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Doctorate in Business Administration



DOCTORAL THESIS

A Business Model for the Automotive Tier-1 Supplier Industry:

New Propulsion Technologies in Germany

- A Case Study -

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Abstract

The German automotive industry faces major changes in the coming decades as a result of new propulsion developments driven by stricter government regulations towards cleaner emissions. Many industry reports indicate a technology shift that questions the success of tier-1 suppliers with regard to the competitiveness of existing business models. Therefore, the questions that arise are related to alternative propulsion technologies, including a unique value proposition in the domain of e-mobility, the character of a competitive business model, and the most appropriate approach to change by concerned players. The research aims to identify a revised business model for tier-1 suppliers as a reaction to the pressure for change created by technological progress.

This research reveals that within current business models the classic value creation process from supplier to customer is still predominantly used. Therefore, the static business model canvas has been set as the focal point to analyse its contemporary application. A business model that is flexible and dynamic, designed to cope with requirements in a value constellation process within e-mobility has instead been subject to rather limited consideration.

The research design is primarily aligned with a value proposition and the 'blocks' of the business model canvas. Due to the unknown product requirements in an uncertain business environment, a novel evaluation process that identifies the importance levels of each canvas block helps to validate the current business models in place. In this way, the qualitative case study builds upon a triangulation method in which data from diverse sources, such as tier-1 suppliers, a university, and consultants, are used in the primary research.

The findings suggest that concerned tier-1 suppliers approach new business opportunities that create unknown customer demands. By taking into account advanced knowledge in Information and Communication Technology (ICT), a unique value proposition makes decisions about the structure of managerial tools and the usage of the other canvas blocks. Indeed, the thesis offers several proposals as to how a tier-1 supplier's organisation can become a flexible and dynamic player in the domain of alternative propulsion systems.

Keywords: Business model canvas, Tier-1 supplier industry, German automotive industry, Value proposition, Key resources, Key activities, Key partnerships, Customer segments, Channels, Customer relationships, Value constellation, Importance level, Strategy, Change, Business model innovation, Business model matrix, Research design, Blue ocean, Red ocean, Ambidextrous approach, Qualitative case study, Constructionist, Triangulation method, Data analysis and interpretation, Data validation and reliability, Generalisability.

Declaration of Original Content

I declare that the work in this thesis was carried out in accordance with the regulations of the University of Gloucestershire and is original except where indicated by specific reference in the text. No part of the thesis has been submitted as part of any other academic award. The thesis has not been presented to any other education institution in the United Kingdom or overseas.

Any views expressed in the thesis are those of the author and in no way represent those of the University.

Signed:

Michael Aberham

Date: 30.04.2018

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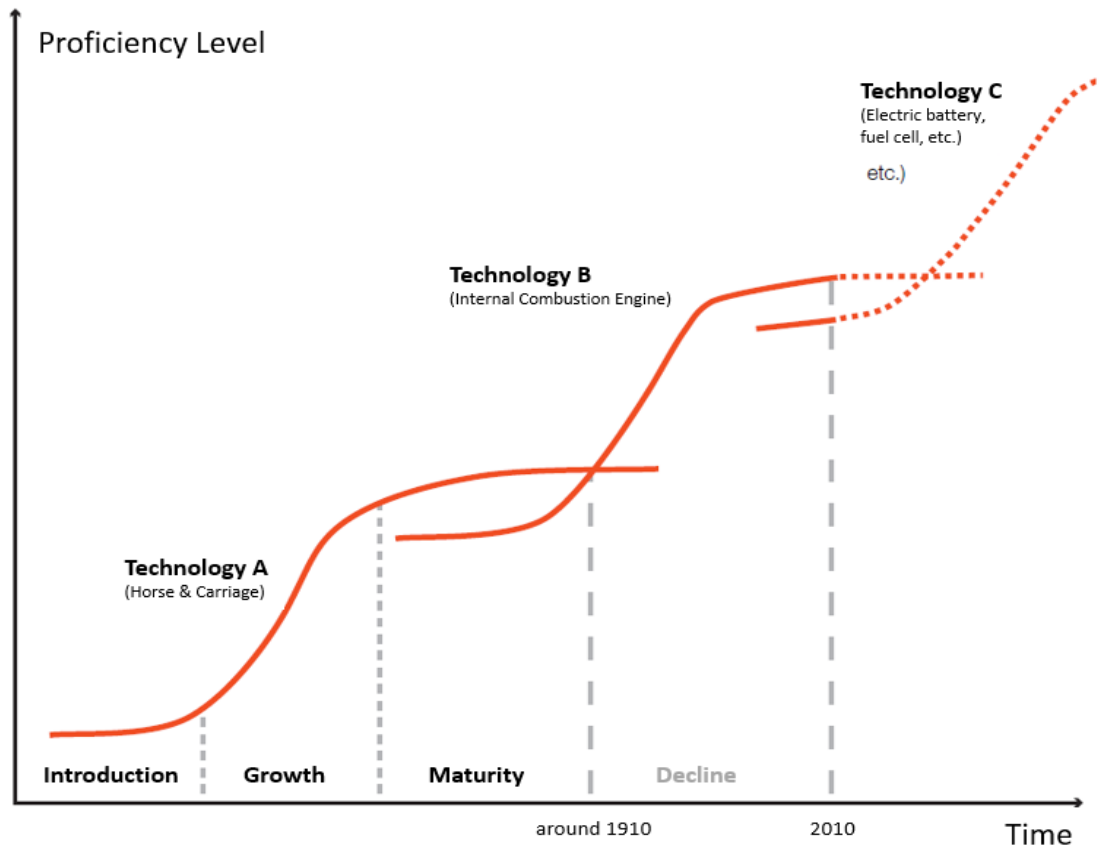
Abbreviations

- (ADAS) Advanced driver-assistance systems
- (ALS) Action learning set
- (BeP) Better Place
- (B2O) Build-to-Order
- (B2S) Build-to-Stock
- (B2B) Business-to-Business
- (B2C) Business-to-Consumer
- (DBA CL) DBA Cover Letter
- (DBA IG) DBA Interview Guide
- (DBA IP) DBA Interview Protocol
- (DBA NDA) DBA Non-disclosure Agreement
- (EV) Electric Vehicle
- (EY) Ernst & Young
- (EU) European Union
- (GTAI) Germany Trade and Invest
- (ICT) Information and Communication Technology
- (ICE) Internal Combustion Engine
- (M&A) Merger & Acquisition
- (OpEx) Operational Excellence
- (OEM) Original Equipment Manufacturer
- (R&D) Research and Development
- (TCO) Total Cost of Ownership
- (VDA) Association of the German Automotive Industry
- (V2G) Vehicle-to-Grid
- (VoC) Voice of Customer
- (USP) Unique Selling Proposition

Chapter 1 Thesis Introduction

The German automotive industry faces big challenges in the coming decades and has already entered a new era. The industry is undergoing a similar change to that previously experienced by the transformation from the carriage to the car around 1910, as depicted in figure 1.1 (Lohmann, 2009).

Figure 1.1: Propulsion technology cycle in the automotive industry



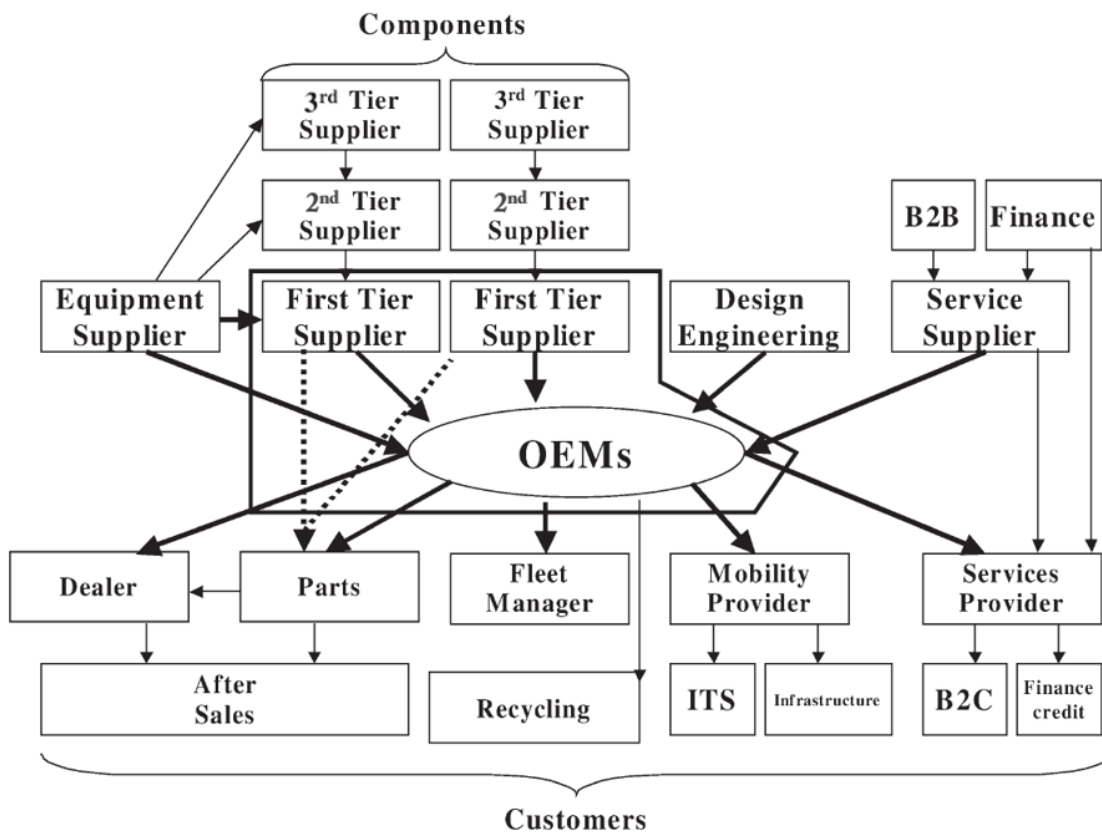
Source: Lohmann (2009)

Lohmann further comments that every product undergoes a natural product life cycle, which takes the form of introduction, growth, maturity, and decline and is mainly originated from technological innovation. Older technologies, such as, the internal combustion engine (ICE), will be replaced by newer ones like electric motors or fuel cell technology.

Current relationships between Original Equipment Manufacturers' and tier-1 suppliers

Over the past number of decades, vehicles have been predominantly manufactured by the Original Equipment Manufacturer' (OEM) in-house, "since they preferred to manufacture a great share of their components themselves" (Volpato, 2004 p. 168). At this time, the design of the ICE was simple and therefore required only a few competencies. However, due to ongoing innovation, stronger competition, and growing customer demands, the ICE has continuously improved its performance and been additionally equipped with increasingly supportive components. "As a matter of fact, the component supply chain has been under pressure for about a decade ..." (Volpato, 2004 p. 171). Under such technological developments, the complexity of the ICE grew steadily so that the OEMs were forced to outsource components to suppliers. Increasing price pressure among OEMs, special technology functions, and cost reductions of components served to ignite the customised supplier industry (Volpato, 2004, p. 171), as depicted in figure 1.2.

Figure 1.2: The European automotive system



Source: Volpato (2004)

Based on Volpato's model and Linton's 2016 description, the supplier industry has been structured into three main levels. A tier-1 supplier delivers to the OEM complete manufactured and assembled components at the optimum time. In such a B2B relationship, the OEM assembles these specialised parts in order to successfully produce a functional ICE. Tier-2 suppliers, which provide parts to the tier-1 suppliers, have less dependency on tier-1 suppliers due to the fact that their broader product spectrum is also required for other applications. They can deliver to tier-1 suppliers, for instance, standardised and supportive components such as tools, adapters, and other small parts that can also be used in other industries. By the same downstream logic, the third tier level can supply raw materials, screws, and all the necessary small parts required by customers to produce those standardised and supportive components. At this level, the products are no longer complex anymore and are used in many other industries.

As such, the more the products are applicable to different customers and the less complexity required, the greater the likelihood of the supplier achieving independence. Hence, OEMs have been interested in developing a kind of partnership with the tier-1 supplier due to its credibility, commitment, skills, and competencies in supplying critical components as precisely as possible and on time (Linton, 2016).

Consequently, both evolved and current relationships between OEMs and tier-1 suppliers have been based on price and volume agreements, enabling suppliers to operate in a predictable and safe business environment. However, such dependence on OEMs relegates to the background other capabilities (such as their limited entrepreneurial skills and strategic direction) that could be aimed at other business fields.

The introductory chapter will outline the contextual background of the thesis. It leads to the research problem, aim, and questions in order to develop a framework against which the business models of tier-1 suppliers can be judged in relation to their competitiveness in this new world of low emissions. It delivers then an overview of the theoretical gap in the literature and the empirical gap in practice, thus demonstrating the significance of the study.

The initial section focuses mainly on change within the automotive industry in Germany and reflects the current developments at a macroeconomic level. It provides an overview of external forces that influence carmakers' business models within this industry. Based

on recent news (Fraunhofer, 2015; Presse- und Informationsamt der Bundesregierung, 2012; dpa, 2014) categories such as environmental awareness, political targets, car drivers' lifestyle behaviours, and new propulsion technologies have been identified as triggering change.

Next, the automotive tier-1 supplier industry in Germany will be reviewed in terms of its current business environments. A tier-1 supplier delivers in the first supplier position specific parts to the OEM as, for instance, cylinder heads that are needed to assemble an engine at the OEM. Indeed, a technical overview about the initial development of ICE has illustrated the technical complexity and limitation of ICE propulsion systems.

The last part of this section will describe the influence of such relationships to the business models of tier-1 suppliers. It points to the scope of actions available to suppliers, and the difficulty for business models to ensure sustainability in such a fierce business environment. Furthermore, it discusses current tier-1 suppliers' business models with known and expected trends. In the light of such trends, the business models will be compared with the requirements arising from new market demands. Therefore, Osterwalder and Pigneur's (2010) business model canvas with its nine elements enables the evaluation of a business model in place. In this context, the case of the Better Place (BeP) model – the failed endeavour to change the current propulsion system - provides an idea of what could happen when business model elements are not evaluated with respect to market demands.

Based on the previously described procedure, the second section defines a vital part of the thesis. It proposes the research aim and questions that, in the third section, lead to the approach to knowledge contribution.

The last section of the introductory chapter ends with an overview of the thesis. It outlines the research approach and the dissertation structure.

1.1 Contextual background

1.1.1 Drivers for change in the automotive industry

In the process of change, some scholars have grouped the external forces that trigger the change process by different categories under the mnemonics PEST, as provided by Johnson and Scholes (1999) and STEP and put forward by Goodman (1995). The abbreviation stands for political, economic, socio-cultural, and technological factors that influence organisations' structures, strategies, and operational frameworks, thus their business models (Senior and Fleming, 2006). Although scholars have offered an additional mnemonic, such as PESTLE, which was extended by 'legal and environment', the following forces, however, were allocated only in the PEST categories to simplify the later overview.

The economic force considers the impact of the greenhouse effect that has in turn led to environmental regulation. Further, it reflects the impact of globalisation and the approaches of nations toward environmentally friendly energies. As a result of this background, the political axis has demonstrated how the stipulated regulations introduced by the EU could influence the automotive industry.

On the other hand, the socio-cultural dimension indicates a trend towards a mobility influenced by car drivers' lifestyle behaviours. Improved connectivity between users as a result of the dominance of the internet and social networks has led to changing demands. The technological factor describes mainly new propulsion developments offered by new and existing players. While each category is comprised of more influencing factors, as described, this section highlights the most dominant ones.

Global environmental pollution

Based on Ball and Wietschel (2009), the exploitation of natural resources to support the increasing demand for energy and the transport system can be in no way sustainable. The International Energy Agency has predicted that due to the economic growth of nations like Asia and South America, the global demand for energy is expected to rise up by at least 50% until 2030. This could lead to a dangerous acceleration of greenhouse gas emissions caused by human activities, especially the burning of fossil fuels, livestock farming, and forest clearance (IPCC, 2007). In fact, such activities intensified an unpredictable climate change. In this vein, Chen (2008) argues that the pursuit of a green

management containing 'green marketing, green production, and green innovation' is necessary in order to increase international environmental regulations.

As a consequence, industrial nations are striving for common global environmental regulations. An established convention has been the framework agreement about climate change of the United Nations - the Kyoto Protocol (named after the first location of the conference in Kyoto/Japan in 1997). It regulated the allowed emission amount of each nation by mandatory target values (Hansen et al., 2005). By 2012, 191 nations, inclusive of the EU, had agreed to reduce emissions on average by 5.2% against the measured value from 1990. Based on the UNFCCC (2012) evaluation, the EU had lowered its emissions in 2010 by 15.4% while Germany had achieved a reduction of 24.8%. These figures indicate a tendency towards further emission reduction, thus to environmentally-friendly energies, which was mainly driven by the Kyoto protocol and EU policy.

European Union (EU) regulations

Apart from the regulations laid out in the Kyoto protocol (European Commission, 2016), the EU has set itself three main climate and energy targets by 2020. The first is to reduce greenhouse emissions by 20%, increase renewable energy by 20%, and improve energy efficiency by the same percentage. In order to reduce greenhouse emissions by 20%, the EU claimed in the category about 'CO₂ emission reduction from passenger cars' that "cars are responsible for around 12% of total EU emissions of carbon dioxide (CO₂), the main greenhouse gas".

Therefore, as published in the web site 'climate strategies and targets, the European Commission's emission target of all new manufactured cars in 2015 has been set to 130 grams of CO₂ per kilometre (g CO₂/km), while the subsequent goal has been defined as 95g CO₂/km by 2021. As CO₂ emissions are directly dependent on fuel consumption, car manufacturers have already been forced to ensure a petrol consumption of around 5.6 litres per 100 km (l/100 km), and diesel of 4.9 l/100 km. However, with regard to the 2021 target, petrol consumption should be less than 4.1 l/100 km, while a diesel car shall not exceed 3.6 l/100 km.

In order to force the automotive industry to follow these regulations, the EU has announced strict penalties to manufacturers per car sold if emissions are exceeded. On

the other hand, incentives and special credits for car drivers are intended to support car regulations as well (European Commission, 2016).

This political axis demonstrates that the EU has strictly aimed to further reduce emission pollution. However, the arising challenges and technical limitations, with which the automotive manufacturers must cope, will be discussed later in this chapter.

Car driver mobility behaviour

Based on Kaas et al. (2016), car driver mobility behaviour has changed to sharing their commute with others and customising mobility solutions. Due to increasing transportation hindrances, including limited parking lots, time limitations, and stricter environmental regulations, drivers tend to use cars as ‘all-purpose’ vehicles, especially in dense urban environments. This can lead to an increase in standardised fleet vehicles while reducing private car use. Further, technical vehicular innovations that connect users via smartphones and the internet provide a sharing service of available vehicles on offer to commuters, which is individualistic. With continued development towards autonomous and driverless vehicles, a new freedom could emerge, enabling customers who access such shared mobility the advantage of having less responsibility, greater flexibility, more time and, thus, an improved lifestyle (Choi et al., 2016).

In consideration of such trends, the additional requirements of expected mobility have changed the sphere for carmakers. Currently, a car designed for private use is still perceived as a status symbol that expresses the owner’s individual lifestyle, whereas the shift to shared mobility “will lead to new segments of specialized vehicles designed for very specific needs ... high utilization, robustness, additional mileage and passenger comfort” (Kaas et al., 2016, p. 8-9). This suggests that carmakers will no longer target diverse customer segments, but rather that simplified, reliable, and low emission vehicle concepts will play an important role in their strategies.

Development of new propulsion technologies

Di Bitonto (2015) argues that the requirement for alternative propulsion systems is the outcome of enhanced environmental awareness, rising fuel prices, and more strict CO₂ regulations for new vehicles. Although recent publications have not displayed a clear direction towards a predominant propulsion system, several developments, like hybrid

(petrol/electric), fuel cell (hydrogen), bioethanol (bio-petrol), and electric (battery) versions are reducing the market share of ICE's (Emadi et al., 2008).

According to Breitingner and Schwarzer (2015), incumbent German car manufacturers such as VW, Daimler, and BMW have pursued different strategies. VW performs the 'follower strategy' and, instead of the ICE, installs a battery in its well-known and popular Golf model, which is named the 'e-Golf'. In contrast, Daimler has developed the fuel cell as its primary drive system. However, more recently it has abandoned the fuel cell development programme and decided to predominantly offer models that are plug-in-hybrids and contain partly electric batteries. Another direction has been taken by BMW in its approach to the electrification of its fleet. It has introduced a modern car design that is also equipped with a battery, known as the model i3. Partly plug-in-hybrids have been designed for the other versions.

Interestingly, propulsion system developments in Germany have not been clearly determined on one definitive direction or one single technology. These rather indicate that strong efforts are being made and different approaches chosen towards environmentally friendly technologies.

Overview

Some may argue that changes made within the automotive industry are mainly due to global climate awareness, stricter policy regulations, different lifestyle behaviours, or technological innovation within such a new market. However, current discussions have shown that some important forces have direct or indirect impacts to initiate change within the automotive industry. Figure 1.3 presents a comprehensive overview to highlight the change factors.

Figure 1.3: PEST forces of change in the automotive industry in Germany

<p style="text-align: center;"><u>Political/Legal</u></p> <ul style="list-style-type: none"> • EU legislation for all EU nations • Germany's emission contract with the EU • Strict penalties for carmakers • Incentives and special credits for consumers • Climate and energy targets 	<p style="text-align: center;"><u>Economic/Environment</u></p> <ul style="list-style-type: none"> • Convention of Kyoto Protocol • Reduction greenhouse emissions by 20% • Generate 20% renewable energy • Improve energy efficiency by 20% • Reduction of CO₂ to 95g/km in 2020
<p style="text-align: center;"><u>Socio-Cultural</u></p> <ul style="list-style-type: none"> • Shared vehicles/customised mobility solutions • Increasing transportation limitations • Progression to autonomous and driverless cars • Better connection via internet/smartphones • From status symbol to pure transportation 	<p style="text-align: center;"><u>Technological</u></p> <ul style="list-style-type: none"> • Adhering to strict emission regulations • Impact of ICE technical limitations • Electric battery, fuel cells, hybrid, plug-in-hybrid, ICE propulsion systems • Diverse strategies e.g. Follower, Changer, or Active designer to place new technologies

Source: Author's own construction

Arguably, the identified forces have been challenging the current business models in the German automotive industry. Based on the cited examples relating to the strategies employed by carmakers, a propulsion system that clearly dominates the new market has not yet been recognised. Instead, the awareness that change could occur as a result of environmental regulations ought to be a warning to concerned carmakers and tier-1 suppliers in order that they react in time.

