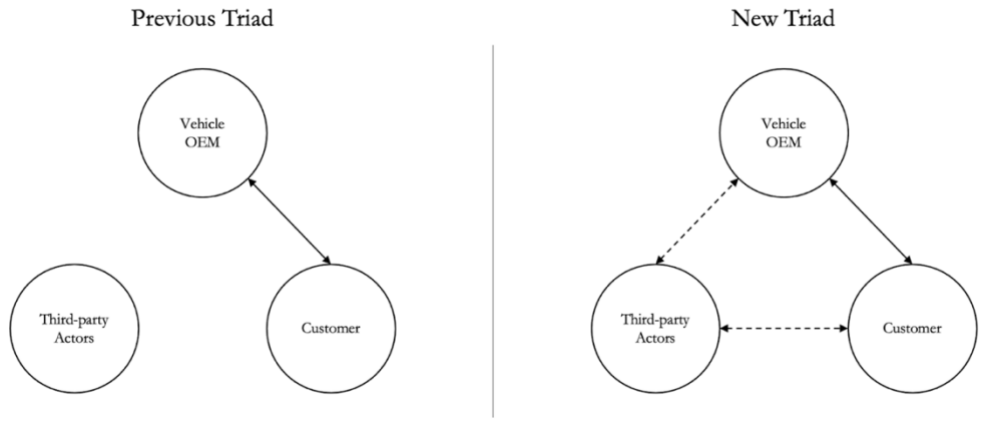

Figure 5.4. Third-party actors become part of feature offering (the dashed line represents a relationship opportunity)

As of today, many vehicle OEMs have partnered with software companies to incorporate operating systems into the vehicle. Since vehicle OEMs can choose their partnerships, they can to an extent affect the functional quality of digital features. However, the software companies providing operating systems often have application stores, where third party actors can provide applications, i.e. digital features. Since these applications are not in direct control of the vehicle OEM, there are risks involved related to digital features that can negatively affect the functional quality. The rapid digital development has increased user demands regarding digital products and interfaces, and it is thereby important to choose these partnerships wisely.

The technical dimension of the experienced quality could be improved by providing additional features to the BEV, that are of importance for the users. What features should be developed could

be derived by investigating how important users consider certain features, and the internal feasibility of developing these. Once the features have been prioritised, a way of ensuring customer satisfaction in the functional quality could be to co-creating the features together with users, i.e. engage customers in the development process of these features.

Looking at the battery-related features, it is evident that not only the BEV vehicle adoption is in an early stage, but also the technological development of batteries. By applying the technological S-curve idea as described by Christensen (1992), it can be seen that the EV battery performance most likely will improve following a similar pattern as that of adoption, with the same input in regards to engineering effort or time. Given this, vehicle OEMs can choose to take different paths. They could wait and see where the development is going, and in turn indirectly affect the technical battery quality by choosing what batteries to incorporate in the cars. Alternatively, they could develop EV batteries internally, which would make them directly responsible for the technical battery quality.

5.2.3 Navigating Care

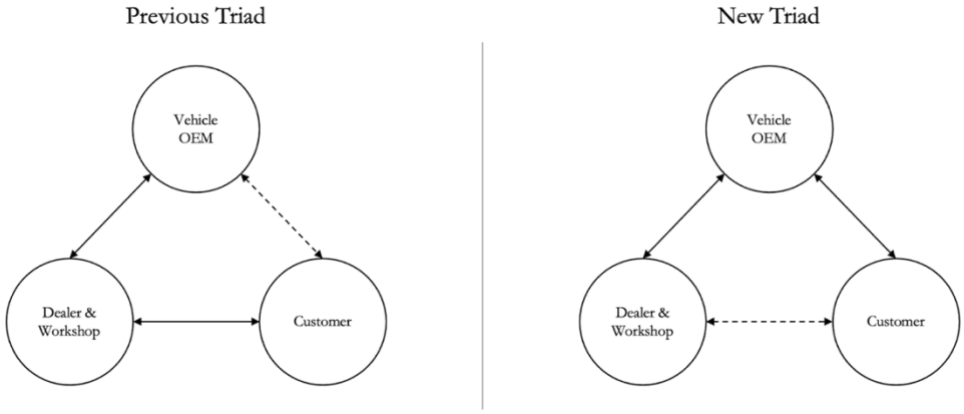

Figure 5.5. Vehicle OEMs take a more direct role in care offering (the dashed line represents a weak relationship)

Many vehicle OEMs are starting to take a more active role in the care offerings related to the vehicle, as more and more services are moved online, and maintenance and upgrades are to a larger extent offered OTA. Figure 5.5 shows how the traditional service triad has shifted as vehicle OEMs are slowly removing the role of dealerships and workshops related to care. This shift, enabled to a large extent by digitalisation, allows the vehicle OEM to utilise the vehicles smart and connected capabilities to predict and adapt their care offering.

To navigate the gap within care, as described in section 5.1.3, vehicle OEMs must utilise their role and comply with the BEV user desires that are yet to be solved. Looking at service quality, vehicle OEMs, given their role, cannot only manage customer expectations but also directly manage the experienced quality. As can be seen in chapter four, BEV users have mainly expressed a desire for more convenient ways of receiving services. Hence, vehicle OEMs should focus on how the service is received, rather than what is received. Therefore, the functional quality is arguably of higher importance when looking to increase the total perceived quality of care. This is further justified by the fact that many BEV users currently view the process of servicing their car as a hassle.

However, certain desired care offerings do not revolve around maintenance and updates but instead knowledge and information. Providing care, in terms of for instance informing users how to optimise their BEVs usage, could be equally as important for achieving a hassle-free BEV customer journey. Here the actual information provided could be seen as the technical quality and therefore providing more desired information is a way of increasing the technical quality of care. The functional quality, in this case, regards how information or knowledge is delivered, i.e. through what means. Here, the vehicle OEMs that can provide information and knowledge in a way that suits the need of each user will achieve high functional quality. Furthermore, providing correct information and knowledge regarding BEVs might also reduce unrealistic expectations which in turn will have a positive effect on the total perceived quality.

5.2.4 Coordinating Navigation

Navigating the gaps of charging, features, and care is essential if vehicle OEMs want to create a hassle-free BEV customer journey. As could be seen above, each gap presents unique possibilities for vehicle OEMs, in terms of what role to take in the actor constellations and how they can provide service value. It is apparent that the charging gap primarily regards the charging touchpoint in the routine phase, and that features are related to the driving touchpoints, both first driving experience but more prominently the driving touchpoint in the routine phase. Further, it is evident that care is more related to the learning- and end phase, and the routine-disrupting touchpoints in the routine phase, i.e. service and new learnings. Even though each gap presents unique challenges, efforts in navigating

the gaps can likely be coordinated to some extent. Figure 5.6 provides an overview of some of the key areas that vehicle OEMs can emphasise when coordinating navigation.

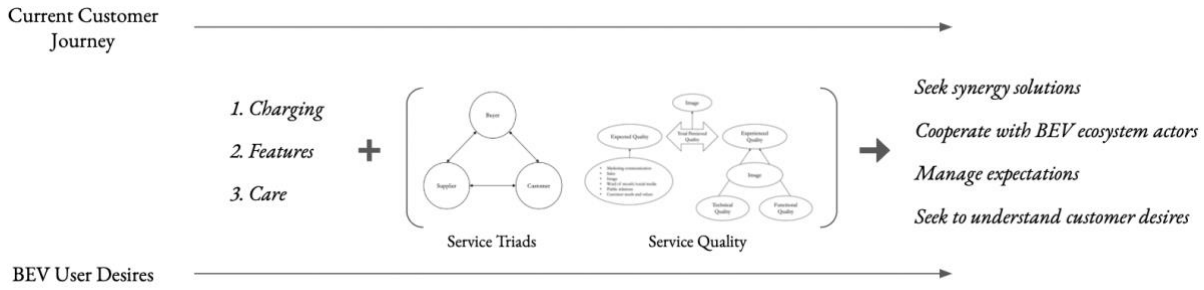

Figure 5.6. Analytical Framework including identified gaps and how vehicle OEMs can coordinate navigation