1.1.2 The automotive tier-1 supplier industry

In 1886, the first car with an ICE was manufactured by Carl Benz, subsequently seen as the hour of birth of the German automotive industry. The ICE transformed chemical energy into mechanical work by igniting an internal mixture of fuel and air. The internal explosion within the engine cylinder pushes the piston to its end position and in so doing this mechanical movement can be used to drive the car (Trommelmans, 1992). Since that time, a strong supplier industry has evolved to become the backbone of the German economy. In 2014, suppliers of Original Equipment Manufacturer (OEM) generated a

turnover of €73 billion of a total €384 billion revenue in the automotive industry (Di Bitonto, 2015).

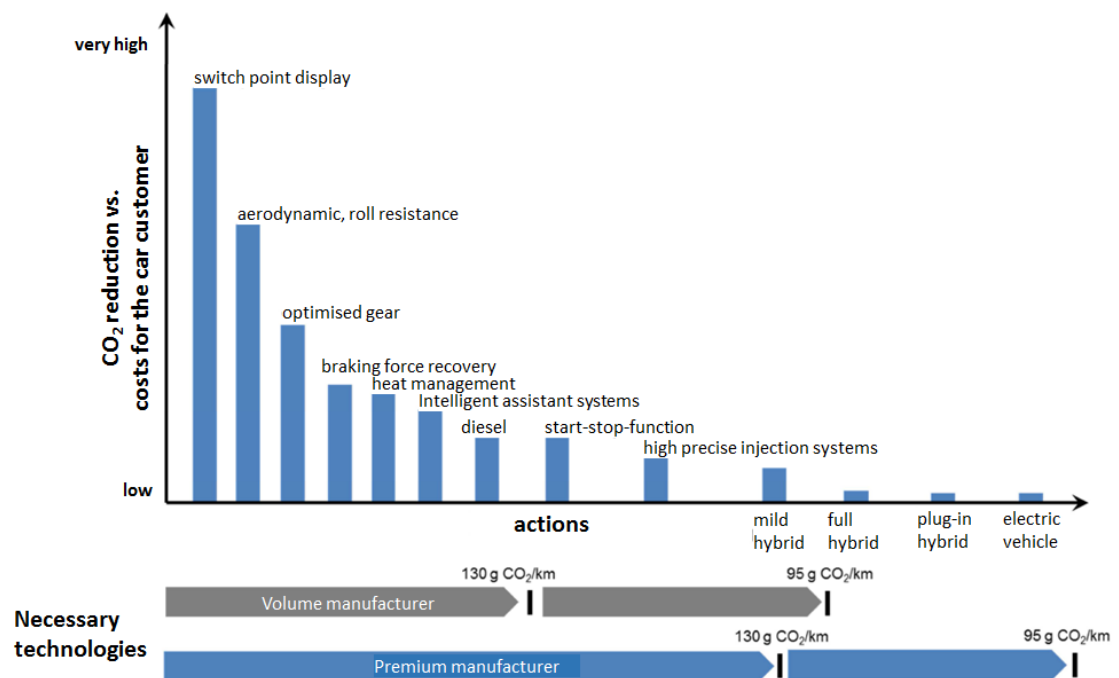
This sub-section describes the technical limitations of ICE in respect to EU demands. It further investigates the efforts needed to improve ICEs in order to compete with arising alternative technologies relating to their economic benefits.

Limitations of internal combustion engines (ICE)

As mentioned by the European Commission (2016), to achieve the agreed target of 95g CO₂/km by 2021, the ICE must not consume more petrol than 4.1 l/100 km, while a diesel car should not exceed 3.6 l/100 km. Such objectives require further technological developments to reduce the fuel consumption of ICE at an equal or increased efficiency of the propulsion system. Innovations such as switch point display, aerodynamic design, roll resistance, etc. have been feasible improvements to save fuel, however, it is a highly capital-intensive endeavour (McKinsey and Company, 2009).

Although some studies (such as that by Velji et al., 2010) suggest that the ICE could have further huge potential to reduce its fuel consumption, thus extending its future, the ongoing intensification of emissions regulation would disproportionately increase development costs (Puls, 2013). Puls further argues that even if technical reductions remain realisable, in the foreseeable time the point of physical boundaries would certainly be reached because every internal explosion within the engine requires a minimum amount of fuel emitting CO₂ in any case. Moreover, such costly reductions must be economically translated into a price that customers will accept. This uncertainty could pose a large risk for carmakers, as it would mean an investment in something that may be in the near future be deemed insufficient. Therefore, technological trends have shown that it would be better to invest in alternative propulsion systems, as portrayed in figure 1.4.

Figure 1.4: Necessary technologies to achieve the imposed limits



Source: Amended from Puls (2013)

The horizontal axis depicts the identified actions that reduce emissions, while the vertical one shows the relation of each action in terms of CO₂ reduction versus costs to the car buyer.

Based on the graph, different actions to further reduce CO₂ emissions were connected with higher costs to car buyers. Although known CO₂ reduction technologies may be accepted, it would be very challenging to achieve the 95g CO₂/km. Only the extension to various hybrid variants and electric vehicles has enabled carmakers to reach the agreed EU target.

1.1.3 Dilemma of tier-1 suppliers' business models

Many authors, for example, Osterwalder and Pigneur (2010), Bieger et al. (2011), Schallmo (2014), assert in either simple or sophisticated ways that a business model creates, delivers, and captures value for the customer.

In consideration of the relationships between OEMs and their tier-1 suppliers (see figure 1.2), this sub-section describes the 'comfort zone' of supplier business models that mainly focus on operational excellence (OpEx), instead of future-oriented strategies. OpEx can be defined as a production system that continuously improves production processes

through the elimination of waste to increase productivity (Issar and Navon, 2016). It indicates further the limitations of such business models within gradually changing business environments as a result of having been statically grown over many decades without remarkable interruption. Interestingly, Wirtz (2013) argues that many works have been published since the year 2000 in which business models and strategy indicated a closer connection. The business model has been used to identify the necessary production factors that follow the company strategy. Hamel (2001) even provided an integrated approach in which a core strategy, strategic resources, the interfaces with customers, and the value-added network can be seen as the main components of a business model. As such, he extended this approach by sub-components, like customer benefits, configuration, and corporate boundaries to reinforce the connections between strategic elements and the business model.

In this context, Osterwalder and Pigneur's (2010) business model canvas with its nine canvas blocks has helped generate an understanding as to how a business model could be unified. Additionally, the case of the BeP model has been used to provide a practical foundation for its contrast with the business model canvas.

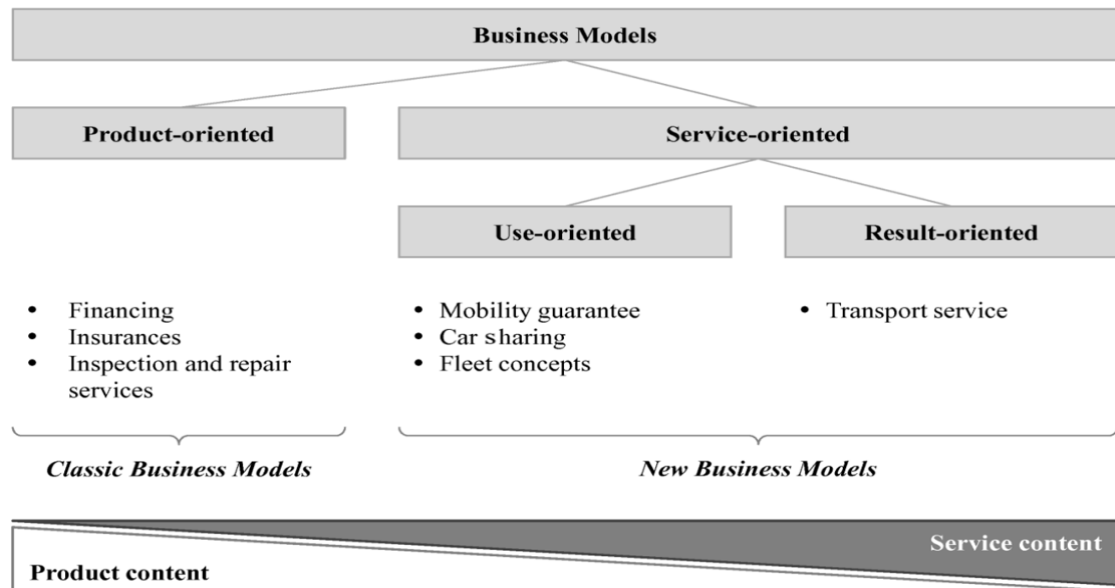
Existing business model limitations in the light of new propulsion systems

Regarding alternative propulsion systems, Di Bitonto (2015) argues that classic OEM business models are experiencing change, since value creation is in continuous decline. According to the findings of Lerch et al. (2010), most of the classical business model parts used for the ICE cannot be adapted to alternative systems as a result of their technological hurdles.

Instead of delivering many parts towards the completion of an ICE, alternative propulsion systems mainly require energy systems like a battery with electric motor or a fuel cell that can be delivered in modules by existing and leading players. Lerch et al. further argued that suppliers have been embedded in a classical business model, providing direct services and striving for competitive advantage to the customer for a long time already. Now it is required that it be transmitted to "innovative business models for electric mobility" (Lerch et al., 2010, p. 3). In this context, McKinsey and Company (2009) has stressed that automotive players must actively participate in new propulsion systems.

In summary, suppliers' business models could be defined as classical models because their product orientation focuses on the core product and sees the services only as a support to strengthen customer loyalty. Accordingly, Lerch et al. (2010) have determined two concepts spread between a 'product oriented business model', the classical business model, and new business models. Known as the service oriented business model, it is shown in figure 1.5.

Figure 1.5: Business models for mobility concepts



Source: Lerch et al. (2010)

While many suppliers are already organisationally structured to provide dedicated services to customers, the classical business model concept demonstrates that being only product orientated is not be sufficient for these new technologies. Instead, it has been recommended that suppliers adopt service-oriented models that can be divided into use-oriented and result-oriented. Indeed, service orientation, as provided by Lerch et al. (2010), considers mainly activities around concepts to improve mobility.

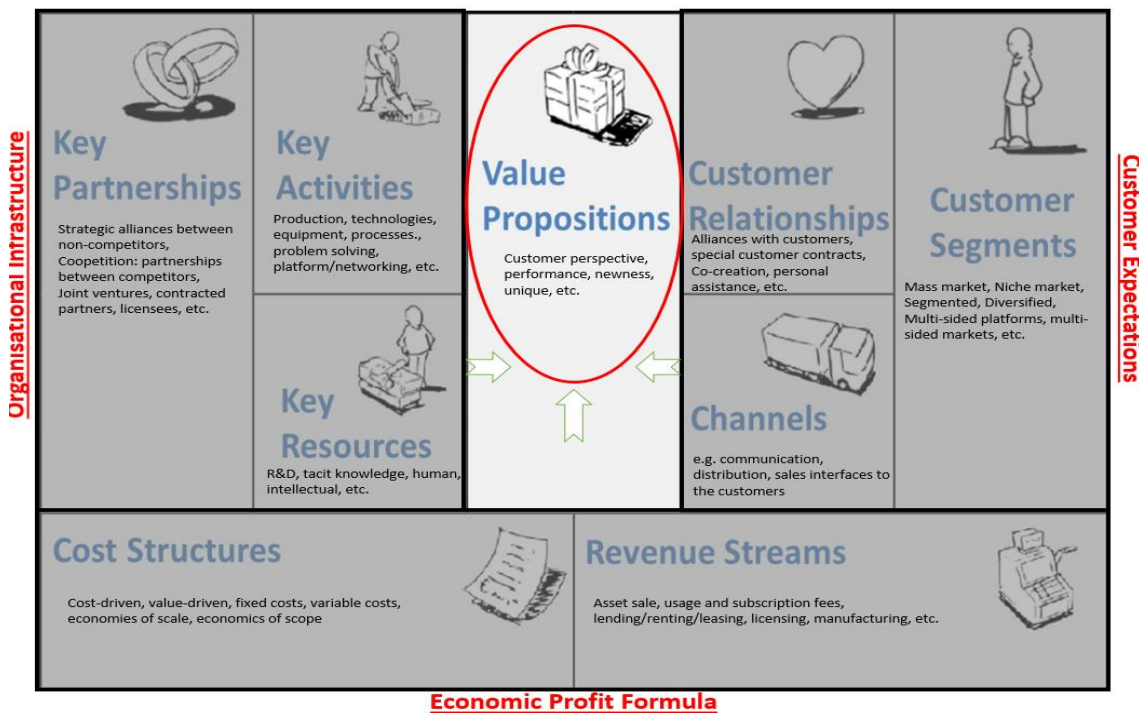
Reflection of a business model concept in use

Osterwalder and Pigneur's (2010) business model canvas contains nine equalised blocks that create, produce, and deliver value in order to validate or redesign a business model (see figure 1.6 below). Additionally, another expression of the blocks has been defined with elements, as proposed by Christensen et al. (2008).

A central aspect of the model is the ‘value proposition(s)’ that can be attached to a product and/or service that meets customer demand. ‘Customer expectations’ are described with customer relationships and channels to deliver value to a customer segment, be it a mass or niche market. The cost structures and revenue streams were combined to simplify it to the ‘economic profit formula, which helps to evaluate the profitability of a business model in a business case. Furthermore, the ‘organisational infrastructure’ contains competencies, such as key partnerships, key activities, and key resources, aimed at creating value.

By setting the value proposition as a focal point of the business model, the study by Osterwalder et al. (2014) has helped to illustrate its central importance and interrelationship with the other key elements of the model, as illustrated in figure 1.6.

Figure 1.6: Augmented business model canvas



Source: Amended from Osterwalder and Pigneur (2010)

Based on this model, Osterwalder and Pigneur propose a similar method to that of “seeing the doctor for an annual exam” in relation to evaluating business models (2010, p. 212). They suggest the use of the SWOT method (strengths, weaknesses, opportunities, and threats) for analysing each canvas block. In this way, the company’s current business model will then be set in comparison to each block of the canvas and scored using a minus

and plus ranking by the organisation's internal team. The intended outcome evaluates the organisation's current market position, enabling it to find out where to correct or modify each block.

Additionally, an extension provided by Osterwalder et al. (2014) exposes a value proposition to analyse and develop the business model blocks. It recommends how organisations may inspect in general existing business models in order to design a new model based on the existing value proposition.

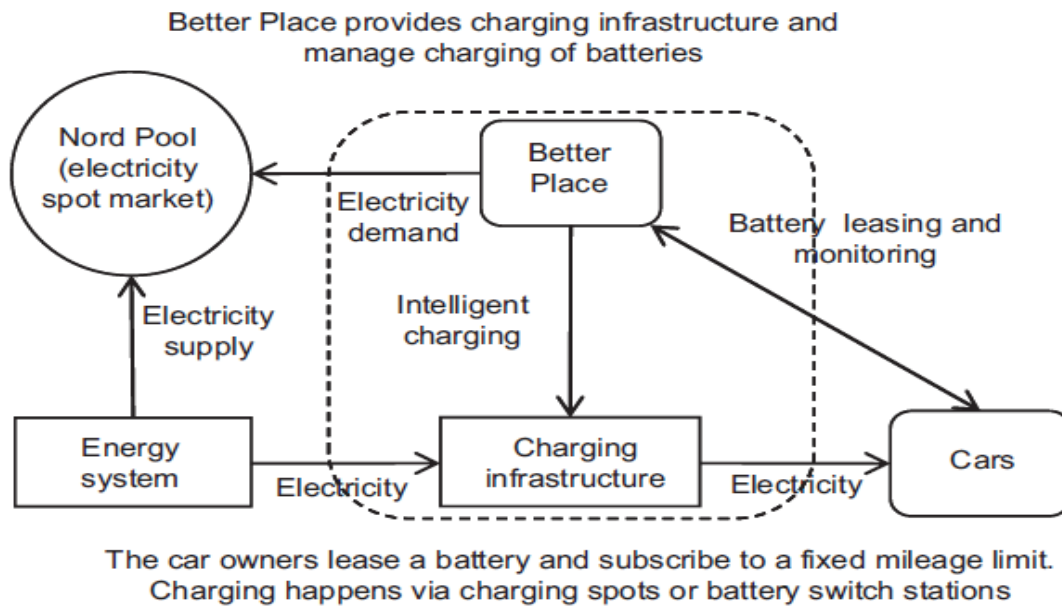
Taking into account the established business relationships and environments of tier-1 suppliers, a framework that recommends an evaluation process of each business model block to sustain competitiveness in era of e-mobility has yet to be approached.

The Better Place model

As a practical example, the BeP case delivered a suitable basis to illustrate what could happen when business model elements are not evaluated in consideration of real market demands. In 2009, Shai Agassi, founder and CEO of BeP, strictly followed his vision to halt the exploitation of oil and foster environmentally friendly mobility and electric vehicle technology in order to make the world a better place. BeP's business model was developed to diminish the existing barriers to electric technology, including cruising distance, charging time, costs, and infrastructure, which were hindering market penetration.

To address these barriers, BeP developed battery-swapping stations – similar to petrol stations – that provide a battery changing service to electric vehicles that takes less than five minutes. In this system, the customer buys only the car without the battery, with the battery itself remaining the property of BeP. For this service, BeP charges a usage fee similar to that paid for petrol at the fuel station (Boomis et al., 2010). The pilot project was launched in Israel and Denmark; figure 1.7 illustrates the Danish example.

Figure 1.7: The ‘Better Place’ model



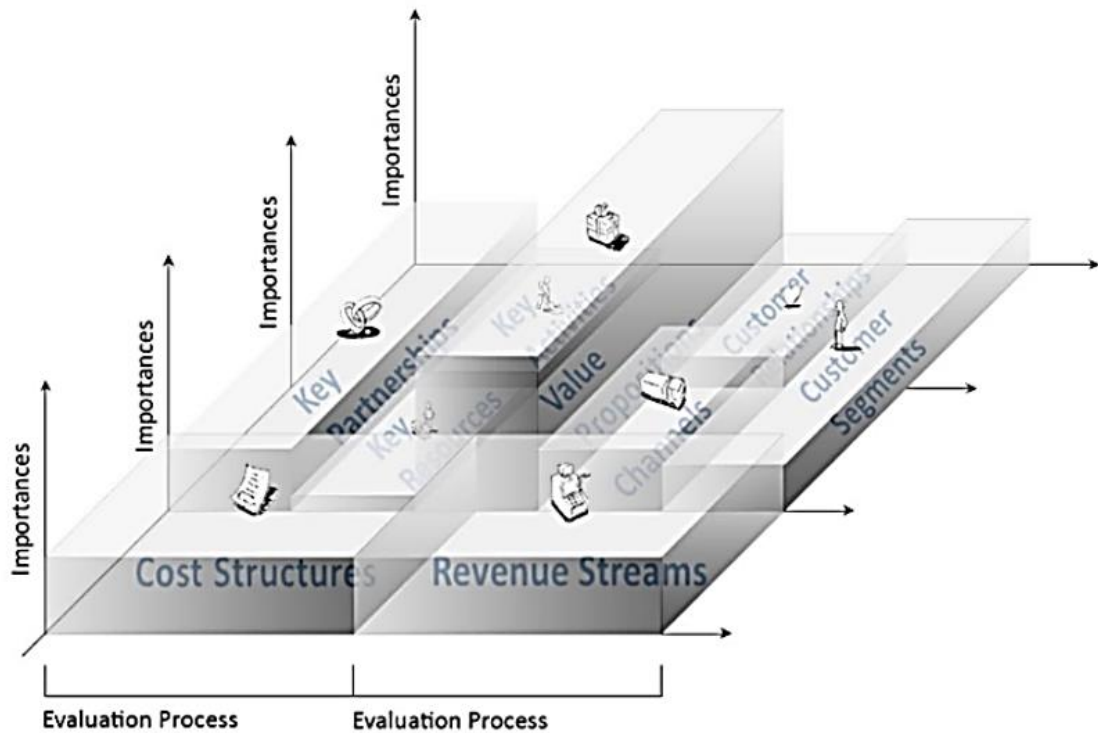
Source: Budde Christensen et al. (2012)

The idea behind this innovative business model is to build up a network with many partnerships between carmakers such as Renault-Nissan, the DONG Energy Company (now Ørsted), and others. To have ‘clean’ cars at competitive costs and acceptable conditions were identified such as the value proposition, while the value chain was mainly considered to provide a service to customers. However, according to Farber (2013), the concept never achieved a breakthrough due to huge accumulated financial losses and without any indication of a financial recovery. Further efforts to access more capital from investors were unsuccessful, causing the bankruptcy of the company.

Although a few sources, such as Boomis et al. (2010), Budde Christensen et al. (2012), or Farber (2013), cited different root causes for BeP's bankruptcy (costs were too high, immature market, unclear customer segments), however, the case and its outcome indicated the necessity to investigate each business model block upon its individual importance level.

The study approach considers the process of how to evaluate an importance level for each canvas block, as portrayed in figure 1.8.

Figure 1.8: Exemplary model of an importance evaluation process



Source: Author's sketch

Such an initial approach to evaluate the importance levels of the canvas blocks illustrates the underlying idea of the case study. As such, it highlights that each canvas block achieves a different prioritisation pertaining to existing resources. In other words, the higher the importance level, the more attention or resources spent by management for a specific canvas block. Arguably, this could even guide an organisation in the most effective way. Therefore, it has been used in order to visualise in the example of the BeP case the differences against the canvas model - depicted in figure 1.6.

1.2 Research problem, aim, questions, and objectives

In consideration of a changing automotive industry that has mainly been driven by external forces, such as worldwide environmental regulations and enforced EU regulations, which also influence technology and mobility in Germany, the research problem can be defined as follows:

How might a successful tier-1 supplier business model be designed to sustain its competitiveness as it moves to providing elements for alternative propulsion systems?

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New Propulsion Technologies in Germany**

Taking into consideration the described supplier relationships and tier-1 suppliers' dependencies on OEMs that face limitations in their existing business models against more advanced ones, the research aim has been defined as follows:

This research aims to identify a framework of the most important business model blocks for tier-1 suppliers against which a business model could be evaluated in the new business environment.

Based on the presented business model canvas, the following research questions were considered to address the research aim:

- How important is a value proposition that creates value to sustain and potentially build upon competitive advantages?
- How significant is a business case in a revised business model?
- How essential is an organisational infrastructure to produce a value proposition?
- How relevant is the customer expectation to value proposition?

The following research objectives are derived from the identified research questions:

- To critically assess the importance level of a value proposition perceived as being of key importance for customer demands
- To critically determine the impact of a business case that would be acceptable for profit-generation by tier-1 suppliers
- To critically appraise the contribution of organisational infrastructures that produce an effective value proposition
- To critically identify the relevance of customer expectations that are equipped with channels and relationships to assist such a value proposition

1.3 Contribution to knowledge

This research focuses on business models in the automotive sector and is delimited in its scope to the automotive supplier industry in Germany.

The study is not seeking to develop new business model elements, but considers instead a change in the evaluation method by concentrating on a value proposition that sets as its focal point the organisational infrastructure, economic profit formula, and customer expectations of the business model canvas. From such a perspective, each element attains a different importance and relationship that in turn leads to a framework, as presented in figure 1.8.

Therefore, the framework recommended to the top management of tier-1 suppliers is an evaluation process that focuses on each canvas block based on their individual importance.

Thus, the thesis contributes to current knowledge by offering a framework for tier-1 suppliers that provides a novel evaluation method of business model elements.

1.4 Overview and structure of the thesis

The literature on business models in general offers countless articles and information. To identify the most relevant knowledge for this study, the literature review mainly considers the relevant fields of the research aim and research questions, which focus on three major research interests.

An initial review of the nature of business models has been structured into three relevant categories, which help the researcher to understand the current knowledge about the value creation processes. This will be addressed in the following section.

Apart from general business model frameworks, which have been offered by various scholars, the business model canvas put forward by Osterwalder and Pigneur (2010) and value proposition design suggested by Osterwalder et al. (2014) are focused on to identify relevant details regarding the importance level related to each canvas block and element. Comparing the failed BeP model with each canvas block offered a reflection of the evaluation methods and the underlying logic.

The section entitled business model management, however, used management tools defined with influence factors including strategy, change, and business model innovation. The review of their influences on the canvas blocks offers a novel approach that also considers management activities. In contrast to the static review of the canvas blocks, this section studies business endeavours that could influence the evaluation of each canvas block.

By reviewing general business models, as well as identifying the specific nature of the canvas blocks that could be complemented with knowledge of evaluation processes, this chapter concludes with theoretical propositions and a conceptual framework. According to Camp (2001), a conceptual framework is the best model to describe the natural development of what has been studied. It represents the researcher's literature analysis

outcomes and provides a frame of how the study has sought the latest knowledge in practice. This, and its cited limitations, provides the theoretical foundation for the following chapters

At this stage, the conceptual framework has been used to build a bridge to practical areas. By comparing the theoretical findings with published examples from concerned organisations, this chapter closes with a preliminary evaluation process that has been considered to express the rough differences among chosen tier-1 suppliers.

The methodology and methods describe a framework or procedure that considers the sampling of selected participants in the field. The qualitative case study focuses upon a sector level of the German automotive industry. Its aim is to gather as much information as possible from customer and interest groups in a given timeframe. The case focuses on how changing market demands create the requirement for a revised business model for the sector. To make sense of the collected data, this chapter outlined the techniques to analyse data that were used to ensure the validity and reliability of the results.

The findings are drawn from the data collection techniques used in the previous chapter. They were presented and summarised using a neutral voice in a transparent manner. Data sampling in the field was aligned to a value proposition in addition to the other business model elements. The process of evaluating and converging the primary research was presented in a table used as the input for the ‘discussion’ chapter.

The discussion chapter took into consideration the three knowledge dimensions and guided a discussion of the theoretical and practical implications. Based on the findings and results of the previous chapter and the literature review, this chapter has been structured to identify the main implications for the whole canvas model. In this, the emerging consequences from the framework have enabled the design of a revised business model approach that offers a contribution to knowledge.

The emerging study findings were critically reflected in the conclusion chapter. As such, it evoked a vivid image of the whole thesis in order to identify the implications for the tier-1 supplier industry. In fact, it delivered the key message of the novel evaluation method to a revised business model. The chapter, and the thesis, ended with the researcher’s learning progress and recommendations for further research.

Chapter 2 Literature Review

In 2009, Creswell defined the literature review, as “a framework for establishing the importance of the study, as well as a benchmark for comparing the results with other findings” (Creswell, 2009, p. 25). Previously, Hart (1998) had outlined already that the reviewer ought to critically reflect upon the findings in order to make sense out of them. As described with the procedure of a literature review in the section ‘Overview and Structure of the Thesis’, the next section will provide the methods taken into consideration to acquire knowledge.

2.1 Overview

This chapter presents a thematic review of the relevant sources that have contributed to the major research disciplines. The initial selection of topic areas for the literature review was driven by the key words emerging from the title, research aim, questions and objectives. But the completed chapter was also influenced by the reading itself and evolved as learning from the literature grew. Dependent on new alternative technologies in Germany, as discussed in the previous chapter, the literature review has considered relevant sources to business models.

To review ‘business models’ in general, academic articles and book sources were germane to describe the nature of the business models due to their accepted knowledge. Although this section was not necessarily linked to the automotive industry, it provided a common insight into the characteristics and aims of organisations’ business models. Furthermore, an explanation regarding the different types and concepts of business models delivered detailed insights into the reasons for participation in existing business environments.

Based on Porter’s (1985) ‘value chain’, current frameworks about the value creation processes of tier-1 suppliers in the automotive industry demanded review because of their specific developments. Academic articles and professional magazines from accepted automotive publishers that reported on the current dilemmas in the B2B environments helped forge an understanding of the value creation process in such a changing business environment. As a consequence of its evolved value chain, which is not evident in other industries regarding to topic nature, sources unrelated to the tier-1 supplier automotive industry would not have described in detail the different approaches to value creation.

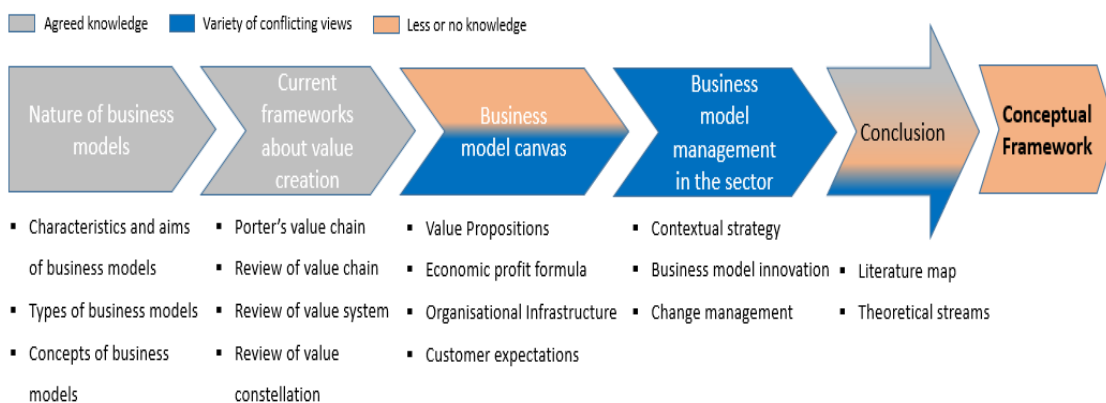
Regarding the evaluation processes of each business model element, the final two sections provide modern findings from articles, books, and professional magazines that have been used in context for each canvas block.

The business model elements of the canvas model stood as the focal point of the review, as a reaction to the failed BeP model. By investigating each element in comparison to the failed BeP model, a deeper understanding of the elements' weights, rather than randomly rummaging through the literature, has been achieved. The study of the dynamic processes that influence the evaluation of modern business models provides an advanced view of the relevance of each canvas block.

Based on the latest knowledge regarding business model management, as proposed by Wirtz (2013) and Budde Christensen et al. (2012), management tools such as strategy, business model innovation, and organisational change were used to analyse differences in the valuation process.

While this literature review could be undertaken differently, the applied procedure researched the most relevant sources to address the research aim and its related questions comprehensively. The literature review took into account areas on which scholars agree, but also embraced a variety of contradictory views, and those topics where little or no knowledge has been identified; see figure 2.1.

Figure 2.1: Structure of literature review chapter



Source: Author's own construction

The conclusion section summarises the investigated dimensions. The nature of business models delivered a general understanding of the business models in place. The section 2.4 'business model canvas' provides a comparison of the static canvas model to the BeP model. Additionally, the last section 2.5 completes the theoretical findings by incorporating management instruments that could potentially influence each canvas block in order to obtain a comprehensive picture regarding the weight of each canvas block. At last, it offers a visualised overview of all accessed papers categorised in the key words and the types of literature.

Finally, the relevant sources were included through the delivery of a conceptual framework. This model represents the identified relationships between the variables of interest and helps to guide the empirical work. The literature review concludes with a discussion about its limitations.

2.2 Nature of business models

The development of the term 'business model' cannot be clearly described. After the establishment of the internet, however, business model related concepts were frequently recorded. In light of this, Wirtz (2013) created an analysis about the frequencies of the term business model in The Economist newspaper from 1995 until 2012. This statistic showed that usage of the term business model grew continuously from the year 2000 onwards, and was mainly connected to the 'New Economy-Boom' that achieved its breakthrough from the information era at the beginning of the twenty-first century.

While the term's distribution in economics-focused newspapers and scientific articles increased to its peak in 2008, a clear and common business model definition has, however, not yet been agreed in the literature.

2.2.1 Characteristics and aims of business models

Many authors have expressed different understandings of the business model and have defined its characteristics and aims using different expressions, as described in table 2.1.

Table 2.1: Chosen definitions of business models

Authors	Definition business model
Afuah, 2004, p.2	"A business model is a framework for making money. It is the set of activities which a firm performs, how it performs them, and when it performs them so as to offer its customer benefits they want and to earn a profit"
Bieger, Knyphausen-Aufseß and Krys, 2011, p.6	New business model concept embraces six steps: value proposition, value creation, value communication and transfer, value capture, value dissemination and value development
Bieger, Knyphausen-Aufseß and Krys 2011, p.32	A business model describes the basic logic how an organisation creates values. In doing so, the business model determines: 1) What an organisation offers that is perceived as a value for the customer. 2) How values are created in an organisational system. 3) How created values are communicated and transmitted to the customer. 4) How the created values are 'captured' in terms of revenues by the organisations. 5) How created values are distributed within the organisation and to the stakeholders. 6) How the basic logic of creating values is further developed in order to sustain the business model in the future.
Christensen et al., 2008, p. 89	A business model consists of four interwoven elements that creates together value: value proposition for the customer, economic profit formula, key resources, and key processes
Hamel, 2001, p.10	"The four boxes in the diagram represent the major components of a business model: customer interface, core strategy, strategic resources, and value network. These basic components are linked by three 'bridging components': customer benefits, configuration of activities, and company boundaries"
Magretta, 2002, p.4	"Who is the customer? What does the customer value? It also answers the fundamental question every manager must ask: How do we make money in this business? What is the underlying economic logic that explains how we can deliver value to the customers at an appropriate cost? "
Osterwalder and Pigneur, 2010, p.14	"A business model describes the rationale of how an organization creates, delivers, and captures value"
Schallmo, 2014, p.6	A business model is the basic logic of an organisation that describes how a value is generated for customer and partner. A business model answers the question how the generated value creates turnover for an organisation. Value enables a differentiation against competitors, tightening customer relationships, and competitive advantages.
Tongur and Engwall, 2014, p. 527	"A business model framework comprises following three components: 1. Value proposition, i.e., the value of the products and services that the company offers to its customers; 2. Value creation, i.e., how this value is created; and 3. Value capture, i.e., how the company retains the value it has created for its customers"
Wirtz, 2013, p.73	A business model depicts a strong simplified and aggregated figure of all relevant activities within an organisation. It explains how marketable information, products, and/or services are developed by a value component of an organisation. Besides the architecture of value adding, the strategic as well customer- and market components are considered in order to realise a higher goal of generating and sustaining competitive advantages respectively.
Zott and Amit, 2010, p.493	"A business model depicts the design of transaction content, structure, and governance so as to create value through the exploitation of business opportunities"

Source: Author's own construction

Following an analysis of the definitions offered by the ten cited authors, three different perspectives could be identified: 1. organisational orientations of business models, 2. a general explanation regarding the aim of the business model, 3. the broader scope containing strategic elements.

All of the examined definitions (Bieger et al., 2011; Magretta, 2002; Osterwalder and Pigneur, 2010; Schallmo, 2014) expressed that a business model should create value to the customer. However, none explicitly explained how to do it; each mainly talked about creating, delivering, and capturing value in either simple or sophisticated ways.

A rather target-oriented approach has been provided by Afuah (2004), Christensen et al. (2008), Tongur and Engwall (2014), and Zott and Amit (2010) who highlight that the overall aim of organisations is to generate profit. Only Hamel (2001) and Wirtz (2013) associate the business model not only with organisational orientation and with value creation for customers, but instead consider strategic elements that incorporate networking and interdependencies into their ideas about the related players.

A connection between business models and strategy has evolved over many years, which has considered the theory surrounding the relationship between core competencies, capabilities, and the building and sustaining of competitive advantage. In this general context, Teece (2010) argues that the business model should be the source of competitive advantage and be more than just doing business in a logical way. Instead, it ought to be refined to particular customer demands.

It must also be non-imitable in certain respects, either by virtue of being hard to replicate, or by being unpalatable for competitors to replicate because it would disturb relationships with existing customers, suppliers, or important alliance partners. A business model may be difficult for competitors to replicate for other reasons too (Teece, 2010, p. 192).

Arguably, many writers focus on strategy and thoughts about the strategic analyses of management to attain competitive advantage. However, organisational core competencies, specific capabilities, and the building and sustaining of competitive advantages have been discussed in various ways to express the up-stream value creation process.

Indeed, a more specific and contextual analysis about strategy in the automotive industry is presented in section 2.5.1.

2.2.2 Types of business models

According to Osterwalder et al. (2005), the types of business models were defined as the business relationship that a supplier has to its dedicated customer. By this, a customer can be seen as a next supplier or as an end consumer. It describes how business activities are used to generate profit (Osterwalder et al., 2005). The literature outlines different types of business models to express the sales systems according to classical or advanced relationships, such as B2B (Business-to-Business), B2C (Business-to-Consumer), B2O (Build-to-Order), and B2S (Build-to-Stock).

B2B describes business relationships between one or more companies, regardless of product or service business. The B2C, meanwhile, defines all private persons as consumers who are buying goods from manufacturers. A more advanced relationship is determined by the strategic processes of companies that manufacture the goods only upon receipt of customer orders, known as the B2O business model. The opposite model is the B2S in which the manufacturer produces goods into customer stock or presents them at dealerships, so that customers can select thereof the available products.

The method of adjusting different business model types to customer demands could be best illustrated by published sources that provide an explanation of how traditional companies react to changing business environments.

B2B vs. B2C

The Würth Group is a traditional and successful ‘mounting and fastening articles’ manufacturer located in Germany with trading organisations operating worldwide. Its initial type of business model was the B2B that delivered articles directly to small shops and industry (Würth, 2016). In 2015, due to increasing competition emerging from e-commerce and driven by companies like Amazon or Grainger, the American equivalent, Würth invested in around €200m in new IT technologies and €50m thereof in e-commerce.

Although its turnover in terms of e-commerce at the time amounted only to 10%, Würth aimed to obtain more private consumers directly via e-commerce and its established sales channels (Fost, 2015). Consequently, its business model type changed from B2B to B2C due to stronger competition, and a value proposition to customers that has been expected by the e-commerce business.

B2O vs. B2S

In general, German carmakers followed both types of business model. The B2O type resembled the modern pull systems, as customers can individually configure their cars on websites in terms of special requests. The manufacture of such an individual car can only be realised after the customer's order is confirmed. However, this has resulted in longer delivery times for customers and higher logistical efforts for manufacturers.

In contrast, the B2S type has not encountered such hurdles, as cars with high market volumes are added to the stock. This results in cars being sold more cheaply and with shorter delivery times. Therefore, German carmakers follow a hybrid strategy that combined both types depending on the requirements of pull vs. push demands (Graf, 2008).

In conclusion, the types of business models describe a reaction by the sales system, as a result of business modelling, e.g., make or buy. For instance, the Swiss watch industry has been confronted with cheap electronic watches, the British motorcycle industry coped with smaller, cheaper Japanese products, and recently, taxi companies have been forced to respond to the new concept of Uber.

Due to ongoing changing business demands and digitalisation to stronger e-commerce businesses, alternative types of business models are inevitably required to evolve.

Hence, the cited examples show that business models ought to be designed depending upon specific customer demands and technological innovations.

2.2.3 Concepts of business models

Apart from the different definitions and types of business models offered by the authors listed in table 2.1 and described in a few examples later on, a commonly agreed concept of business models has not been identified (Magretta, 2002). Magretta argues in this context that such a concept needs at first, "a simple working definition that clears up the fuzziness associated with the term" (Magretta, 2002, p. 87).

Due to the different understandings of the term, such as the characteristics and aims, types, and concepts of business models, Magretta (2002) also warns that no organisation could afford the fuzzy defined concepts important to produce performance.

The overview in table 2.2 of business model concepts illustrates, therefore, the different understandings of the cited authors.

Table 2.2: Overview of business model concepts

	Afuah (2004)	Bieger et al. (2011)	Christensen et al. (2008)	Hamel (2001)	Magretta (2002)
Concepts and elements of business models	> Profit concept > Value added concept	> Performance concept > Profit concept > Value added concept	> Performance concept > Profit concept > Key resources > Key processes	> Value added concept > Organisation-oriented concept > Strategically-oriented concept	> Performance concept: activities associated with organisational concept > Profit concept > Organisation-oriented concept
	Osterwalder and Pigneur (2010)	Schallmo (2014)	Tongur and Engwall (2014)	Wirtz (2013)	Zott and Amit (2010)
	> Performance concept > Profit concept > Value added chain	> Value added concept > Profit concept > Competitive advantage	> Performance concept > Profit concept > Value added chain	> Organisation-oriented concept > Value added concept > Strategically-oriented concept > Competitive advantage	> Value added concept > Profit concept > Cooperation- and coordination concept

Source: Author's own construction

Almost every author has provided a business model concept that aims to generate profit. Only Hamel (2001) and Wirtz (2013) considered value added, organisation-oriented, and strategic-oriented concepts to be more relevant as an economic logic for a business model. Furthermore, the value added concept is understood to be as important as that related to profit, besides performance. Undeniably, a value added concept provides benefit to customers that may not necessarily lead to profit at the end. Instead, a profit-oriented concept would not consider unprofitable endeavours that could cause, for instance, the withdrawal by customers of their orders.

Indeed, the authors' definitions regarding the business model concept consider, on one hand, the supply of value added to customers and, on the other, profit generation. Other concepts, such as organisation-, strategic-, and competitive-oriented concepts were also seen as important but only partly embedded in the current thinking.

Summary:

The nature of the business model is equipped with many diverse facets. Since the authors could not conclude on a commonly accepted definition, a specific characteristic was instead highlighted as being the most relevant.

However, certain streams, in terms of generating profit and adding value to the customer, could be defined as a key function of the business model that enable it to keep the organisational structure aligned to such functions. This can be achieved by organisational change that enables a basis on which to revisit the current cost structure and technological expertise. It has been illustrated, for instance through the example of Würth (2016) and the success story of Dell, both of which changed their business model from B2B to B2C due to changing business environments.

2.3 Current frameworks about tier-1 supplier value creation

Based on the theory offered by Porter (1985), this section reflects his underlying theory of a value chain that has been more criticised in recent times. Its limitations are better understood when the disadvantages of sequentially performed activities aimed at revenue generation are critically examined. The findings can then be used to review value chains in the automotive industry.

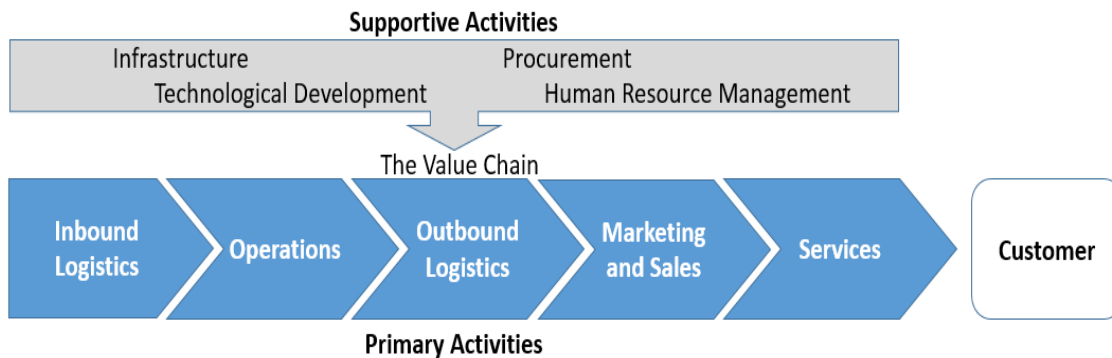
The value system, however, connects value chains from different sectors using the existing support activities of value chains in order to advance the value creation process, as initially suggested by Porter (1985, p. 35).

In contrast, the value constellation has considered a network-based value creation model. The concept was first proposed by Norman and Ramirez (1993) as a response to network-based value potential, and later visualised by Michel (2010). It considers how a value within the network can be created by internal and external actors, and which relationships are important to the value creation process. Arguably, Wirtz (2013) simplifies this concept by suggesting that value creation, network structure, and systematic understandings of organisational structures are the three most important theories.

2.3.1 Porter's value chain

Based on Wirtz (2013), a business model is a simplified and aggregated figure of all relevant company activities. It explains how products or services are produced through the company's value chain, as depicted in figure 2.2.

Figure 2.2: Porter's 'Value Chain'



Source: Amended from Porter (1985)

Porter's idea was to illustrate company activities twofold. Value-added activities were described with 'primary activities' and non-value added with 'support activities'. By using resources such as labour, equipment, material, and money in the most effective way, the primary activities were understood as a system where input, transformation, and output processes determined company profitability. The support activities strengthened the efficiency of the primary activities, which could be interpreted as OpEx.