One way of coordinating efforts would be to seek synergy solutions. For instance, to achieve a high total perceived quality of charging or care, vehicle OEMs can utilise features. The functional quality of charging could be improved by providing a variety of in-car entertainment options. In other words, providing high technical quality in terms of features, i.e. the variety of entertainment options, could solve how the functional quality of charging is delivered, e.g. by looking at a tv show in the car. This would close certain gaps related to charging and features simultaneously. Further, a first-class infotainment system, which is one of the BEV user desires in the car features cluster, could be used to address both the feature and the care gap. If the system is first-class, it implies a high technical quality of features. If it also can provide a first-class information and knowledge sharing system, it would simultaneously solve how information and knowledge are delivered, and in turn, improve the functional quality of care.

It is however clear that vehicle OEMs are just one of many actors involved in the BEV ecosystem. It is also evident that the actor constellations look different depending on the gap, and that the extent to which vehicle OEMs can take an active role in providing experienced quality varies. This means that vehicle OEMs need to manage several partnerships simultaneously, and trust other actors to provide sufficient experienced quality to their users. Further, vehicle OEMs are just one of the actors affecting the expected service quality. Dealership personnel may set high expectations on the BEV experience by saying what the customer wants to hear to make a sale, or a peer may oversell their BEV experience to influence a purchase. This is not under the direct control of the vehicle OEM which presents challenges regarding what is expected by the user. In line with what Finne and Holmström

(2013) suggest, vehicle OEMs should seek to obtain cooperation between all actors involved in the BEV ecosystem, and as a result, improve service quality and align interests of the involved actors.

The same dilemma regarding expected quality can be seen internally, where sales and marketing to an extent are responsible for setting expectations on the BEV experience. However, since sales and marketing are not responsible for delivering the experienced quality in the usage phase, it is of importance for vehicle OEMs to coordinate sales and marketing with the departments delivering experienced service quality. In doing so vehicle OEMs can avoid making overpromises that may result in unmet expectations, inevitably lowering the total perceived quality.

Regardless of how these gaps are viewed, the transition to BEVs presents many challenges for vehicle OEMs. Navigating present and future gaps will not be an easy task and will force many vehicle OEMs to rethink their traditional way of doing business. To survive, vehicle OEMs may have to cooperate with actors within and outside of their industry boundaries, but also align interests internally. Above all, vehicle OEMs should continually seek to understand the desires of their customers and how they, given their role, may work to deliver these desires.

5.3 Research Outcome Discussion

This research has presented a customer journey map of the BEV usage phase as well as BEV user desires divided into eight clusters. These findings are derived from a single vehicle OEM and its customers, but the researchers have attempted to present the findings in a generalisable way. These findings show the customer perspective, both regarding what they currently are experiencing in the usage phase, and what experiences that they desire. Further, in chapter 5 the report has instead taken a vehicle OEM perspective. Building upon theories on service triads and service quality, the researchers have provided suggestions on how vehicle OEMs can navigate three overarching gaps to enhance the BEV usage phase. If vehicle OEMs value these findings, the aim of the report has been fulfilled. In this section, the significance of the research outcome will be discussed.

5.3.1 Customer Journey Identification

The customer journey map clearly highlights some aspects of what is suggested in literature. Dividing the customer journey into phases, as suggested by Rosenbaum et al. (2017) and Lemon and Verhoef

(2016), was a natural step early in the research as it helped the researchers to make sense of the findings from the interviews. Further, the touchpoints in the current customer journey are clearly of different character (Richardson, 2010a), include unique customer activities (Richardson, 2010b), and involve different actors (Lemon & Verhoef, 2016). In this sense, the findings are in line with what can be expected from previous literature. However, since the researchers tried to generalise the findings, some aspects suggested from literature are not included in the proposed customer journey, e.g. managerial practices aimed at improving the customer journey (Rosenbaum et al., 2017). This was however purposely done since the researchers were interested in the nature of the customer journey and how BEV users navigate across the touchpoints, as is suggested by Maechler et al. (2016). By involving managerial practices in the customer journey the map would possibly have been too vehicle OEM specific.

The fact that the current customer journey was constructed based on findings from a single vehicle OEM and its customers has its benefits and weaknesses. Lemon and Verhoef (2016) suggest involving customers in the mapping process, which successfully was done. Five of the interviewees were also BEV users, and out of these, four had a close connection to the vehicle OEM. These interviewees contributed with many of the activities and key insights in the customer journey and understood both the customer- and the vehicle OEM perspective. Undoubtedly, a weakness with trying to draw general conclusions based on these findings is that the data is limited. By involving more BEV users with experiences from different vehicle OEMs the significance of the findings could have been strengthened. Specifically, involving BEV users from vehicle OEMs that have been on the market for a longer time would have strengthened the findings on the end phase. As of now, this phase is more predictive than the learning phase and the routine phase.

5.3.2 User Desires Identification

Initially, research question two was intended to result in an optimal customer journey based on BEV user desires. However, Rosenbaum et al. (2017) stress that assuming all customers experience the same touchpoints prevents improvements of a company's service offering. Moreover, Lemon and Verhoef (2016) state that all-inclusive customer journey maps should be avoided. Therefore, it was decided that creating an optimal desired customer journey would not be beneficial. Furthermore,

Lemon and Verhoef (2016) suggest utilising users when mapping the customer journey through customer self-journey mapping. This involves asking customers to form ideal journeys to improve the understanding of the customers desired journeys. This can clearly be linked to concept mapping where the users were involved in both data collection and analysis.

However, the results generated by concept mapping are not directly linkable to a specific touchpoint. Therefore, it differs from what Maechler et al. (2016) suggest, regarding that companies should identify what their customers need, expect, and desire in each part of the journey. Instead by using concept mapping, a broader perspective has been taken. This has facilitated the analysis in terms of enhancing the customer experience, regardless of which touchpoint it relates to. The researchers have seen that concept mapping as a method has, given a relatively unexamined research area and a relatively small sample size, managed to generate several unique desires. Therefore, the six steps of concept mapping as utilised by Bäckstrand and Halldórsson (2019) are seen as suitable for understanding user desires in a specific context.

5.3.3 Gap Identification and Navigation

To answer research question three, theory on service triads and service quality was applied. These theories have, to the researchers' knowledge, previously not been used in the context of improving a customer journey, especially not in the rapidly changing automotive industry. The basic form of a service triad as represented by Wynstra et al. (2015) was a useful tool to illustrate how actor constellations in the automotive industry have changed as a result of the ongoing transformation trends. Service quality as described by Grönroos (2015) could be used to understand how vehicle OEMs given a certain role in the service triad can affect the perceived quality. By applying these theories to the identified gaps, the researchers found that synergy effects could be achieved, meaning that desires related to different gaps could be solved simultaneously. Consequently, these theories were shown to be appropriate for examining customer experience as it relates to how vehicle OEMs can enhance the customer experience given their role and their ability to affect the perceived service quality.

6. Conclusions

This study aimed to provide vehicle OEMs with valuable insights that can help them understand and enhance the BEV usage phase experience for their customers. It was thereby deemed appropriate to research the current BEV usage phase customer journey, to get an understanding of the key touchpoints that are experienced by BEV users today. Thereafter, to understand what users need for a hassle-free customer journey, BEV user desires were sought. Lastly, based on these findings, the researchers wanted to derive potential gaps, and investigate how vehicle OEMs can navigate these gaps to enhance the customer experience. By interviewing stakeholders at a vehicle OEM currently transitioning from ICEVs to BEVs, performing a concept mapping with BEV users, and talking to industry experts, the following could be concluded.