Porter's model suggests that value adding activities are sequentially ordered, which is rather fitting to a manufacturing environment, but could be difficult to adopt, for instance, by a service provider. Due to direct partnerships and grown dependencies within the value chain, suppliers were subject to transparent control within their business fields.

Consequently, higher cost pressures, stronger competition, alliances, and shorter innovation cycles in the current car market were easily handed over from customers to suppliers. Supplier profitability was mainly achieved by regular OpEx activities and design improvements offered to customers (Volpato, 2004).

Many OpEx methods, such as automatisisation, one-piece flow, lean manufacturing, and continuous improvement processes have been implemented to gain profitability, but the attained competencies have specialised suppliers in a particular way. As such,

reorganising their business models to be receptive to new business opportunities was perceived as a big challenge (Volpato, 2004).

2.3.2 Value chain

According to Volpato (2004) and Humphrey and Memedovic (2003), change in the automotive industry's value chain was initiated by the oil crisis of the 1980s and 1990s. Increasing costs, not only for fuel, but also in the manufacture of car components forced the industry in Western countries to produce cars more efficiently by reducing engine fuel consumption. Furthermore, growing globalisation boosted the import-export progress of vehicles and accelerated the competition among the OEMs.

In particular, Japanese carmakers were extremely competitive due to strong and tight relationships with selected suppliers. This close interaction and trustful cooperation offered the advantage of dealing with problems like loss of efficiency and quality deviations. They thus achieved competitive advantages by regular improvement of their value chain performance, as systemised by OpEx (Volpato, 2004).

One of the consequences of this evolving competition was that western OEMs “reduced their in-house production levels and began to transfer design functions to their leading suppliers” (Humphrey and Memedovic, 2003, p. 20). This demonstrated that the classical value chain model with its primary activities of input, transformation, and output processes experienced modernisations, although the basic logic of creating value in the B2B was sustained.

Such value chain modernisations are summarised by Humphrey and Memedovic (2003) as three significant changes:

- 1) Design activities being handed from OEMs to tier-1 suppliers. Customers provided only the specification of the required product to suppliers instead of sourcing owned-designed parts. In this case, suppliers could develop special expertise and customised products by using their own design elements.
- 2) Complete functions and responsibilities shifting to tier-1 suppliers, rather than single components being sourced from different supplier levels. Tier-1 suppliers not only became responsible for the functionality of a module or segments, such as filter systems, brake systems, and so forth, but also for the administration of tier-2 suppliers.

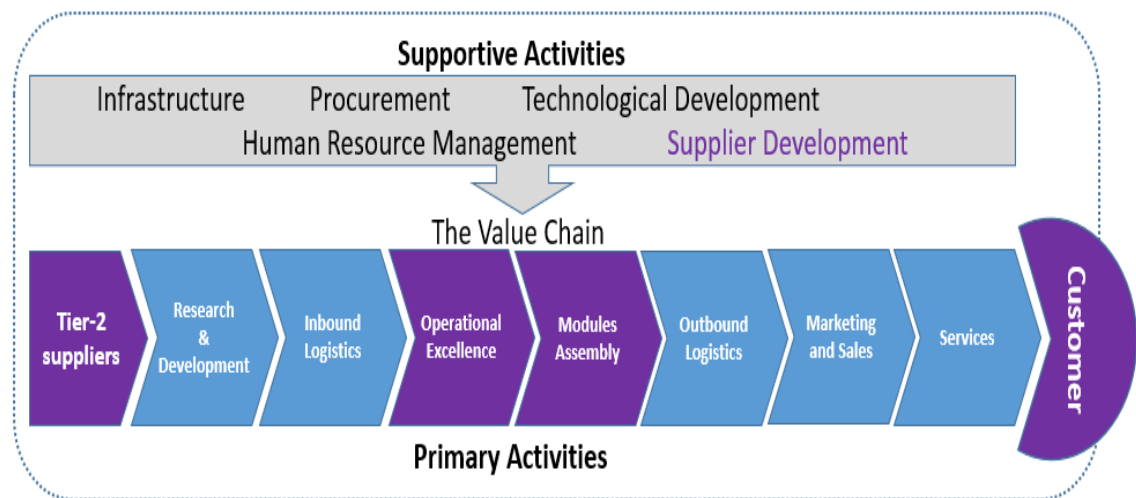
3) Stronger OEM involvement within the production systems of tier-1 suppliers. Due to increasing prices and cost competition, carmakers forced their suppliers into a closer relationship in order to receive the goods as cheaply as possible just in time, and at a very high quality level.

Using a similar approach, Doran (2004) describes the transformation of value-adding activities from OEMs to tier-1 suppliers in terms of modules. She argues that experienced tier-1 suppliers benefit from increased responsibility, stronger involvement in research, and acquire greater value creation activities. The above-mentioned strategies are considered for all levels of supplier within an existing sector, albeit guided towards value shifting downstream in order to reduce OEM responsibilities.

Although Volpato (2004) distinguishes between suppliers who deliver the same parts to different customers, and those who supply different products to the same customer, some tier-1 suppliers are treated as the extended OEM value chain. Closely monitored and controlled by the OEMs, tier-1 suppliers have improved their primary activities in terms of improved efficiency, higher quality standards, faster reaction times, and the specialised expertise of each component or module.

However, those companies whose primary activities were in the sector developed competitively adapted their value chain mainly to the requirements of the OEMs, as depicted in a customised tier-1 supplier value chain in figure 2.3. As such, Doran (2004) offers the extension by modules, while Humphry and Memedovic (2002) and Volpato (2004) deliver operational excellence and tier-2 suppliers.

Figure 2.3: Customised tier-1 supplier value chain



Source: Author's own construction

In comparison to Porter's value chain, as shown in figure 2.2, the highlighted value added activities and customer role - portrayed by the dashed frame - demonstrate the developed relationships between OEMs and tier-1 suppliers. In this way, the focus of tier-1 suppliers lie on operational improvements along the installed value chain to generate profit, despite OEMs having transferred more value adding activities to them.

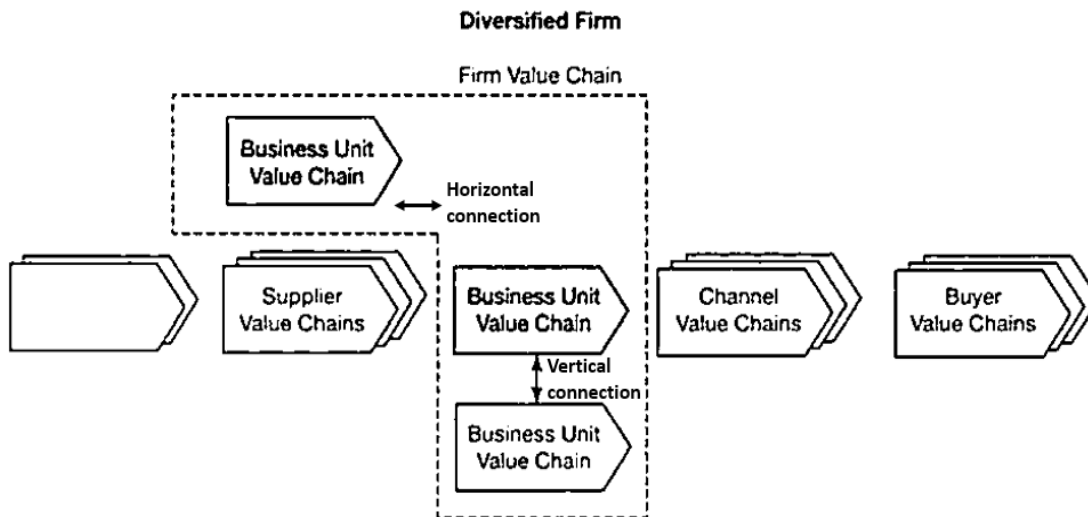
Consequently, those suppliers 'captured' within their value chain have developed efficient production systems (OpEx) over time at a high quality standard built on narrowed research activities and specialised competencies.

2.3.3 Value system

Apart from the linear value creating activities in single companies, Porter (1998) has also suggested the concept of a value system that mainly concerns diversified organisations. Due to ongoing globalisation and the need to achieve competitive advantage, value creation stems not only from the value chains of single organisations, but also from diverse streams of activities beyond such frames. Wirtz (2013) notes that value systems within diversified companies connect the activities of internal and/or external value chains from different sectors in order to gain advantages within the value creation process. In doing so, the main concept of creating value in a linear value chain remains valid.

However, the value system has a broader scope that also considers the value chains of suppliers, channels, and buyers. Additionally, a business unit was divided in two different connections, as illustrated in figure 2.4.

Figure 2.4: The Value System



Source: Amended from Porter (1985)

The horizontal connection describes the intersectoral potential of diversified companies due to structural conformities. For instance, Bosch can use a system controller not only for household appliances, but also within the automotive sector. In contrast, vertical connection defines the vertical integration of activities within a value chain. Depending on costs and unique features, firms may decide to outsource an activity to a supplier that then delivers the product or service more efficiently than if it were manufactured in-house.

However, the role of tier-1 suppliers has changed significantly, as the automotive world has become too complex and, without partners, firms are unable to achieve competitive advantages (Kothandaraman and Wilson, 2001). Di Bitonto (2015) argued that the supplier role becomes even more important if they can be flexible and provide the demanded values of customers. Hence, in the scope of the value system, suppliers cannot only operate within their classical value chains. Instead, they offer modularisation, low costs, shorter life cycles, and assembly strategies.

The value system offers the automotive industry methods to combine values that are used for different applications, while inefficient activities within the value chain have been

outsourced to competitive sub-suppliers. However, due to the increasing complexity of customer requests, fast changing business environments, and expected solution providers at competitive costs, the value system as such has not experienced a significant breakthrough. Instead, flexible and innovative approaches were necessary to survive within the sector, as will be discussed in the next sub-section.

2.3.4 Value constellation

Norman and Ramirez (1993) define a value constellation as a

value-creating system itself, within which different economic actors – suppliers, business partners, allies, customers – work together to co-produce value. Their key strategic task is the reconfiguration of roles and relationships among this constellation of actors in order to mobilise the creation of values in new forms and by new players (Norman and Ramirez, 1993, p. 66).

Wirtz (2013), conversely, describes it rather simply as a network-based value creation model that represents the internal and external actors of the firm. Dietl et al. (2009) in turn comment that value creation is the most important activity of an organisation that can be framed, since the value architecture enables it to gain a competitive advantage.

They argue that

architectures of value creation describe the structure and relationships of all the value-adding activities that are carried out by various actors to bring a particular product or service to market. It is not limited to the value chain in terms of horizontally linked actors, but includes all the contributions to value creation from vertical (e.g., cooperating competitors), as well as lateral actors (e.g., related service providers such as banks) (Dietl et al., 2009, p. 44).

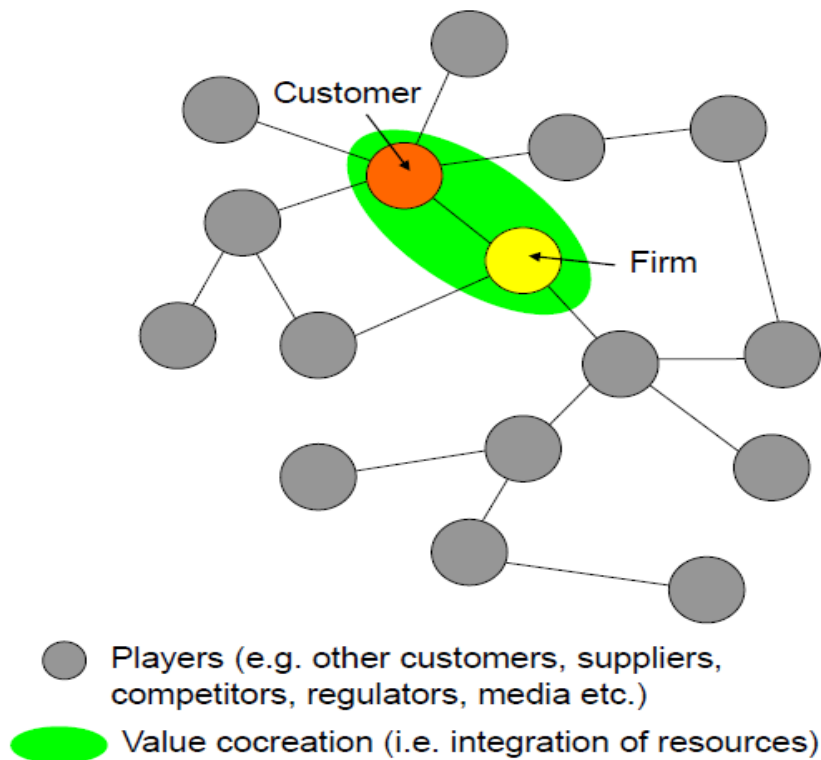
Despite the horizontal and vertical actors, they do not view the concept as a value system, but rather a strategy to place organisational settings into particular relationships with suppliers and distributors. In such a position, central units can easily recognise important value-adding players and value-adding units. In a more concrete approach, Norman and Ramirez (1993) coined the phrase ‘[T]he new logic of value’ to emphasise a value constellation built on the basics of goods, services, and designs. It therefore requires countless business transactions, agreements between suppliers and customers, employees and employers, and groups of supportive specialists.

As a result of such interwoven relationships, “companies created value when they make not only their offerings more intelligent, but their customers (and suppliers) more intelligent as well” (Norman and Ramirez, 1993, p. 69). Wirtz (2013) asserts that the

value constellation concept resembles a paradigm shift from the linear value chain to a microprocessor metaphor. Due to the interdependent relationships between diverse players, combined with increasing digitalisation, the concept focuses strongly on generating value at various points of the multi-directional value creation processes. A sketch, provided by Michel (2010), resembles the microprocessor metaphor and is illustrated in figure 2.5.

Figure 2.5: The Value Constellation

Value Constellation, not Value Chain



Source: Michel (2010)

Michel (2010) commented that nowadays the business environment of a value constellation-oriented company is difficult to determine because of the countless players involved. Major activities of firms aim to mobilise customers so that they create value by themselves. In this regard, the customer is involved in the value creating process and no longer seen as a passive consumer, but rather as an active ‘co-creator’.

Hence, what the product or service did for the customer is of no concern now, but what the customer was doing with the product or service is of interest (Wirtz, 2013; Michel, 2010; Norman and Ramirez, 1993).

As previously discussed, tier-1 suppliers were ‘captured’ in a linear value chain or system that was mainly controlled by the OEMs. Further improvements and innovations along the linear system were still executable by OpEx in the B2B, however, a value constellation concept demanded a paradigm shift, thus different approaches.

For instance, Guille and Gross (2009) present a rather modern type of a value constellation, the V2G (Vehicle-to-Grid) model. They claim that an ‘aggregator’ facilitating the appropriate infrastructure, in addition to relationships with the government and energy providers, will play a central role because of its ‘agency’ function between users of electric vehicles (EV) and electric service providers. This highlights the changing roles and relations of involved players, with value no longer only created by the manufacture of goods.

Summary:

Apart from the benefits of Porter’s theory, which provides a generic framework to analyse costs, potentials of differentiation, identification of non-value added activities, the grouping functions into outsourcing activities, and OpEx, it is possible to expose the limitations which lacks in strategic thinking. Missing service orientation and non-flexible organisational structures are additionally identified.

In the 1980s, the automotive industry developed tight relationships with selected tier-1 suppliers. Within these relationships, OpEx activities were the main focus in a linear value chain of tier-1 suppliers, in addition to the following levels. Although value-added activities have been transferred from the OEMs to tier-1 suppliers, cost pressures at high quality, diverse products or modules, and just-in-time deliveries were regular challenges to sustaining competitiveness. Therefore, the later value system extended the scope to the value chains of suppliers, channels, and buyers in order to improve their value efficiency by outsourcing or unifying value activities. However, such evolved value interdependencies, driven by globalised competition and digitalised networks, altered the linear value chain to an intertwined network, the value constellation.

Consequently, the current frameworks about value creation processes indicate that for tier-1 suppliers value-adding activities were difficult to sustain. Rather, a value constellation concept that involves a ‘co-creator’ for the generation of new values as part of a revised business model is considered to enable competitive advantages.

2.4 Business model canvas

Besides the findings regarding the tier-1 supplier value creation process, this section sets in focus the business model canvas of Osterwalder and Pigneur (2010) and Osterwalder et al.'s (2014) 'value proposition'. With respect to alternative technologies and the failed BeP model, as described in 1.1.3, the review helps to identify the importance of each business model element that mainly focuses on alternative business opportunities as a continuation to previous value creation findings. Therefore, it was helpful to widen the scope of tier-1 suppliers' potentials instead of the B2B model to other business model types.

In this way, as offered by Christensen et al. (2008), the value proposition, economic profit formula, organisational infrastructure, and customer expectation have been used to simplify the model review. A comparison has been made of the nine blocks - value proposition, revenue streams, costs, key activities, key resources, key partnerships, customer segments, customer relationships, and channels - and the BeP model in order to understand their individual importance levels, as proposed by Osterwalder and Pigneur (2010). However, a central aspect of the model was the 'value proposition', as depicted in figure 1.7, which guided the following business model elements through the relevant literature.

2.4.1 Value proposition

Based on Osterwalder and Pigneur (2010, p. 23), "a value proposition creates value for a customer segment through a distinct mix of elements catering to that segment's needs. Values may be quantitative (e.g. price, speed of service) or qualitative (e.g. design, customer experience)". Due to a selected bundle of products and/or services that are supplied to customer needs, it "solves a customer problem or satisfies a customer need (Osterwalder and Pigneur, 2010, p. 22)". As a continuation of this explanation, Osterwalder et al. (2014) simplified the definition of a value proposition, noting that it, "describes the advantages which a customer can expect from the products or services" (Osterwalder et al., 2014, p. 6). In contrast, Wirtz (2013) has analysed several value proposition definitions and concludes that similarities exist in the literature between the term value proposition and business model innovation. He argues that a change in the

value proposition can be commonly declared as an essential innovation approach (Wirtz, 2013, p. 205).

Business model innovation can thus be described as having been initiated by a value proposition. Aside from generic definitions that a value proposition delivers value to customers (see Bieger et al., 2011; Giuntini, 2012), a more simplified statement is offered by Böhmann et al.: “A value proposition to the customer is the origin of a business model that decides the success or failure of a company” (Böhmann et al., 2013, p. 57). It considers the perspective of the customer and aims to win their conviction and sympathy.

Companies deliver a value proposition (product and/or service) to the customer seen as a ‘specific value’ that is either consciously required from its perspective or not. Such a determined value proposition, however, enables decisions about the structure of other elements in the business model canvas that makes a business model unique, thus competitive (Christensen et al., 2008).

To understand what is posited as a ‘specific value’ from the perspective of customers, Osterwalder et al. (2014) proposed a reflection of three customer demands that should be used by the supplier to analyse its own standpoint.

Customer tasks:

Suppliers take on many different tasks to support customers in their daily work. These can be divided into functional, social, and prestige activities that fulfil specific customer activities.

Customer problems:

These are understood as difficulties that arise before or after finalising important activities. These can negatively influence the result, reputation, or future development of customers' businesses.

Customer profit:

This demand describes the economic stability of customers within their business environment. It requires the sustainability of the existing business and development of innovative models.

Obviously, Osterwalder et al. (2014) associate a value proposition mainly with the satisfaction of specific customer demands active within current sectors, and being aware of their explicit demands. They presume that 'specific values', which are important to customers, are visible and recognisable to suppliers by using analysing techniques, such as research, interviews, observations, direct exchanges, partnerships, and experiments. However, Christensen et al. (2008) argue that without delivering a unique value proposition to the customer a business model will not be successful. A successful business model, in their opinion, is associated with an idea of how to satisfy an unknown customer demand.

For instance, Ratan Tata, of the Tata Group, realised that many commuters on Indian roads were unable to afford a car. Instead, they used mopeds, bicycles, and other carriers to get around. Tata recognised the huge market potential in addressing commuter concerns in relation to safety, weather protection, and mobility, duly offering a value proposition designed for this customer segment, known as the Tata Nano. Although this value proposition requires the sale of a car for less than \$2,500, readjustments and reductions of the other business model elements developed the cheapest car in the world that has been bought by millions of customers (Christensen et al., 2008).

Kim and Mauborgne (2005) offer another approach to the presentation of value propositions. Their completely new perspective distinguishes markets as red and blue oceans. Companies that exist in red oceans are those that fight about customers, competitive advantage, and market share in existing business fields. Operating in this way, companies have limited chances to survive, since they are regularly pressurised to perform better than others do. When inventing a value proposition, or a business field that

creates a new market, they leave their intensive red ocean and enter the blue ocean, an area that is initially free from competition.

For example, Japanese carmakers followed a vision in the 1970s, challenging the American automotive industry with a new strategy. Instead of manufacturing luxury and large vehicles, their mission was to build small vehicles with high quality standards and low fuel consumption. A few years later, the oil crisis led to increasing demands for compact and efficient cars, with the result that Americans suddenly preferred Japanese vehicles. By sustaining the vision of manufacturing compact and fuel-efficient cars, almost overnight a 'blue ocean' was created that developed companies such as Toyota, Nissan, and Honda (Kim and Mauborgne, 2005).

The literature currently offers three dimensions to determining a value proposition. More frequent opinions consider the satisfaction of visible and identifiable customer needs (Osterwalder et al., 2014; Osterwalder and Pigneur, 2010; Wirtz, 2013; Böhmman et al., 2013). Christensen et al. (2008) introduce the notion of inspiring a value proposition unconsciously desired by existing customers. In comparison to the previous dimension, it refers to the customer not knowing what they want, thus a specific need for a value proposition does not exist. In this scenario, the company creates a customer need.

Hilti, an electric tools manufacturer for building companies, realised that to possess electric tools is not a real value proposition for customers. Construction companies earn money through the fulfilment of many projects in short timespans. For this, electric tools were required to be solid, efficiently available, and maintained. Based on this innovative value proposition, Hilti changed its strategy from being a manufacturer and sales company to transform itself into a service provider. This caused a modification of the business case as many assets were taken over and included on the balance sheet. Instead of selling tools for fixed prices, it began to offer only a monthly fee that includes all servicing (Christensen et al., 2008).