First, it is evident that the current BEV usage phase customer journey can be categorised into sub-phases that are characterised by when in time they appear, and what key touchpoints are involved. Those phases were named *Learning Phase*, *Routine Phase*, and *End Phase*. Moreover, unique activities and actors involved in each touchpoint were identified and key insights could be derived. Secondly, through concept mapping it was found that BEV user desires could be classified into eight clusters representing areas of importance for a hassle-free customer journey: (1) *Sustainability*, (2) *Updates and Safety*, (3) *Car Features*, (4) *Battery Performance*, (5) *Information and Customer Care*, (6) *Charging Infrastructure*, (7) *Route- and Charge Planning*, and (8) *Additional Services*. Thirdly, by further analysing these clusters, it was found that three overarching gaps between the current journey and BEV user desires exist, namely *Charging*, *Features*, and *Care.* By utilising the theoretical framework, with a focus on Service Triads and Service Quality, the researchers could discuss potential ways of navigating these three gaps to enhance the customer experience. Here, it was concluded that vehicle OEMs continually should work to understand the desires of their users and that they should investigate what role they can take in delivering these desires.

6.1 Managerial Implications

The findings on the current customer journey are mainly derived from a single case study. However, the level of abstraction in the customer journey map is high, making it easy to adapt the activities, actors, and insights regarding certain touchpoints to better represent customer journeys of other vehicle OEMs. This is also applicable as the customer journey changes since the touchpoints will most likely stay the same, while specific activities or actors may be modified. Further, the customer journey map could be extended with more customer feedback on each touchpoint, resulting in a better understanding of the user experience. This could be done through a quantitative survey, providing representative data, or through an empathy mapping workshop with BEV users, to get a deeper understanding of what users say, think, do, and feel during the usage phase.

Regarding the user desires, before deciding on what to pursue, vehicle OEMs would benefit from investigating how important these desires are for their customers, as well as how easily each user desire can be delivered. This could for instance be done by performing customer surveys asking BEV users to order the desires by importance, and by internally assessing the resources and capabilities of the firm to see what desires are feasible. Here, desires that are important for BEV users and easy to deliver for the vehicle OEM should be prioritised. Desires that are important for users, but not aligned with the vehicle OEMs internal resources and capabilities, can preferably be solved through partnerships.

Lastly, vehicle OEMs providing BEVs need to investigate what role they can take in the BEV ecosystem. The discussion regarding the gaps of charging, features, and care, identified in the last research step, emphasise areas of importance and how different parts of the business can be adapted. Vehicle OEMs can choose to take an active role in affecting the experienced service quality in one of the gaps and decide to manage expectations in another. Again, this depends on how the vehicle OEM wants, and is able, to position itself in the BEV ecosystem. Further, vehicle OEMs should try to manage both external actors, and internal departments, to make sure they do not promise more than what can be delivered. Setting high expectations can certainly be an effective way of attracting customers and increase short-term sales. However, vehicle OEMs could perhaps benefit more from setting lower expectations with the possibility of overdelivering, since that would result in more satisfied customers, consequently creating customer loyalty.

6.2 Future Research

Previous research on the BEV usage phase customer journey is limited. Therefore, this thesis has aimed to provide vehicle OEMs with valuable insights that can help them understand and enhance the BEV usage phase experience for their customers. The outcome is a BEV usage phase customer journey map, BEV user desires clusters, three key gaps derived from the clusters, and suggestions on how these gaps can be navigated by vehicle OEMs. As the industry is rapidly changing, it is suggested to revisit this topic as technological development and BEV diffusion may imply new findings.

As this report focuses solely on how vehicle OEMs can enhance the BEV usage phase, further research is suggested that can extend this research with perspectives of other actors in the BEV ecosystem. Moreover, this research has been conducted in collaboration with a single vehicle OEM and the researchers have attempted to generalise the outcome to represent the automotive industry. Further research that includes perspectives from multiple vehicle OEMs and their customers could result in findings that are naturally representative for the industry.

Further, the findings on the current customer journey are overarching. However, the activities in each touchpoint are more complex than what this research shows. Therefore, it could be interesting to delve deeper into each touchpoint to gain a better understanding. Regarding BEV user desires, concept mapping was used to ask what BEV users need for a hassle-free usage phase, from handover to disposal. Hence, the resulting user desires are not linkable to specific touchpoints in the customer journey without researcher interpretation. To provide suggestions that are directly linkable to a touchpoint, concept mapping could be applied with a narrower focus on that specific touchpoint.

Furthermore, this research has provided suggestions on how vehicle OEMs can enhance the BEV customer journey using theory on service triads and service quality. Service triads theory was used to illustrate how the actor constellation in each gap has changed as the result of the automotive industry transformation. However, the current customer journey presents varying actor constellations in each touchpoint. Further research could potentially utilise service triads theory to analyse what role vehicle OEMs can take in each touchpoint, rather than in each key gap identified in this research. Lastly, to test the validity of the analysis method as well as the research outcome, further research applying the theories of service triads and service quality to similar contexts is suggested.

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Appendix A

Interviews

A.1 Interview Subjects

	Date	Actor type	Role	Duration (hh:mm)
1	2021-02-04	Vehicle OEM employee	Consumer Insights Manager	00:50
2	2021-02-17	Vehicle OEM employee	Battery Strategy Manager	00:58
3	2021-02-18	Vehicle OEM employee	Program Manager	00:56
4	2021-02-24	Vehicle OEM employee	External Consultant	01:08
5	2021-03-01	Vehicle OEM employee	Head of Department	00:52
6	2021-03-02	Vehicle OEM employee / BEV user	Senior Director	01:03
7	2021-03-04	Dealership / BEV user	Chief Commercial Officer	00:45
7	2021-03-04	Dealership	Business Development	00:45
8	2021-03-04	Former vehicle OEM employee / BEV user	Program Manager	01:24
9	2021-03-16	Vehicle OEM employee	Strategy Manager	00:55
10	2021-03-17	Vehicle OEM employee / BEV user	Director	00:54
11	2021-03-30	Vehicle OEM employee	Project Manager	00:53
12	2021-03-30	Vehicle OEM employee	Business Development Manager	00:51
13	2021-04-06	Researcher / BEV user	Industry Expert	00:55

Table A.1. Overview of interviewees

A.2 Interview Template

Purpose

The purpose of this study is to explore the Battery Electric Vehicle (BEV) customer journey from handover to end of life, highlight user desires, as well as identify ways to close the gaps between the current and desired BEV customer journey. With this interview, the goal is to get an understanding of what has already been done internally regarding the customer experience and get a better understanding of the customer journey as of today.

Anonymity

Complete anonymity is guaranteed in this interview; hence it will not be possible to connect the contents of this interview to your name. Neither will it be possible to link your name with the results or reports that will be published at the end of this study, not internally at your organization nor publicly in the report published by Chalmers University of Technology.

Recording

To make the information gathering process more efficient and to minimize the risk for factual errors, we kindly ask you to allow us to record the interview conversation. Please let us know if this is a problem.

Below you will find a conceptual model and on the next page interview guide.

One of our goals is to create a map of the current BEV customer journey

Topics of interest:
- Service points
- Actors involved
- Other important activities and/or incidents

We also aim to understand:
- How the BEV customer journey differs from the "traditional" aftermarket customer journey
- What challenges that are involved with the BEV customer journey

Questions

I: Gain an understanding of the interviewee and his/her position

- Could you please introduce yourselves and your background?
- Could you please describe your position and role at the company?

II: Gain an understanding of the importance of mapping the BEV customer journey

- Could you briefly describe your understanding of the customer journey as a concept?
- Have you dealt with any customer journey mapping activities?
    - What has been done?
    - How has it been done?
- In what ways could a better understanding of the BEV customer journey impact the organization?
    - What are the challenges involved in mapping the BEV customer journey?

III: Gain an understanding of the current BEV customer journey from handover to end-of-life

- What trends can be seen regarding aftermarket services in the automotive industry?
- Could you describe your view of the touchpoints involved in the BEV ownership experience?
    - What is unique about the BEV customer journey compared to that of ICEV?
    - What do you believe are the main BEV customer concerns?
    - What do you believe are the main benefits for BEV customers?
    - What actors are involved in the different touchpoints?
- How are the touchpoints affected by a subscription/leasing alternative?

IV: Other topics that the interviewee finds relevant

- Is there anything else you wish to share with us related to this topic?

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