In contrast, Kim and Mauborgne (2005) present a different approach to the value proposition, arguing that players must leave their existing 'battlefields' and look towards inventing a value proposition that creates a 'blue ocean'. This may take the form of new business fields, products, changing role – for example, becoming a service provider to

new customers – or different strategies. As such, companies must realign any organisational structures and business models aligned to the value proposition.

Interestingly, all three dimensions commonly state that suppliers should align with the perspective of customers in order to understand and analyse their real demands. Apart from visible demands, an advanced approach could be to create unknown demands that serve to conquer a blue ocean.

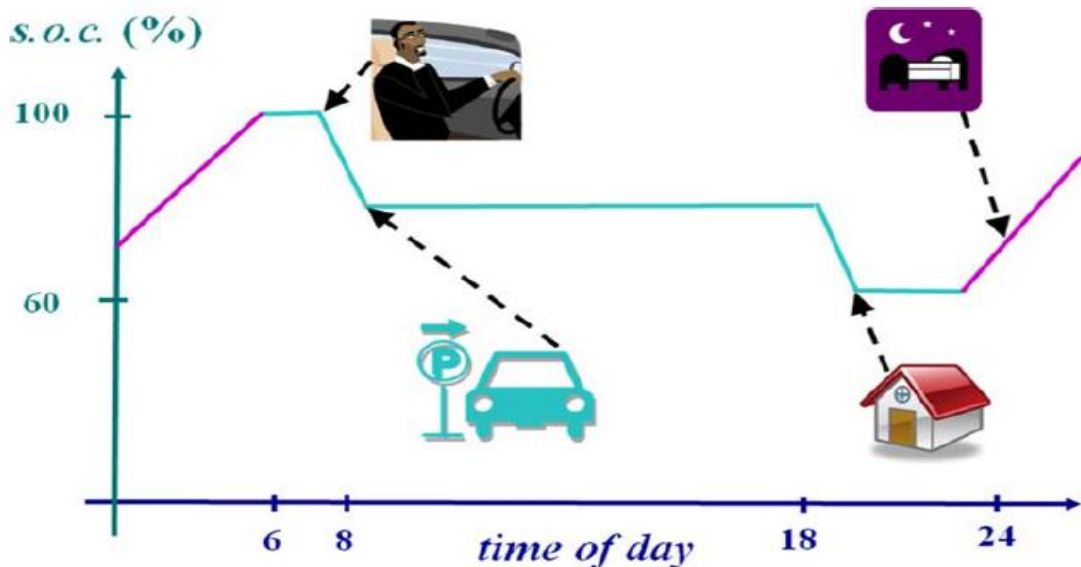
As reviewed, the three dimensions identified a value proposition for tier-1 suppliers, with the resulting questions related to the importance of customer demand in the domain of alternative propulsion systems. While earlier disclosures indicated no clear direction towards a predominant propulsion system, several developments such as hybrids (petrol/electric), fuel cell (hydrogen), bioethanol (bio-petrol), and electric (battery) reduced the market share of ICE (Emadi et al., 2008). Under such circumstances, the value proposition cannot be addressed in just one direction and it is considered rather helpful to consider in which customer expectations such directions may be created.

In their 2009 study of current trends in alternative propulsion systems, Emadi et al. argued that many obstacles still required consideration. Despite the technological difficulties of developing fuel cell vehicles, barriers of EV such as “weight, volume, and cost to achieve the expected efficiency, and performance” (Emadi et al., 2009, p. 2244), were identified as major economic obstacles to overcome. Indeed, later sources concerned with alternative technologies focused mainly on the barriers of EVs in terms of technological and social challenges, including work published by Warth et al. (2013), Steinhilber et al. (2013), and Dijk et al. (2013).

Apart from the absence of governmental incentives, they argued that the battery gains customer trust when technological barriers such as cruising distance and charging time, in addition to economic obstacles including cost and infrastructure are acceptable to customers. Interestingly, these barriers were analysed in more detail and seen as potential value propositions in case the electric mobility would achieve a breakthrough (Emadi et al., 2013). However, Schlick et al. (2011) claim in their study about future electric mobility that such barriers are difficult to overcome when a concerned player does not build cooperation and strategic alliances as an important part within a value constellation.

In this context and in the domain of electric mobility, an interesting example of a value proposition has been presented by Guille and Gross (2009). The battery of an electric vehicle in a consumer grid could not only be used to absorb energy from an electricity supplier during the night, but also to generate and store energy during the day. Figure 2.6 illustrates the assumed consumption of an EV for a typical day.

Figure 2.6: Evolution of the S.O.C. of an EV for a typical day



Source: Guille and Gross (2009)

The state of charge (S.O.C.) from 0-100% (empty-full) indicates that charging during the night (purple line) could use the available energy more efficiently, as before. At night, non-storable energy could be retained in the battery which is then released daily at peak times. “In the proposed design, the aggregator provides preferential rates for EV charging, battery supply and maintenance, and parking services in return to the obligation of the EV owner to plug the EV at specified times” (Guille and Gross, 2009, p. 4389).

The V2G model describes a value proposition developed by setting an ‘Aggregator’, thus a service provider, between the energy supplier and the customer. The principle of a value constellation incorporated the required values from different business providers, such as infrastructural services, governmental incentives, energy provision, and battery appliances, contracted to the aggregator. Based on this technical function of the V2G model (depicted in figure 1.7), BeP, in its role as aggregator or integrator, initiated a

similar approach. The novel value proposition provided the customer with the service of “an installed infrastructure such as charging spots and automatic battery switch stations and manages the charging of the battery” (Budde Christensen et al., 2012, p. 502). In this way, the company addressed the barriers of the EV, like cruising distance, charging time, costs, and infrastructure.

Looking back on the previously discussed value proposition parameters from the customer perspective, the V2G model delivered: (1) A service where customers do not need to take care about charging the battery, maintenance, and parking lots; (2) An initiative that is unique due to the balancing behaviour of non-storable electricity. (3) The resolution of technological and economical barriers through the offer of service rates to customers. (4) Several cooperatives and alliances with the aggregator were merged to approach a unique value proposition that incorporated the government, energy providers, battery manufacturers, and households.

Findings:

A value proposition, perceived as being of key importance in terms of customer demand, ought to be examined using the following parameters from the customer perspectives: (1) Delivery of important value to customers either by supporting them in their activities, generating profit, or helping to problem-solve. (2) Creating or inventing a unique value that produces a customer demand. (3) Addressing current technological barriers such as cruising distance and charging time, as well as economic obstacles like cost and infrastructure. (4) Considering cooperation and strategic alliances between concerned players, as associated with the value constellation discussed in 2.3.3 (Schlick et al., 2011; Michel, 2010; Norman and Ramirez, 1993).

Although the BeP model has mainly fulfilled the previously discussed requirements of the value proposition and followed the notion of a V2G model, it nevertheless failed after several years. Arguably, the cited service model was not only chosen because of its failed business model, but rather because it describes a process that proposes the identification of a unique value proposition. Indeed, the discussed examples indicate that without a unique value proposition, an importance evaluation of the other business model elements may run the risk of no longer being competitive. Therefore, in the case of BeP the value proposition is of great importance within the business model canvas.

Hence, to understand the importance levels of the other business model elements in the light of a specific service provider (as sketched in figure 1.8), the following sub-sections provide a review that compares the canvas blocks with the findings of the BeP model.

2.4.2 Customer expectations

Osterwalder and Pigneur's (2010) canvas blocks, such as customer segments, customer relationships, and channels, can be summarised as customer expectations (Christensen et al., 2008). Customer segments define the external group of people to whom the company aims to reach and supply. Within the company, customer relationships describe the characteristics of the affiliation built by the company with specific customer segments, while channels provide the method of value proposition delivery.

Christensen et al. (2008) do not consider blocks of success, or the aforementioned business model blocks. They rather embed customer segments and relationships into the notion of a value proposition for the customer and describe the channels as part of the key resources. In contrast, Kim and Mauborgne (2005) argue through their blue ocean strategy that a customer segment is the developmental outcome of the value proposition and it defines how organisations structure relationships and channels. In comparison to the BeP model, this sub-section investigated which customer segments were equipped with channels and relationships to assist the value proposition.

Customer Segments

Borup (2014) noted that BeP intended to attract customers through feelings, believing that customers would pay for the feeling of being part of a new lifestyle. "By choosing BeP they can feel that they have themselves made a responsible choice that is good, not only for themselves and BeP, but for broader society as well" (Borup, 2014, p. 10). On the other hand, Boomis et al. (2010), Budde Christensen et al. (2012), and Noel and Sovacool (2016) made no mention of BeP's use of emotional factors to attract customers. Instead, these researchers highlighted the financial benefits to customers, arguing that BeP's concept was mainly to convince customers through the offer of monthly leasing fees. Instead of facing high initial investments, customers would be burdened with affordable amounts.

However, no detail has been offered on the customer segment type or how they were attracted. The review of BeP's customer expectations showed no market survey was

undertaken in either Israel or Denmark, which would have resulted in a more specific customer group demand.

Customer Relationships

In principle, Osterwalder and Pigneur (2010) describe four different types of customer relationships. (1) Personal assistance seeks to support customers by offering human interaction. (2) Self-service or automated services in the form of manuals or direct support via several media formats aimed at solving customer problems. (3) Building communities to exchange knowledge and solve problems in both directions. (4) Introduction of a relationship that creates value through customer collaboration.

BeP's sought to oblige customers to adhere to annual mileage subscriptions as part of its infrastructure strategy. In this way, customers contracted with BeP were provided with direct services as a result of an in-car software platform. The connection between users and customer service allowed them to find convenient charging spots and to drive with real-time traffic information (Boomis et al., 2010). However, Noel and Sovacool (2016) argue that this infrastructure strategy solved no real functional barriers of EVs, as customers rather "refrain from changing their behaviour, identity, and desires regarding ownership of a vehicle" (Noel and Sovacool, 2016, p. 384).

Indeed, BeP intended to build a permanent relationship with customers that provided direct services to solve the functional barriers of EVs. However, the question remained to be clarified as to whether customers really wanted to be transparent and visible at every time.

Channels

According to several authors, such as Osterwalder and Pigneur (2010), Christensen et al. 2008, and Osterwalder et al. (2014), channels are the physical interface between suppliers and customers. These are connected via advisers and sales teams in order to supply a value proposition to the customer segments. Channels further describe the methods used to reach customer attention for company products. In contrast to customer relationships, channels do facilitate the real delivery of the value proposition to customers.

Based on BeP's value proposition, as discussed in the previous sub-section, the V2G service model provided to customers mainly the installed infrastructure, swapping

stations beside the charging spots, and battery management to cope with identified customer barriers (Budde Christensen et al., 2012, p. 502). However, BeP's model was not designed to deliver its value proposition to the customer segments.

Relevant articles about the BeP model, such as Boomis et al. (2010), Budde Christensen et al. (2012), Borup (2014), and Noel and Sovacool (2016) note that customers were forced to initially seek the installed swapping stations and charging spots. In other words, the promised value proposition was not truly available to customers. Instead, BeP expected that customers would find their stations in the course of maintaining their mobility. Hence, it remained questionable as to whether potential customers were willing to adapt to such a change.

Findings:

Customer segments, relationships, and channels are consolidated into the expectations of customers. Noel and Sovacool (2016) found that Danish customers were considered "green", more so than other countries. Therefore, BeP considered entire customer segments in Denmark as being receptive to its value proposition. In addition, the company assumed that it could entice customers through their feelings about being part of a new lifestyle at lower investments and consistent costs. However, the requirements of the different customer segments and their change behaviour were not been assessed, as noted by the authors. "BeP failed due to (...) a misunderstanding of its first two core markets" (Noel and Sovacool, 2016, p. 384).

Hence, the evaluation of the customer expectation importance level can be found to be high, mostly because of customer segments. A business with no customers who are in principle willing to pay for the value proposition will find that other efforts are irrelevant.

2.4.3 Economic profit formula

As depicted in figure 1.6, the economic profit formula offered a simplified way to evaluate the revenue streams and costs related to a defined value proposition. According to Christensen et al. (2008), the concept explains how companies generate profit while providing a value proposition to customers. They divided the concept into four factors; (1) the revenue model: price x volume, (2) cost structure: direct and indirect costs depending on the organisational infrastructure, (3) margin model: the result deriving from the revenue model and the cost structure, (4) turnover ratio: the frequency of change in

inventories. Simplified, Christensen et al. (2008) propose a business case that requires the definition of the price first, followed by the costs, in order to identify profitability.

As such, BeP was the owner of the battery installed in its EV and consumers would pay for the used miles, similar to a mobile phone data plan. In this way, the EV’s capital cost could be reduced to a level similar or even cheaper than that for a conventional car (Boomis et al., 2010). Furthermore, due to environmental constraints, the company built on the assumption that EV customers would be willing to pay more for an EV, as shown in table 2.3 (Noel and Sovacool, 2016).

Table 2.3: BeP EVs cost in Denmark/Israel compared to ICE vehicles

	Denmark Better Place EV	Denmark typical ICEV (Volkswagen Golf)	Israel Bet- ter Place EV	Israel typi- cal ICEV (Kia Picanto)
Capital cost (in 2012\$)	38,000	45,700	35,000	33,200
Estimated fuel Monthly cost	300–560	153	320–470	133

Source: Noel and Sovacool (2016)

Shai Agassi considered attracting customers with a lower EV purchase price in Denmark – but still at a slightly higher purchase price in Israel - in return for providing a subscription through the use of their services at higher monthly costs. Indeed, Budde Christensen et al. (2012) conclude that BeP revenue is generated from battery leasing, managing, and charging, and providing the required infrastructure. The authors also argue that even now EV exists in the perception of car drivers as being associated with higher purchase prices and lower running costs.

Based on its business case reaching an economic break in Denmark by 2020, BeP and the energy provider, Dong Energy, planned to operate around 500,000 EVs. However, this prognosis had already been reduced to 20-100,000 EVs in 2010 and the monthly costs of the subscription plans were markedly higher than planned (Budde Christensen et al., 2012; Noel and Sovacool, 2016).

Under such circumstances, the business case could not be profitable since less revenue and higher costs deteriorated the company’s financial liquidity even faster than anticipated.

Consequently, another reason for Denmark's business case failure was due to very low sales, investments that were too high, and costs. For example, one battery-swapping station was set in the business case at a cost of \$500,000, but ended up at \$2 million.

Therefore, the economic profit formula required critical evaluation taking into account the set figures in the business case. For Budde Christensen et al.:

the business model therefore requires a critical mass of customers in order to reach the economic break-even. In this respect, it was a key weakness of the business model that it still faces a 'chicken and the egg' situation where a critical mass of vehicle owners are needed to cover infrastructure costs while installed infrastructure at the same time is needed up front in order to attract potential vehicle owners (Budde Christensen et al., 2012, p. 504).

Moreover, strong interdependencies with local players were essential in order to analyse local market conditions since the return on investment depended upon customer purchase behaviours (Noel and Sovacool, 2016)

Findings:

An economic profit formula should not only consider revenue streams and costs, as proposed by Osterwalder and Pigneur (2010). Instead, the consideration of non-measurable influences such as critical mass of customers, unknown customer acceptances, and negative market conditions requiring interdependencies with local players, may result in a more realistic business case. Specifically, had BeP considered in its business case the possibilities of reduced revenue, higher investment and costs as a result of facing immature market conditions, the pilot project in Denmark could have been introduced differently. As such, in view of this comparison the economic profit formula is of high importance, since available funds are a factor when deciding on the period in which the project should make a successful return on investment.

2.4.4 Organisational infrastructure

Within the organisational infrastructure, provided by Christensen et al. (2008), Osterwalder and Pigneur (2010) described the blocks in the business model canvas as 'key activities', 'key resources', and 'key partnerships' that produce a value proposition. To expand in more detail: "The key activities block describes the most important things a company must do to make its business model work" (p. 36), while "the key resources block describes the most important assets required to make a business model work" (p.

34). They conclude that “the key partnerships block describes the network of suppliers and partners that make the business model work” (p. 38).

Interestingly, Osterwalder and Pigneur (2010) presume in their definitions that each block is required in order for a business model to work, since it will fail in the absence of one. In contrast, Christensen et al. (2008) argue that the business model is not necessarily required to count on each block. It rather depends on the value proposition and economic profit formula. Conversely, Osterwalder et al. (2014) argue that each business block is required to support the value proposition, albeit in different and individual approaches.

Obviously, it is necessary to consider key activities, resources, and partnerships in the business model but with differing importance levels. Therefore, each block of these organisational features that produce a value proposition should be critically assessed.

Key activities:

For Osterwalder and Pigneur (2010), key activities are defined with production activities, problem-solving methods, and platform/networks that operate a business model. However, Osterwalder et al. (2014) later argue that key activities are determined by the company’s value creation processes, which are designed by norms, rules, and regulations to successfully grow the business model. Such repeatable processes can be defined as production, planning, budgeting, sales, and service.

In contrast, Wirtz (2013, p. 276) claims that the creation process ought to be flexibly designed and considered for the whole value chain in order to react flexible to customer demands. In this way, the organisation’s core competencies should be aligned to strategy and value added processes. Arguably, key activities are understood as the core competencies of an organisation that concentrates on value creation processes to fulfil customer demand (Osterwalder and Pigneur, 2010; Osterwalder et al., 2014; Wirtz, 2013).

BeP’s business model defined the battery pack, the connection system including its mechanism, and the battery exchange station alongside charging spots, as being core competencies to overcome long charging times, high costs, and cruising distances. However, the provided services were mainly oriented on a small range of vehicle models since a swapping station would require standardisation among car manufacturers, yet existing carmakers are likely not to be interested in one single standard (Noel and Sovacool, 2016).

Key resources:

Barney and Hesterly (2008, p. 74) assert that resources “are defined as the tangible and intangible assets that a firm controls that it can use to conceive of and implement its strategies. Examples of resources include a firm’s factories (a tangible asset), its products (a tangible asset), its reputation among customers (an intangible asset), and teamwork among its managers (an intangible asset)”.

Key resources can be defined as the physical, intellectual, human, and financial assets required to create a value proposition (Osterwalder and Pigneur, 2010). The definition of Christensen et al. (2008) considers similar assets, however, it is argued that regardless of tangible or intangible assets, the focal point should be on the key resources needed to enable the value proposition for customers.

Although, Wirtz (2013) makes identical comments about key resources, the major differences relate to three factors. The key resources in this scenario include being valuable, intangible, and difficult to imitate. As such, these factors are required in order to build a basis approaching sustainable competitive advantages. Hence, firms must be aware of the key resources required to make the core competencies needed to produce the value proposition that is valuable, unique, and inimitable. To be aware of a firm’s resources and capabilities, Barney and Hesterly (2008) provide the VRIO framework in this context. ‘Value’ stands for the question about the opportunity to identify competitive resources, while ‘Rarity’ questions the uniqueness of a resource. The question of ‘Imitability’, on the other hand, treats the difficulties of duplicating a resource/capability by competing organisations. The modification of the acronym’s last letter from the former VRIN framework is attributed to the question of ‘Organisation’, which is the wherewithal to use the resource or capability. Barney recognised that the question of a ‘Non-substitutable’ resource would not consider the firm’s readiness to take advantage of its value. Hence, VRIO uses a sort of tools to analyse and assess the existing resources and capabilities necessary in organisations. As such, the underlying questions of the VRIO acronyms are considered to evaluate internal strengths and weaknesses in order to develop a competitive advantage (Barney and Hesterly, 2008).

BeP directed its key resources at finance tangible assets, such as the installation of charging spots and automatic battery exchange stations, the technical infrastructure to

monitor battery charging, conversations with EV owners, and energy providers. Furthermore, the complex computer system managing the charging of the vehicles was another of the key resources (Budde Christensen et al., 2012).

However, intangible core competencies were rather considered in the background. Problems around hiring adequate labour, insufficient marketing, and limited management skills meant that the project was not managed properly. Once, in the context of qualified labour, an employee stated that “[E]verything we needed to go right went wrong. Every cost on our spreadsheet wound up being double, every time factor took twice as long. There was nothing normal about BeP” (Noel and Sovacool, 2016, p. 379).

Key partnerships:

According to Osterwalder and Pigneur (2010), key partnerships can be distinguished in different partnerships that build strategic alliances between non-competitors, partnerships between competitors within a ‘coopetition’, joint ventures, and buyer-supplier relationships. Kim and Mauborgne (2005) suggest that partnerships are necessary when costs could be optimised by sourcing from a cheaper supplier base, and where technologies are missing. Depending on the value proposition, key partnerships are required to achieve innovation within price structures.

Since it considered capital costs to customers as investments in the infrastructure, to provide batteries and swapping stations, BeP allied with several partners.

- (1) Carmakers to design cars compatible with the batteries.
- (2) The makers of leading lithium-ion batteries suitable for electric vehicles in order to access the newest technology.
- (3) The partnership with a government owned electric utility, e.g. Dong Energy in Denmark, to ensure that electricity is supplied without emissions by renewable energy (Boomis et al., 2010).

While Noel and Sovacool (2016) make no explicit claim that the cited partnerships were the main reason for the failed model, partnerships with several car manufacturers and stronger governmental support would have had greater influence in convincing customers to buy electric vehicles.

Findings:

The organisational infrastructure consisting of key activities, resources, and partnerships can be interpreted as the organisation's core competencies. Such core competencies are developed by qualified and educated labour. BeP's case illustrated that had it also nurtured intangible assets, better managerial decisions would have followed. The key partnerships help to reduce costs, structure prices, and support the company presence in foreign markets.

Arguably, the organisational infrastructure mostly considered the core competencies needed to make a value proposition worthwhile. However, depending on the economic profit formula and the customer segments, it is possible to acquire such tangible and intangible assets externally as well. Therefore, the importance level of the organisational infrastructure appears relevant, but not high.

Summary:

Although it could be argued differently, the static analysis of the BeP model by the business model canvas exposed differences in the importance level of each element, even within each canvas block. The value proposition, being the most important element of the canvas, should be decided upon from the perspective of the customer in order to meet their visible or invisible demands.

Based on the value proposition, the customer segments require identification according to several methods including market surveys, interviews, etc. in order to validate assumed sales from potential customers. Customer relationships and channels can in this way be assessed according to focused customer groups. In this way, the business case of an economic profit formula comprises of the financial incomes over a certain period, while the organisational infrastructure presents the costs required by a value proposition. These costs are connected to the required core competencies that determine whether a business case is successful.

Conclusively, the literature review around BeP has shown that not enough attention was paid to the requirements for the business to become profitable (number of customers, number of exchange stations in what density, etc.), and how long for it break even.

BeP could have taken another approach if the highest attention had been placed on the value proposition, then to the customer groups with their explicit requirements, and the costs, which were all required for core competencies. Using this method, the business case of BeP would have been developed differently and may have yielded other approaches.

The summarised view of the method to evaluate the importance level of each canvas element reflected, however, only a static evaluation process. This was not valid when other influence factors were considered.

The next section will examine influence factors, such as strategies, business model innovation, and change. In contrast to the static review of the canvas blocks, thus, it will study processes that could influence the evaluation of each canvas block.

2.5 Business model management in the sector

As part of the research objectives, this section investigates influence factors that take as their focal point the defined business model elements. Instead of using the business model canvas as a tool of "description, visualization, evaluation, and modification of business models" (Osterwalder and Pigneur, 2010, p. 12), the management instruments have been chosen to investigate their influence on the evaluation process. In addition to the existing knowledge of business model evaluation using the static method, as described in section 2.4, the dynamic part of evaluating the processes of each business model element focus on strategy, innovation, and change because of their significant impact on the success of business models (Wells, 2013; Böhmman et al., 2013; Wirtz, 2013; Kim and Mauborgne, 2005).

By focusing on strategy, innovation, and change, the literature reveals a variety of conflicting views in terms of assessing the importance level of each business model element.

2.5.1 Contextual strategy

Several definitions of the word strategy exist in the literature. Porter (1998) argues that operational effectiveness is not a strategy but in fact the flexible response to rapidly competitive market changes. Kim and Mauborgne, in turn, asserted in 2005 that strategy

is not a competitive behaviour of being better than others, but instead the development of new business fields is seen as a competitive strategy.

The question that arose related to the strategic impacts of alternative technologies affecting business model blocks.

Several sources cited that BeP's business model was driven by the vision to make the world better. This vision derived in a strategy to reduce the CO₂ emissions of vehicles within the transport system, but only when the energy sector had increased the usage of renewable energy to improve overall CO₂ emissions (Budde Christensen et al., 2012; Noel and Sovacool, 2016; Borup, 2014).

Apart from BeP's vision, external market forces (discussed in 1.1.1 and depicted by the PEST forces in figure 1.3.) were the main drivers of change to cause companies to reconsider their strategies.

In 2012, Budde Christensen et al. argued that reducing CO₂ emissions could be achieved through the implementation of EVs only when the total energy balance from energy creation to the final consumer is lower than today. Likewise, Wells notes that "strategy and the creation of new business models require an embedded understanding of products and sectors alongside a whole system perspective" (Wells, 2013, p. 234). However, Dijk et al. claim that the electrification of vehicles may not be a profitable strategy due to the "continuous improvement of the conventional ICE vehicles, which have achieved a significant reduction in energy consumption through a deliberate strategy" (Dijk et al., 2013, p. 141). Therefore, companies in the automotive sector adopted a diversification strategy in their portfolio, consisting of pure EVs and hybrid variants.

An even more cautious approach that influenced the strategy regarding alternative technologies was discussed in the same year by two separate studies. Steinhilber et al. offer a definition of strategic influence as the consequence of "strategy change in the industry and policy change in government" (Steinhilber et al., 2013, p. 534), while Schwedes et al. (2013) claim that it is mainly affected by a technological innovation to create efficiency earnings.

Arguably, strategic impacts on the business model that have been cited in the recent past indicate that external influences driven by emission reductions were rather vague and unclear. Budde Christensen et al. (2012) refer to premises that should be fulfilled, Wells

(2013) requires in the first place an understanding of the whole energy system, while Dijk et al. (2013), Steinhilber et al. (2013) and Schwedes et al. (2013) argue more critically and conservatively against alternative technologies. It gives the impression that it was clear that the landscape was changing, but big change was unimaginable in the context of the automotive industry.

Nonetheless, since 2014 the literature has disclosed in greater detail new concepts that present direct strategic impacts. Although the BeP model failed - which could be compared to the previously discussed V2G model of Guille and Gross (2009) - Parson et al. (2014) offer two strategies based on the paradigm of the V2G model to allure EV customers.

One strategy is to eliminate contract requirements completely and allow consumers to provide the service at their convenience on a pay-as-you-go basis. This eliminates some of the inconvenience cost of signing V2G-EV contracts and makes V2G-EVs more attractive to consumers. Another strategy is for power aggregators to consider providing consumers with cash payment in advance in exchange for signing a V2G-EV contract. This approach eliminates the uncertainty associated with earnings from V2G power and reduces the high discount rate consumers seem to apply for revenue from V2G-EV contracts (Parson et al., 2014, p. 323).

In a similar context, Tongur and Engwall (2014) confirm that a value proposition is needed, as described by Parson et al. (2014). However, without having the core competencies aligned to the value proposition, the firm may lose its competitive advantage. They argue that surviving technological shifts stems from mastering technological- and business model innovation. Di Bitonto (2015) even stresses that a high-tech strategy encompassing several stakeholders is necessary to advance alternative technologies. In this regard, Morrissey et al. (2016), Madina et al. (2016), and Helms et al. (2016) define a value proposition to serve EV customers with an innovative strategy. Morrissey et al. (2016) note that “[A] highly connected network of strategically located fast chargers” (Morrissey et al., 2016, p. 270) is needed in order to become commercially viable. The possibility of access to cheaper electricity overnight helps to reduce the total cost of ownership, as specified by Madina et al. (2016). As such, Helms et al. (2016) claim that a service oriented value proposition requires flexibility, which “differs in several regards from established business models” (Helms et al., 2016, p. 356).

They argue that timing can be defined as a core capability in creating flexible time-based business models. However, in order to be effective and competitive, such flexible business models require information and communication technology (ICT) support.

Consequently, while it is not feasible to investigate every source, the recent review of strategic impacts affecting the business model elements can be summarised in two main findings.

(1) Papers prior to 2014 were not clear on the strategic orientation of alternative technologies. Scholars were aware that something was going on and strategic thinking might be subject to change, however, the implications to the business model remained in the background. Different strategies were suggested, such as the ‘whole system’ perspective (Budde Christensen et al., 2012; Wells, 2013), diversification strategy (Dijk et al., 2013), or a wait-and-see strategy (Steinhilber et al., 2013; Schwedes et al., 2013).

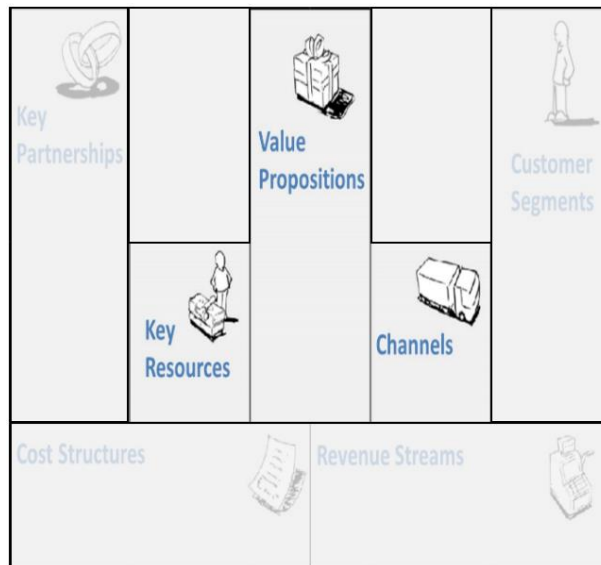
However, articles after 2014 revealed strategies that were of direct concern to business model design, as indicated by the flexible business model proposed by Helms et al. (2016). Therefore, the strategic approach and timing driven by technological innovation played an important role in business model design.

(2) It seemed that strategic influences upon the development of successful business models varied over the discussed period. However, the identification of a value proposition stood mainly in the foreground of the previously mentioned cases, either in the whole value chain from creating energy to the final consumer or in terms of dedicated customer services, such as user friendly payment systems or infrastructure for fast charging. As such, key resources as the enabler of technological innovation, specifically by research and development (R&D), were necessary to support the value proposition. Furthermore, such key resources could also be necessary in order to reach customers through attractive channels.

As posited by Helms et al. (2016), a service oriented business model provides a flexible and effective response to dynamics in the energy sector. Such characteristics could be used, for instance, for defining a vision and mission, which indicates the participation of an innovative player within a dynamic business environment.

Hence, in the light of strategic influences the business model can be simplified with the findings, as portrayed in figure 2.7.

Figure 2.7: Strategic impacts of alternative technologies to the canvas blocks



Source: Author's own construction

Nonetheless, key partnerships, customer segments, cost structure, and revenue streams were highlighted as being almost as important as the other blocks. From a strategic and timing perspective, however, they did not make any significant contributions in terms of business model design. The key activities and customer relationships can be rather kept in the background.

2.5.2 Business model innovation

In recent years, the term 'business model innovation' has been used more frequently in the literature. In 2008, Christensen et al. offered three steps in terms of a structured management process. At first, management must define a strong value proposition. Secondly, the economic profit formula should be calculated in order to compare it with the existing business model. Only then can the decision be taken as to whether or not the innovative business model can be realised (Christensen et al., 2008, p. 89).

Another framework put forward by Zott and Amit (2010) defines business model innovation with the synonym 'NICE'. Novelty stands for new activities and structures. Lock-In considers participating third parties in business activities. Complementarities define the bundling of activities in order to improve value added. Efficiency, however, deals with the reorganisation of activities to minimise transaction costs.

Further, a survey in 2008 of more than 1,000 CEOs recommended that continuously improving business models confirm the benefit of business model innovation (Wirtz, 2013). In 2014, however, Bohnsack et al. posited that business model innovation is not comparable with business model strategy, as “innovation provides firms’ with the opportunities to gain competitive advantages” (Bohnsack et al., 2014, p. 285).

Surprisingly, the business model innovation was not explicitly mentioned by either Osterwalder et al. (2010) or Osterwalder et al. (2014).

By 2014, the different views and interpretations demonstrated that there was still no agreed definition of business model innovation in the literature. This may be due to the different strategic directions within the automotive industry, as mentioned in the previous section. Hence, due to this strategic development in the automotive industry, it was recommended to investigate innovative factors after 2014. This is because the recent past captures a more realistic view of the innovative factors to define the importance levels that influence the business model blocks.

Tongur and Engwall (2014) argue that both technological innovation and business model innovation was required at the same time. They associate 'servitisation' with the transformation from manufacturing companies to service oriented firms. For this, value is created by technological innovation that supports servitisation to EV customers. In contrast, Bohnsack et al. (2014) highlight the innovation of each business model block and the interactions among them, providing two dimensions. In the case of EVs, efficiency and novelty are the main components to sustain competitive advantage. They note that firms “did not make radical changes to the value proposition, most adjustments occurred in the value network and the revenue/cost model” (Bohnsack et al., 2014, p. 299). Bocken et al. (2014, p. 55) in turn argue that sustainable innovation cannot be determined, but rather a "categorisation of sustainable business model archetypes" should be recommended. They therefore recommend eight archetypes whose systems help to support the innovation process in order to approach business model sustainability.

In their 2016 work, Hall and Roelich suggest that an innovative business model should focus on technology innovation and efficiency in value creation. In addition, they also note the efficiency of care for socio-economic benefits. With the value proposition, value

capture, and business model archetypes they believe that established companies can influence the policy of electricity market supply.

Interestingly, a number of articles published in this context since 2016 focus on EVs charging infrastructures and the usage of electricity in the entire value chain (Helms et al., 2016; Hall and Roelich, 2016; Morrissey et al., 2016; Kemfert et al., 2016; Madina et al., 2016). The question of whether the technological innovation of EVs and the required battery charging infrastructure at an affordable cost was the creation of the business model innovation remains unanswered.

Based on the study by Morrissey et al. (2016), a high proportion of EV owners prefer to charge their vehicles at home in the evening while public sector users expect a well-connected network of rapid charging stations. “Priority should therefore be given to developing a highly connected network of strategically located fast chargers before developing other locations where possible” (Morrissey et al., 2016, p. 270).

In a similar way, Madina et al. (2016) argue that the possibility of charging EVs at home may incentivise EV customers once the total cost of ownership (TCO) is lower than the comparable costs of ICE vehicles. This can be achieved by charging overnight at a lower cost and bonuses offered to EV purchasers. The authors also emphasise the complications around business model innovation, as “electro-mobility is a complex eco-system, where different actors create a network of interactions and collaborate to create a positive business case” (Madina et al., 2016, p. 292).

In this regard, Helms et al. (2016) argue rather cautiously since flexible business models may adapt continuously to arising need. This competition creates a risky environment in which cost reductions made in order to maintain required flexibility could lead to business models that need to be more competitive.

While the concept of innovation can be easily confused with the business model strategy, it seems that the recent literature points to the lack of innovation in the infrastructure area in order to gain a competitive advantage. Only a few sources recommend that automotive companies should be innovative in developing new propulsion technologies, as if this ‘red ocean’ - based on the definition provided by Kim and Mauborgne (2005) - is too competitive, with the result that a ‘blue ocean’ must be conquered.

This response may be attributable to the socio-economic needs of EV customers. More recently, however, authors define business model innovation either with the purpose to improve the company's business model blocks or with managerial tools that focus on technology, efficiency, and novelty, as proposed in the 'NICE' synonym by Zott and Amit (2010).

Arising from recent articles about innovation, which address the barriers to EVs presented in the introductory chapter (Boomis et al., 2010; Budde Christensen et al., 2012; Noel and Sovacool, 2016), some common streams of potential values are identified as though electro mobility had already achieved its breakthrough. This could be a logical explanation for the placement of technology, efficiency, and innovation in the focus of an innovative business model.

Consequently, three main findings can be highlighted for the evaluation process of each business model element.

(1) On the basis of the recent literature, electro mobility is more frequently discussed, as was the case in several business sectors. Many authors offered different scenarios as to what future mobility will look like. Indeed, the question remains open as to whether electro mobility has already reached its breakthrough. Nevertheless, efforts in R&D continue to be important in order to achieve the required innovations.

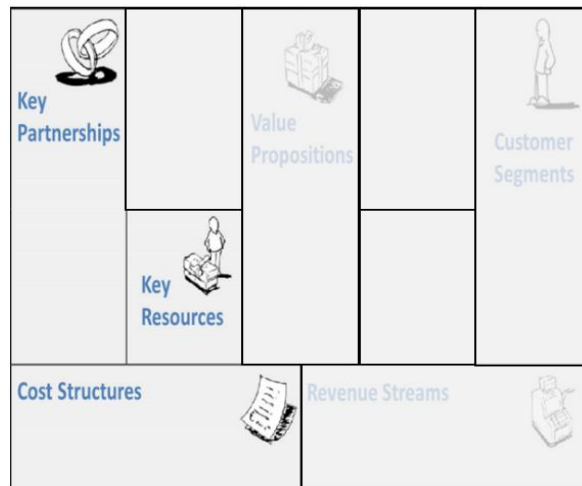
(2) Due to the upcoming complexity of the energy market and technology innovation in the ICT, which has created a stronger network of providers and consumers, a service oriented value proposition supported by partnerships in a flexible business model may be required (Helms et al., 2016).

(3) Instead of competing in a highly competitive manufacturing environment contested by new globalised players, a concept "to fundamentally reconfigure energy systems and contribute substantively to sustainable energy futures" (Hall and Roelich, 2016, p. 297) could be a 'blue ocean' within the electric infrastructure sector. This could enable the provision of innovative technology at affordable costs for customers. As Tongur and Engwall (2014) suggest, efficient and technological innovation supports the servitisation to offer new products to the customer.

Compared to the strategy, business model innovation differs from the previous section as a result of its sustainable competitive factors. These factors could be compared to the

business model blocks that enable companies to survive in conquered business areas as they consciously focus on continual value creation (Tongur and Engwall, 2014; Bohnsack et al., 2014; Hall and Roelich, 2016; Helms et al., 2016), as highlighted in figure 2.8.

Figure 2.8: Innovative impacts of alternative technologies to the canvas blocks



Source: Author's own construction

As noted in the three key findings, R&D resources are important to enable technology innovation. Partnerships and cost structures in turn are just as important as technology innovations. An innovative business model is attractive to customers because of its efficiency, which benefits them. The value proposition, customer segments, and revenue streams are also relevant. However, these blocks can be seen in the sense of sustainable innovation as being the results of the more important blocks. In this context, important activities, customer relationships, and channels are held in the background.

2.5.3 Change management in the automotive industry

Many scholars offer numerous theories on change and how companies can adapt to new market requirements, as described in sub-section 1.1.1. As a result of the ever-shorter frequencies of change in modern times and the changing mobility of the automotive sector, this section was deliberately chosen at the end to capture the latest news on change. Recently, Kaas et al. (2016) provide a comprehensive overview of relevant disturbance factors with which the automotive industry could in principle be confronted. The authors separate these factors into high- versus low-disruption in order to specify the magnitude of change and “be interpreted, as a projection of the more probable assumptions across all four trends” (Kaas et al., 2016, p. 4), as depicted in table 2.4.

Table 2.4: Overview of the high-disruption vs. the low-disruption scenario

	High	Low
Diverse mobility		
City policies discouraging private vehicles	Intensified	Steady
New, on-demand business models	Prevalent	Limited
Modal shift away from car ownership to shared mobility	Significant	Limited
Autonomous driving		
Regulatory challenges are overcome	Fast	Gradual
Development of safe and reliable technical solutions	Comprehensive	Incomplete
Consumer acceptance and willingness to pay	Enthusiastic	Limited
Electrification		
Battery prices continue to decline	Rapid	Protracted
Regulator-driven emission restrictions	Intensified	Gradual
Consumer demand for electrified powertrains	Widespread	Restrained
Connectivity		
Uptake of car connectivity globally	Vast majority	Partial
Consumers regularly using paid content	Mainstream	Limited

Source: Kaas et al. (2016)

Interestingly, the four categories imply that change will rather occur in a high-disruption scenario. In particular, governmental regulations like emission restrictions and the discouragement of private vehicle ownership are mentioned as intensified signals for change. Indeed, the widespread customer demand for electrified powertrains, combined with a new demand on business models, confirms that the automotive industry may be confronted with a high-disruption change.

Within the business model framework, however, Wirtz (2013) argues that change management must deal with increasing dynamics within the economy. In contrast to the previous sections, this part considers the external influences that require adaption of firm strategy and business model innovation. He identifies three main drivers that initiate change:

- (1) Markets - driven by power shifts, the entrance of new competitors, and emergence of new markets.
- (2) Technology - forced by further development and innovative achievement.
- (3) Deregulation and regulation - driven by government intervention and enactment of new laws.

This thesis has previously discussed business model change factors and the important forces that can directly or indirectly impact trigger change within the automotive industry (see figure 1.3 about PEST forces of change within the German context). With this in mind, the question arose as to how the identified change forces influence the importance evaluation of canvas blocks. In terms of the dynamic ‘change forces’ proposed by Wirtz (2013), therefore, the very latest news from accepted automotive sources are used to investigate and determine the relevant business blocks.

(1) According to Gao et al., the German automotive industry faces “a paradigm shift to mobility as a service, along with new entrants that will inevitably force traditional car manufacturers to compete on multiple fronts” (Gao et al., 2016, perspective 7). New strong OEMs, tech companies, and mobility players (Tesla, Google, Apple, Uber, etc.) could increase the complexity of competition, thus, the pressure to the traditional automotive industry, which is forced to reduce further costs and emissions.

Under such circumstances, the interventions of such global giants may lead to new partnership constellations among players. In this sense, Lienkamp (2016) argues that the desire and need for individual mobility will be maintained for each customer. This may lead to the fact that car-sharing concepts become increasingly attractive to customers, since such concepts are tailored to individual demand. However, this may be the biggest risk to the automotive industry as illustrated by the business model of ‘Uber’. ‘Uber’ provides a service that allows vehicle owners to lease existing seats in their cars to customers. The use of a common vehicle reduces car ownership numbers to five out of ten cars (Lienkamp, 2016, p. 42).

On the other hand, a report by ‘Germany Trade and Invest’ (GTAI, 2016/2017) about the German automotive industry refers to a trend study by McKinsey that predicts a 30% increase in ‘smart cars’ over the next few years. Due to the increased connectivity of every single vehicle via the internet, the premium segment in particular offers greater safety, comfort, and infotainment to customers (Gao et al., 2016; GTAI, 2016/2017).

Interestingly, Lienkamp (2016) predicts a decline in vehicles enforced by improved car-sharing concepts. This assumption is not supported by Gao et al. (2016) and GTAI (2016/2017) who rather forecast an increase in the number of connected vehicles due to the higher demands generated by individual customers.

A combined version that considers both change factors, however, has been provided by Kaas et al. (2016). They argue that fundamental change within individual mobility behaviour is foreseeable due to the expectation that several transport possibilities may be used. Specific needs should be addressed for the consumer, such as spontaneous travel, the receipt of goods and services, rather than being fetched. “As a result, the traditional business model of car sales will be complemented by a range of diverse on-demand mobility solutions, especially in dense urban environments that proactively discourage private car use” (Kaas et al., 2016, p. 8).

Consequently, current markets are changing to customers’ mobility demands. Advanced connections in vehicles and the entry of global giants have caused power shifts that have resulted in new alliances. The concept of car sharing, along with ICT are two emerging markets for change.

(2) In comparison to the technological innovation, as discussed in 2.5.2, wherein the infrastructural area of EVs might be a company’s ‘blue ocean’, the question remains as to which external technologies can trigger change. In the context of advanced technology, many authors describe that autonomous driving could be the next breakthrough technology in the coming years (Lienkamp, 2016; Kaas et al., 2016; GTAI, 2016/2017; Gao et al., 2016; VDA, 2016).

However, fully autonomous vehicles will not be commercially available by 2020. In the meantime, advanced driver-assistance systems (ADAS) will play a crucial role (Gao et al., 2016). On the other hand, Luthardt (2017) notes that the automotive industry, ICT companies, and mobility providers are merging increasingly due to greater mobility in big cities to deal with growing, complex, and high customer expectations. In turn, software competencies are the most important differentiating factors to emerge within the industry.

It seems that the arising challenges will not only be served by specific core competencies, but that a wide range of diverse and customised technologies will be required. Arguably, the automotive sector faces four disruptive forces that mutually reinforce and accelerate one another: electrification, autonomous driving, diverse mobility, and connectivity (refer to table 2.4, Kaas et al., 2016). As such, GTAI (2016/2017) suggest that this could even lead to a closer relationship between OEMs and tier-1 suppliers, depending on how much

value tier-1 suppliers can add to the product. However, this requires tier-1 suppliers to shift their roles to electronics and software providers, which in turn will lead to “supply chain partnerships becoming increasingly important in the value chain of the automotive industry” (GTAI, 2016/2017, p. 7).

Consequently, technological trends indicated that further developments and innovative achievements could be majorly achieved in the ICT sector. Apart from the specific competencies required to manufacture EVs, changes towards electronic technologies and software applications within partnerships are essential to compete with existing players. As GTAI states, “German’s industry strength in electronic technologies and software solutions is crucial for technological advancement” (GTAI, 2016/2017, p. 6).

(3) In light of the overall climate debate and CO₂ emission reduction, as discussed in the ‘introduction chapter’, regulations in the Kyoto protocol were the initial driver of change (European Commission, 2016). Targets set by the German federal government to have one million EVs on the road by 2020 (Presse- und Informationsamt der Bundesregierung, 2012), and the EU stipulation of 95g CO₂/km by 2021 (European Commission, 2016) have provoked the question as to which of the resulting political regulations and laws have provoked concrete activity within the German automotive industry.

According to a report by the ‘Association of the German Automotive Industry’ (VDA, 2016), the main incentives provided by the German federal government relate to financial subsidies for the EV charging infrastructure, the reduction of tax for vehicles that deliver lower emissions, and a direct lump sum payment for every EV customer.

Madina et al. (2016) argue that subsidies do not promote EV purchases, rather several tax rebates: “e.g., in car vehicle tax, in electricity tax or VAT for electricity consumed in private home charging”, make the TCOs attractive for customers (Madina et al., 2016, p. 293).

Although it was questionable whether lower TCOs were sufficient to achieve higher customer acceptance, such regulations could enable private households to become electricity sellers, which may thereby accelerate the infrastructure net of charging stations. Tax incentives could then promote the idea of the free market economy, since

private households would be important players in the definition of supply and demand, and thus directly influence electricity prices.

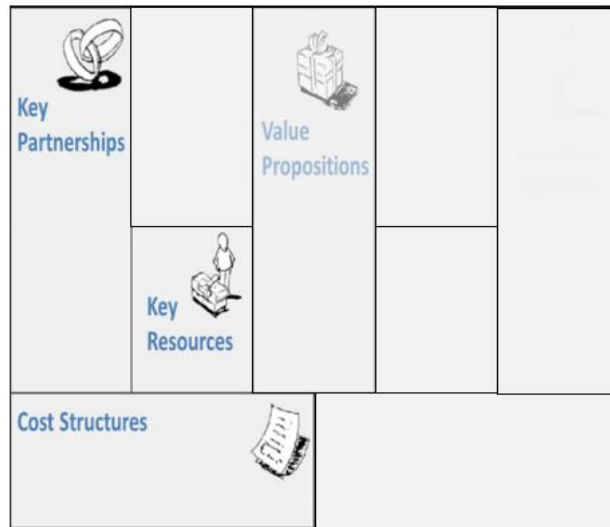
Another interesting theory driving emissions and pollution reduction is provided by Lienkamp (2016), who argues in the wake of the recent VW diesel scandal that government activities are stepping up the promotion of clean cars and the independence of natural resources. This has pushed the German automotive industry lobby into the background. Likewise, this could also be a trigger to switch to alternative technologies of various mobilities.

In summary, deregulation and regulation driven by government interventions and the enactment of new laws are still not actively perceived in Germany. It seems as if further development of autonomous driving is being awaited before reacting to political decisions. This is confirmed by the cited intentions of the VDA report. “The Federal Ministry of Transport and Digital Infrastructure defined the following areas of action in which the necessary conditions for the new technology will be created: Infrastructure law, innovation, networking, as well as IT security and data protection” (VDA, 2016, p. 122).

Nevertheless, recent debates and the switch to alternative and environmentally friendly technologies within the energy sector would imply that new technologies embedded in close partnerships are greatly fostered by the federal government.

Wirtz's (2013) investigation of the forces of change, which have been simplified, are described in relation to markets, technology, and governmental influences (see overview in table 2.4 by Kaas et al., 2016). Due to the highly-disruptive nature of the four trends and the discussed change forces, it could be concluded that these influence the framework of business models, as depicted in figure 2.9.

Figure 2.9: Change influences of alternative technologies to the canvas blocks



Source: Author’s own construction

From the three key findings, the following has been deduced: R&D resources are important in order to participate in infrastructure, networking, and ICT technologies. In turn, different partnerships are important in the development of specific competencies for a unique value proposition. However, as highlighted by Madina et al. (2016), influence on the business block ‘cost structure’ is substantial when TCOs of EVs are higher than in traditional vehicles.

In this respect, customer segments, customer relationships, key activities, and channels are held in the background due to their downstream response to ‘change’.

Summary:

In contrast to the previous sections, where the review considered agreed knowledge, this section addressed external influence factors to the business model canvas from the market, along with a variety of conflicting views. It further incorporated a chronological procedure to capture the dynamics of strategy, business model innovation, and change in the automotive industry that provided a perception of the importance level of each business model block. As such, the emerging findings of each influence factor (refer to figures 2.7, 2.8, 2.9) are concluded according to level of importance. The relative importance levels are directly based on the frequency of their occurrence in the research data and then classified into three different categories. ‘Low’ stands for less important, ‘Medium’ for important, while ‘High’ expresses a higher importance than the others.

Thus, each business model block can be rated in its relative importance as shown below in figure 2.5.

Table 2.5: ‘Business model management’ importance level of each business block

Business model elements	Organisational Infrastructure			Value Proposition	Customer Expectations			Economic Profit Formula	
	Key Partnerships	Key Activities	Key Resources		Customer relationships	Channels	Customer Segments	Cost structures	Revenue Streams
Strategy	Medium	Low	High	High	Low	High	Medium	Medium	Medium
Business model innovation	High	Low	High	Medium	Low	Low	Medium	High	Medium
Change	High	Low	High	Medium	Low	Low	Low	High	Low

Source: Author’s own construction

It is interesting that key resources, as defined with R&D, achieved the highest importance level even before partnerships, cost structures, and the value proposition. This could be explained with the required core organisational competencies that should focus on ICT and software skills. However, such competencies are not necessarily available, thus partnerships consisting of alliances, cooperations, or coopetitions (the simultaneity of cooperation and competition is defined in the literature as coopetition, see Wirtz, 2013, p. 191), help to complement missing knowledge in order to fulfil a competitive value proposition.

Revenue streams, customer segments, and channels are important blocks, although they primarily focus on customer interaction and how they can draw attention to customers' individual expectations.

Key activities and customer relationships are not perceived as important as others. Taking into consideration that ICT and e-commerce enable services and individual customer demands, organisational structures and relationships were therefore kept in the background.

2.6 Conclusion

The literature review has been guided by three key words: (1) business models in general, (2) tier-1 suppliers' value creation process in the automotive industry, and (3) evaluation processes of each business model element. The latter has been divided into static and dynamic elements in order to comprehensively address the research aim and objectives.

A common definition of a business model has not yet been agreed, therefore, the initial review considered the nature and characteristics of business models in general. To be more specific in reviewing existing knowledge, recent frameworks about the tier-1 supplier value creation process has complemented the review of areas in which a common understanding is evident.

The business model canvas provided by Osterwalder and Pigneur (2010), along with the value proposition design of Osterwalder et al. (2014), has been chosen as the basis to frame the evaluation process. Hence, the failed BeP model has been chosen in order to compare it with the business model canvas to understand the different importance levels.

Additionally, the dynamic part of the analysis focused on influence factors that provide a variety of conflicting views about the classification of each business block. By setting the business model canvas as a basis to compare it with agreed and conflicting views, it has been found that there were also areas with no or little knowledge.

2.6.1 Literature map of relevant sources

The overall used sources in the literature map consider a period before and after the technology C in the propulsion technology cycle, as provided by Lohmann (2009) in figure 1.1. Based on the overall picture of the literature review, a period of around two decades can be defined as the era of change in the German automotive industry, with the development of the term 'business model'. Therefore, based on the different areas of the literature review, it was helpful to present the sources in a colour coded literature map which shows into which classification each author falls, as summarised in table 2.6.

Table 2.6: Literature map of a business model study

	Nature of business models	Tier-1 suppliers value creation	Business Model Canvas	Business Model Management
Articles	Hart (1998) Hamel (2001) Magretta (2002) Afuah (2004) Osterwalder et al. (2005) Zott and Amit (2010) Tongur and Engwall (2014)	Normann and Ramirez (1993) Kothandaraman and Wilson (2001) Humphrey and Memedovic (2003) Doran (2004) Volpato (2004) Dietl et al. (2009) Guille and Gross (2009) Michel (2010)	Normann and Ramirez (1993) Enadi et al. (2008) Guille and Gross (2009) Michel (2010) Boomis et al. (2010) Schlick et al. (2011) Guintini (2012) Budde Christensen et al. (2012) Fojcik (2013) Warth et al. (2013) Steinhilber et al. (2013) Dijk et al. (2013) Borup (2014) Noel and Sovacool (2016)	Guille and Gross (2009) Boomis et al. (2010) Zott and Amit (2010) Budde Christensen et al. (2012) Wells (2013) Fojcik (2013) Steinhilber et al. (2013) Dijk et al. (2013) Schwedes et al. (2013) Bocken et al. (2014) Bohnsack et al. (2014) Tongur and Engwall (2014) Parson et al. (2014) Di Bitonto (2015) Morrissey et al. (2016) Madina et al. (2016) Helms et al. (2016) Hall and Roehlich et al. (2016) Kemfert et al. (2016) Kaas et al. (2016) Gao et al. (2016) Lienkamp (2016) Luthardt (2016)
Books	Porter (1985) Graf (2008) Osterwalder and Pigneur (2010) Bieger et al. (2011) Wirtz (2013) Schallmo (2014)	Porter (1985) Porter (1998) Wirtz (2013)	Kim and Mauborgne (2005) Bamey and Hesterly (2008) Osterwalder and Pigneur (2010) Wirtz (2013) Böhmman et al. (2013) Osterwalder et al. (2014)	Porter (1998) Kim and Mauborgne (2005) Bamey and Hesterly (2008) Osterwalder and Pigneur (2010) Böhmman et al. (2013) Wirtz (2013) Osterwalder et al. (2014) Grant (2015)
Professional Magazines, Websites, others	Christensen et al. (2008) Würth (2016) Fost (2015)	Christensen et al. (2008)	Christensen et al. (2008) Patent US 8,013,571 B2 (2011) Patent US 8,164,300 B2 (2012) Patent US 8,006,793 B2 (2011) Patent US 7,993,155 B2 (2011) Patent US 8,454,377 B2 (2013)	Presse-und Informationsamt (2012) European Commission (2016) VDA (2016) GTAI (2016/2017)

Source: Author's own construction

The thematic literature map is structured by the key words and key phrases. The horizontal axis defines the type of source, while the vertical axis lists all relevant authors. Hence, the different knowledge levels are highlighted in colour to easier allocate authors' contributions to the later conceptual framework.

Since the 'business model' term was developed after the Nineties, other sources would have not been relevant. This enabled a review of business model development until the present day in order to capture significant propositions in these areas.

2.6.2 Findings and theoretical streams for a conceptual framework

In this section, the key findings that emerged from the literature were summarised to theoretical propositions. Henceforth, the derived propositions finalised the conceptual framework and established the basis from which to approach the empirical research.

Based on the analysis, the nature of business model development in the German automotive industry was mainly focused on the ICE. Because of its continuously improving technologies, which were primarily focused on being better than competitors, independent suppliers were therefore increasingly tied to OEMs over the years. As a result, the business models of tier-1 suppliers were increasingly adapted to the requirements of OEMs. The resulting B2B type was an example of how the value chain has been adjusted by sub-suppliers to the customers. Porter's (1985) famous value chain model underlined clearly the understanding of a business model at that time. In particular, the focus was on the entire organisation and the method whereby organisations become more effective within the whole value chain. Therefore, tier-1 suppliers added OpEx and modularisation into their value chains in order to sustain competitive advantages.

However, due to increasing technological complexity, globalisation, and higher customer expectations, advanced models developed interdependencies within each process so that the linear value chain switched to network-based activities and the value constellation model put forward by Michel (2010, see figure 2.5). Thereby, suppliers should be organisationally flexible in order to provide to the customer value added while simultaneously remaining profitable.

In this way, common opinion has assumed that key activities and key resources shape organisational infrastructures in order to produce a value proposition for customers.

Grounded on such a knowledge and pushed by the vision to make the world better than today, BeP attempted to significantly alter the technology used in the automotive industry.

The static comparison between the failed BeP model and the business model canvas revealed that each canvas block displayed differences within their importance level. Although different evaluation conclusions could be reached, it has been evidenced that each canvas block contained different importance levels. This can be underlined by BeP's chosen approach and its failed business model.

The question remains open as to whether BeP would have achieved a different result had its attention to other elements been different. This static comparison has revealed that a value proposition perceived from the customer perspective ought to be supported by identified and measurable customer orders that promise sufficient sales. In addition, costs incurred in the development of intangible and tangible assets to create core competencies were essential to achieving a competitive advantage.

Although external influence factors were not considered in this comparison, the findings recommend a prioritisation of the value proposition, the demands of customer segments, and the costs related to financing core competencies. Of course, the approach chosen by BeP to specialise with an OEM, such as Renault, prevented the development of a flexible and universal technology. Therefore, focusing on a specific technology would not perhaps have been necessary once the right R&D core competencies were available.

The dynamic part of the study reviewed external influence factors to the business model canvas because of the increasing frequency of change within the automotive industry. The investigation emphasised managerial instruments, such as strategy, innovation, and change, as a response to the question around the implications of these factors in the evaluation process.

Due to several conflicting views that could be explained by the unknown direction of mobility in Germany, the study recommends a chronological review in order to identify the most relevant influential factors in the evaluation process.

The business environment within the automotive industry was rather stable before 2014 and companies analysed their business environment based on Porter's five forces. Competitors, customers, and partners were known. However, times have changed and managers are now operating in a very dynamic time. Dynamic environments require

alternative or new skills. It is imperative to learn to think adaptively in new situations. Today it is a competitive advantage for those who can effect organisational change faster and without time-consuming discussions.

New technologies that allow the customer to travel on-demand, combined with lifestyle changes that entail pure mobility from A to B could be demanded as emerging business areas. In view of these aspects, it could be stated that the automotive industry in Germany faces a big bang change from manufacturing to service oriented business environments.

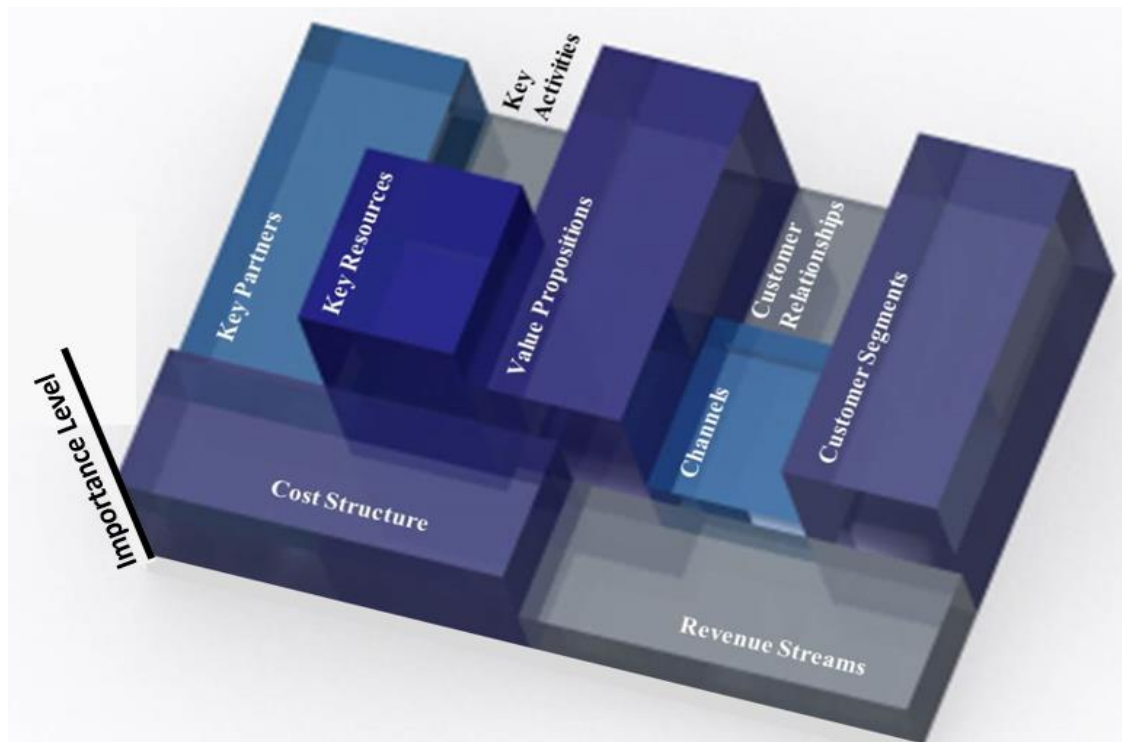
Thus, the analysis of dynamic factors has shown that R&D in ICT and software plays the most important role in value proposition enablement. This can be delivered through attractive channels at competitive costs; these can take the form of provided services in the energy sector or in the charging infrastructure of EVs, as described by Gao et al. (2016).

In summary, a major proposition could be defined as follows: a value proposition shall be perceived from the customer perspective and delivered by services within the energy sector. This will be undertaken preferably in urbanised areas through direct channels, such as customer contracts, usage-bound contracts, flat rates, etc., with revenue streams generated at reasonable cost to create unique values in network-based activities (value constellation) for an agile customer segment.

This necessitates a split of the major proposition into the following theoretical propositions that require testing in the primary research.

- Current R&D centres required to be reflected in and readjusted to ICT and software competencies. Such core competencies may be identified in-house or externally acquired.
- Based on customer surveys that identify mobility behaviour, a unique value proposition could offer a special service for mobility.
- The customer segments and how a value proposition is delivered through the channels available are deciding the costs and sales, as highlighted by various importance levels in figure 2.10.

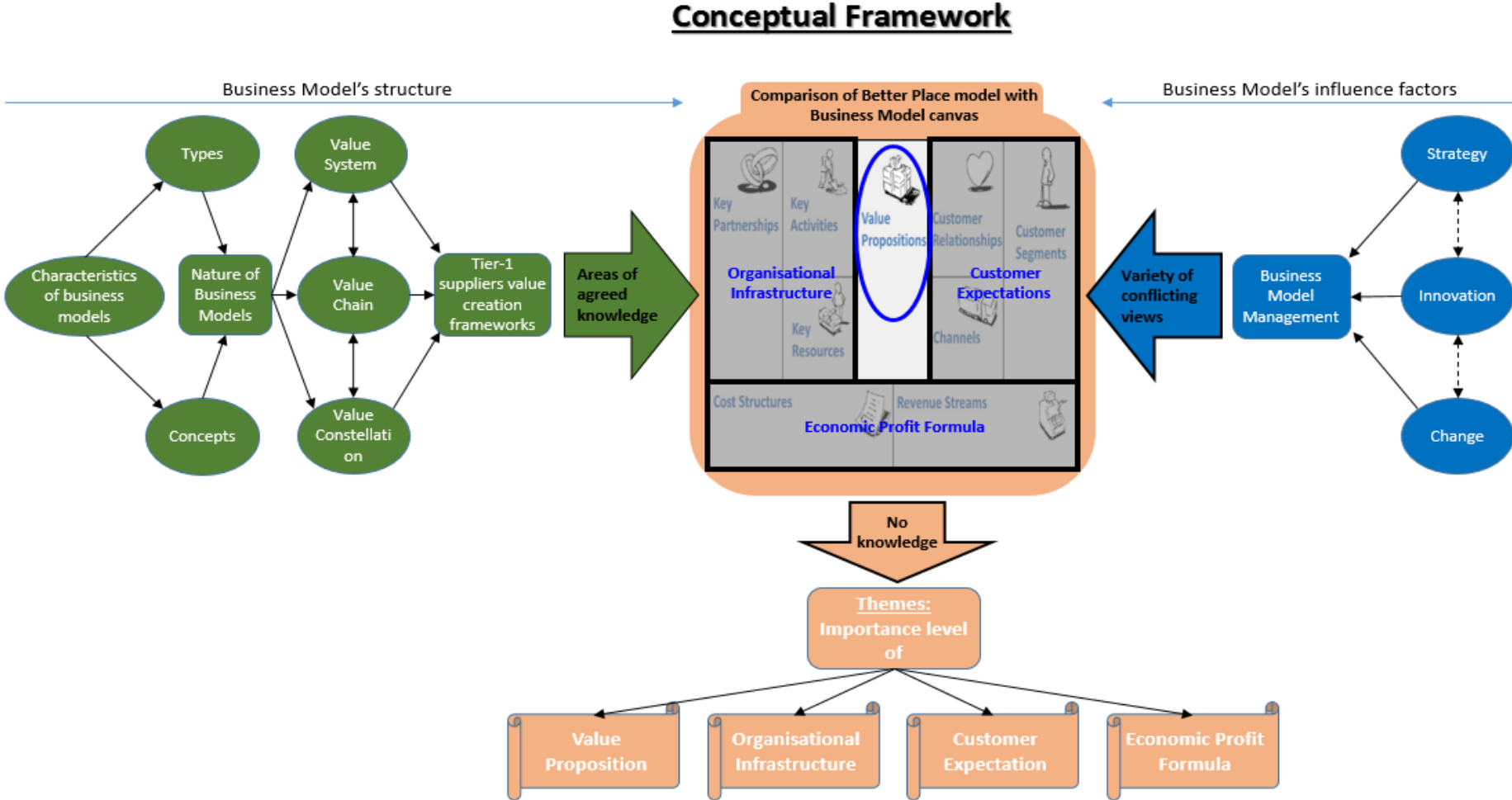
Figure 2.10: Importance evaluation based on the literature review



Source: Author's sketch to visualise an evaluation process

Consequently, the findings can be comprehensively summarised to address the missing knowledge gap in the literature. The colour coding reflects the different literature sources, as outlined in table 2.6, and highlights the areas of agreed knowledge and variety of conflicting views that guide the theoretical propositions without knowledge, as presented in the conceptual framework in figure 2.11.

Figure 2.11: Study's conceptual framework



Source: Author's own construction

Based on Christensen et al. (2008), Osterwalder and Pigneur (2010), and Osterwalder et al. (2014), every business model element and block has respectively been considered with an equalised importance evaluation of the business model. Therefore, the empirical research, which has been guided by the theory, should test the theoretical propositions to close the gap in knowledge.

The next chapter is been used to bridge the theoretical findings to practical areas that have been so chosen to illustrate the constraints of concerned companies.

2.7 Limitations

The literature review showed several limitations. Firstly, the scope of sources was mainly limited to the German automotive industry because of the vast amounts of data available. Despite the global transformation to modern technologies and its possible influencing impact in the German context, some sources may be missing which could result in different considerations. In particular, recent debates about environmental pollution in China and worldwide trading pressure to invest heavily in environmentally friendly technologies are factors not considered in this study.

A further limitation has been identified in regards to all components of business models available in the literature. Since some classical business model elements – value proposition, create, deliver, and capture values – are well known, nowadays fast changing business environments can create new and unique constellations that are as yet unforeseeable.

Chapter 3 Connection to Industry, Practice, and Organisation

In order to substantiate the research problem and derived objectives, this chapter will build a bridge from theoretical knowledge to recent practical cases in the tier-1 automotive supplier industry in Germany. Practical cases of leading suppliers will be used to contrast the identified themes, since they reflect current activity in changing business environments.

Since this chapter mainly provides information from published websites, the findings simply present the different approaches within the sector, but will not be used to justify the methodology. Its prime role is therefore contextual. Hence, by comparing existing knowledge with practical cases from the related industry, the cases have been chosen to highlight the different approaches of leading tier-1 suppliers.

By closing the gap between practical endeavour and theoretical findings, this chapter will conclude with a compact overview that can be used to arrive at a specific moment in this dynamic environment in order to support the research strategy.

3.1 Recent case studies of tier-1 suppliers in the German automotive industry

According to an overview provided by GTAI (2016/2017, p. 9), “Germany boasts 21 of the world’s top 100 automotive OEM suppliers. Of these 21 companies, 10 belong to the top 50 automotive suppliers in Europe” (GTAI, 2016/2017, p. 8). Together these companies generated in 2015 a turnover of €75 billion in the German automotive industry. By 2014, €20 billion had been invested in R&D, since it is key that companies stay on top of current trends and developments if they are to maintain their leading position in such a dynamic market. Therefore, cases of three current leading suppliers, namely ZF Friedrichshafen, KSPG, and Leoni, have been closely investigated due to their different product portfolios and dependencies from the ICE.

ZF Friedrichshafen

In 2016, ZF generated with 136,000 employees sales of €35 billion that positioned it in 3rd place according to the ranking of GTAI (2016/2017). Its ambitious goals up to 2025 are directed towards autonomous mobility. “Digitalization and autonomous driving are prompting radical change in the automotive industry. The Group’s broad product

portfolio facilitates the deployment of new solutions in a variety of mobility-related sectors” (ZF Friedrichshafen AG, 2017).

It is comprised of seven divisions divided into car power technology, car chassis technology, commercial vehicle technology, industrial technology, e-mobility, aftermarket, and active and passive safety technology. Obviously, the paradigm of all divisions is connected to the overall focus of ‘technology’. Although the core business of ZF has been transmission systems with different applications over many decades, the industrial technology division provides the knowledge to participate in renewable energy markets.

The recently launched e-mobility sector offered electronic systems for hybrid modules, plug-in hybrid transmission and electric drives for EVs, not only within the B2B business but also as an e-mobility system house “where electro mobility-related customer requests are processed and the competencies of the group are bundled” (ZF Friedrichshafen AG, 2017, E-Mobility). The ‘active and passive safety technology’ division, however, creates future trends such as efficiency, safety, and automated driving. All of these technologies can then be bundled to service the customer by the ‘aftermarket’ division, as it aimed to strengthen customer services worldwide.

It appears that ZF has recognised ongoing change in the automotive industry and responded by aligning its organisational infrastructure towards alternative technologies, while continuing to exploit its core business of transmission systems. Simplified, ZF used the so-called ambidextrous approach, as proposed by Fojcik (2013). This theory posits the exploitation of the current core business while exploring new market opportunities. This two-handed approach enables firms to finance the new business fields using revenues coming from the core business.

ZF’s statements highlight that the new e-mobility division has been launched in order to focus on three main priorities. ‘Electrification a la carte’ covers a broad range of electric products that provide to customers many different solutions not offered by other suppliers, thus a unique competitive advantage. The second priority, ‘power electronics’, considers an electric driveline that incorporates electronics and software. This technology regulates the power required for electric motors in order to structure costs more

efficiently. Lastly, the ‘custom-made solution’ mainly focuses on the voice of customers (VoC).

Therefore, the e-mobility systems house plays a vital coordinating role with the purpose of meeting individual customer demands, and constantly adapting to specific market needs and expectations.

Consequently, ZF essentially changed its business model in the period from 2014-2016. It has chosen the ambidextrous approach to finance a new division which is mainly focused on R&D, with the aim of greater efficiency in the cost structure. The customer segments for e-mobility can be satisfied by constantly capturing the VoC. ‘Channels’ are considered within the aftermarket division in order to be prepared for autonomous driving. However, a unique value proposition that opens up a ‘blue ocean’ for customer mobility is not recognisable.

KSPG

KSPG is an abbreviation of Kolbenschmidt-Pierburg and was renamed Rheinmetall Automotive in 2016. Under the umbrella of the Rheinmetall group, two major sectors are aligned to the slogans ‘security’ and ‘mobility’ to be lived with ‘passion’. KSPG generated sales of €2.6 billion in 2016 with almost 11,000 employees (Rheinmetall Automotive AG, 2017). This resulted in KSPG being 15th place in the GTAI ranking.

KSPG is divided into three divisions: ‘Kolbenschmidt’ manufactures and delivers to OEMs the mechanical parts needed to operate the ICE. ‘Pierburg’ supplies many components around advanced technology to lower ICE emissions. It “offers high-technology solutions: on-demand controlled electric coolant pumps, DC-motor driven exhaust gas recirculation systems, divert-air valves, as well as the main different versions of drive modules. All these developments help to create an economically and ecologically balanced automobile” (Rheinmetall Automotive AG, 2017, Pierburg). The ‘Motorservice’ division, on the other hand, trades with aftermarket components around the ICE that are come mainly from the other divisions. Its competencies lie in technical, specific services, and customised problem solving services to enable a comprehensive customer offering.

However, a particular division or business unit addressing e-mobility is not yet recognisable. While KSPG has launched a vehicle with a range extender that acts as a

bridge to electric propulsion systems, clear statements around new technologies are not officially disseminated on its website. Perhaps it is not ready for the rapid change taking place in the automotive industry.

If the latter is true, KSPG may face tremendous problems in the near future, as its current product portfolio does not match expected requirements. The ‘Kolbenschmidt’ division supplies mechanical components to the ICE that contain useless competencies in the light of electric and software technologies. Further, the ‘Pierburg’ division supports low emission technologies but still specialises in the reduction of ICE emissions. A transformation to new technology would require an understanding of existing competencies in more detail. On the other hand, the ‘Motorservice’ division has service competencies that could be used for capturing the VoCs.

In summary, KSPG’s strategy and organisational infrastructure seems not to be ready for disruptive change within the automotive industry. Based on the identified importance level of each block, R&D competencies, the value proposition, channelled customer segments, and efforts to finance the change are not yet visible. However, some core competencies and service activities could be available within the organisation that requires further development. This, along with a basic concept to enable KSPG to cope with the next industry challenges, has been recommended.

Leoni

Leoni is a tier-1 supplier to the automotive industry and other industries that deliver mainly automotive cables, wiring systems, and components. With a workforce of 79.000 thousand employees, Leoni generated sales of €4.4 billion in 2016 (Leoni, 2017), placing it at number 14th in the GTAI ranking. Its two business areas, sub-divided into various business units, are hierarchically structured from concept development to system/module finalisation. The ‘wiring systems’ business area has been directed to supply the automotive industry, while the ‘wire & cable solutions’ division offers a broader range of applications. This includes wires, strands, and optical fibres, and other products that are delivered to customers from the medical, telecommunication, energy, and infrastructure, in addition to domestic and electric appliances.

Hence, Leoni prepared its divisions to meet a visible strategy aimed at benefiting more from global future trends through its products and services by involving amongst others, mobility, urbanisation, industrialisation, and globalisation.

In particular with regard to the digitisation of industry, which highly interconnects humans, machines and products, Leoni furthermore is transforming to become a solutions provider: In future the range of power transmission and data management consist more smart cables and cable systems, including sensor technology, software and smart services (Leoni, 2017, Company Portrait, p. 2).

As a result, the ‘wiring system’ division has been restructured in order to strengthen its focus on R&D, which has mainly been oriented on “trends of electro mobility, autonomous driving, and the increasing electrification of mechanical consumers in the vehicle” (Leoni, 2017, p. 109). The ‘wire & cable solutions’ division, however, has strengthened further its good competitive positions through innovations, including an illuminated charging cable for electric vehicles and network production lines known as Industry 4.0.

Although Leoni had been concentrating on two divisions, its overall product portfolio did not necessarily bear the risks expected by rapid change in the automotive industry. Because its expertise could be used in different business fields, these sustainable revenues could be easily used to compensate losses caused by alternative technologies.

However, it seemed that Leoni realised the pending change and began to readjust its organisational structure in such a way that it is still able to finance the ‘wire systems’ division. Thus, the stabilised economical performances in the ‘wire & cable solutions’ division provided the backbone to conduct change. Indeed, R&D and customised solutions to customers were highlighted as being the most important factors, while the organisational structure accordingly required adjustment. Of course, due to its long-term experiences in the field of electric business, Leoni possessed better prerequisites to adapt its business model. However, it seems to have decided on an appropriate strategy to sustain its competitive advantage in the near future.

Summary

The available sources on the current activities of concerned tier-1 suppliers in the automotive industry have revealed different scenarios.

ZF has established a new organisational division and follows the ambidextrous method, while strengthening its service activities around customer expectations. This, R&D, and the customer segment channels combine to enable the company to meet e-mobility.

KSPG, in contrast, reveals no clear strategy as to which direction it is pursuing. Perhaps change strategies have been made available to the executive board already, but to follow with new technologies in such a fast changing business environment, and ensuring the engagement of employees, could be very difficult.

In contrast, although Leoni stood on a safer business terrain, it plans to use one established business area to balance the change in the other division. Accordingly, it is focusing on R&D and services while gradually changing its organisational infrastructure. Indeed, this approach resembles an ambidextrous approach to innovate the business model. In contrast to ZF, however, the exploration of new business opportunities is conducted within an established division.

The three cases are presented below in an overview to better illustrate the differences.

Table 3.1: Business model evaluation of three tier-1 supplier

Business model elements	Organisational Infrastructure			Value Proposition	Customer Expectations			Economic Profit Formula	
	Key Partnerships	Key Activities	Key Resources		Customer relationships	Channels	Customer Segments	Cost structures	Revenue Streams
ZF Friedrichshafen	-	-	High	Medium	-	High	High	Medium	-
KSPG (Rheinmetall Automotive)	-	Medium	-	-	-	Low	Low	-	-
Leoni	-	Low	High	Medium	-	Medium	High	Medium	Medium

Source: Author's own construction

Based on the evaluation of the discussed tier-1 suppliers, the overview provides at a glance the areas in which they are considering adjusting their business models. Interestingly, and almost in line with the findings of the literature, ZF and Leoni are placing R&D and customer segments as being of the highest importance, and how to reach them are also viewed as important. KSPG, however, has undertaken limited evaluation and accordingly was not considered.

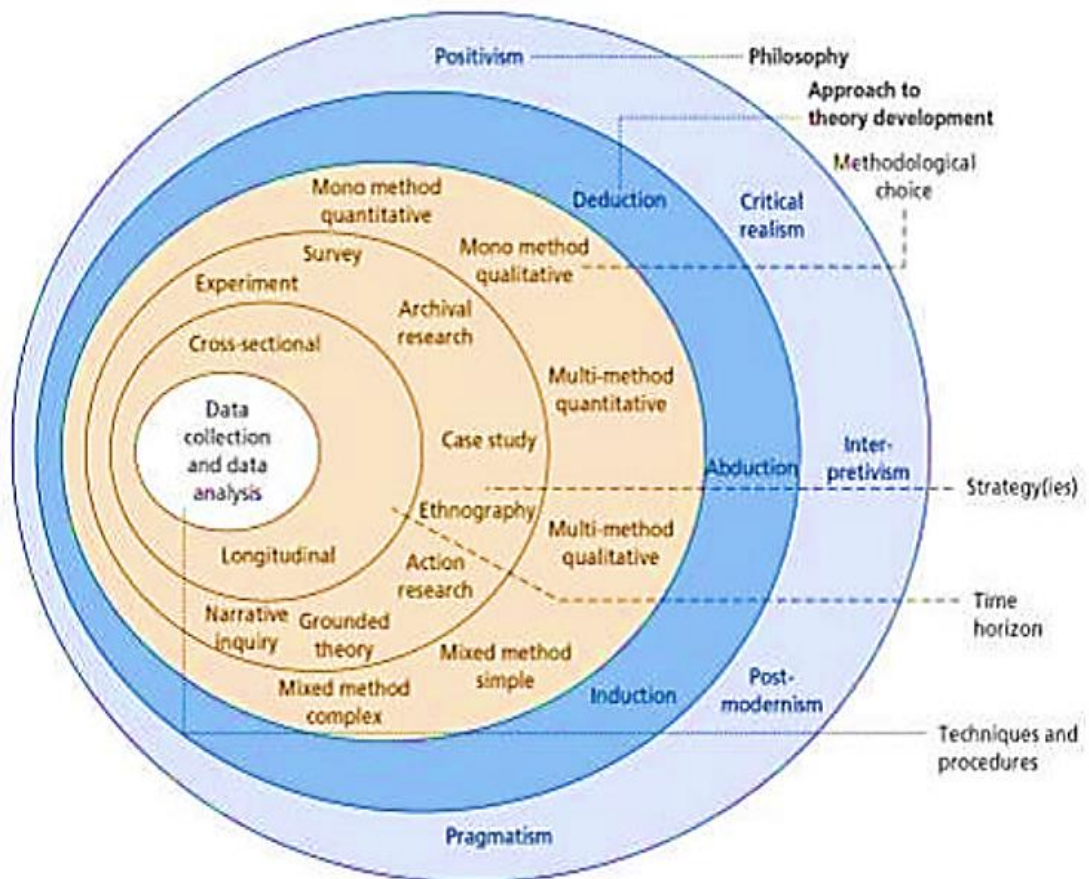
Keeping the cost structure under control at adequate revenues can also be defined as relevant. Indeed, neither company showed any evidence of exploring new and different business opportunities within blue oceans. Instead, they still compete in the ‘red ocean’ environment. Their reactions, as followers of the innovative trends within the automotive industry, certainly resulted from their long-term experiences as suppliers in the B2B business.

Chapter 4 Methodology and Methods

According to Saunders et al. (2016), a research framework should contain the methodology and methods of collecting and analysing data in order to answer the research questions and meet the research objectives. They have provided a research design for business students that contains a number of different layers. These layers are compared with an onion that requires peeling from the outside to the inside.

The research onion procedure suggests that researchers ought to first determine their own philosophical stance regarding the research to be undertaken before entering the next stage. By adopting a paradigm (i.e. worldview about how things work), decisions relating to the research approach, strategy, data collection, and analysis can be consistently made against that backdrop, as depicted in figure 4.1.

Figure 4.1: The Research Onion



Source: Saunders et al. (2016)

Equal to the proposed steps of the research onion, this chapter has been structured in a similar way.

The research settings section uses the outcomes from the literature review and defined the researcher's paradigm in order to identify the fundamental thinking underpinning the study. This approach to theory development identifies the inductive, abductive, or deductive reasoning to enable the researcher to reach the most appropriate conclusions in relation to the research questions.

Next, the research methodology describes the research design drawn from the researcher's philosophy and the nature of the research in order to determine a quantitative, qualitative, or mixed methods approach (Creswell, 2009).

The research strategy section offers the study's strategic approach, research methods, and sampling strategy, which in turn lead to the data collection method.

The section entitled primary data collection follows and demonstrates the process by which way the researcher conducted the collection of data in the research field. It represents the preparation phase, including the development of interview questions that outlines how data collection was undertaken. This is followed by data analysis and interpretation of the results to produce empirical streams whose significances required reliability, validity, and generalisability checks.

Finally, the chapter ends with the emerging limitations and ethical rationales arising from the data collection process.

4.1 Research settings

Based on the findings in the literature, this section builds the initial research design approach. As the theoretical propositions presented in the literature review indicated differences in the importance levels, the following procedure considered testing this theory in the field. The theoretical findings argued that the most important blocks were (1) key resources, explicitly defined as R&D that requires ICT and software competencies, (2) a unique value proposition with regard to mobility and services, and (3) customer segments, including the channels that deliver the unique value proposition.

4.1.1 Research philosophy

Guba (1990) argues that the nature of paradigms is constructed by human endeavours that guide actions with their inevitable errors: for example, the societal paradigm guiding human morality, the organisational culture paradigm guiding the experiences and knowledge of the persons involved, and many more. These paradigms, which are associated with a disciplinarian inquiry, can be defined by basic answers to ontological, epistemological, and methodological questions:

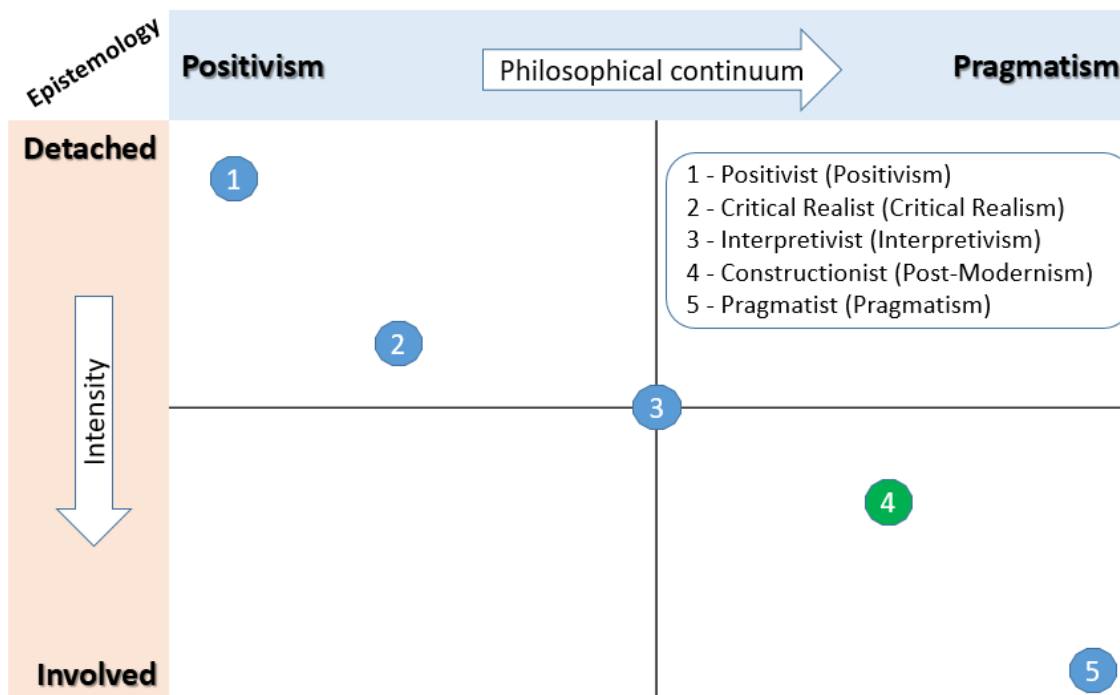
(1) Ontological: What is the nature of the ‘knowable’? Or, what is the nature of ‘reality’?

(2) Epistemological: What is the nature of the relationship between the knower (the inquirer) and the known (or knowable)?

(3) Methodological: How should the inquirer go about finding out knowledge? (Guba, 1990, p. 18)

Although the literature offers several other definitions of paradigms (e.g. Easterby-Smith et al., 2012; Crotty, 1998; Saunders et al., 2016; Creswell, 2009), the cited method to identify the researcher’s worldview by asking these questions appeared to be a rather rational procedure. In response to the bandwidth of known paradigms, Easterby-Smith et al. (2012) provide a paradigm map that can be linked with the dimensions proposed by Saunders et al. (2016) to illustrate, at a glance, the various positions of researchers’ worldviews (as shown in figure 4.2).

Figure 4.2: Paradigm Map of Researcher's Intensity



Source: Amended from Easterby-Smith et al. (2012)

Although it can be argued in these ‘paradigm wars’ that such a determinism would not justify a philosophical validity, the map delivers at least an overview of the various directions of researchers’ worldviews. Along the philosophical continuum, one amplitude – the left side of figure 4.2 - is defined as the ‘Positivist’, which describes those who see a reality - based on a definition of Kant (1787) - ‘a priori’ that is objectively measurable and concerned with regulations and law-like forms. Conversely, on the right extension of the diagram, a relativist ‘a posteriori’ – as explained in a palpable example later on - with their subjective intervention – as a pragmatist or action researcher – understands the world as a constructed phenomenon influenced by everyday life. This approach recommends that the researcher should use whatever methods are required to deliver what is sought. Critical realism, interpretivism, and post-modernism are situated as alternative paradigms to positivism and pragmatism, with a focus on interpretation and intensity at the cost of causation. Furthermore, the individual epistemology of a researcher, results in diverging outcomes that can be seized with the intensity of engagement in the study: either detached or involved (Easterby-Smith et al., 2012).

With regard to the nature of the study's topic, the positivist and critical realist would have presented several hypotheses at first to explore the data that will justify the real hypothesis as, for example, illustrated in the game of snooker. A realist view would analyse the 'picture' (location of the balls) on the table in which each ball would be individually analysed as to whether or not it would be successfully pocketable within a statistical probability. The relativist, however, would concentrate more on game strategy and how to position the balls in order to achieve advantage over the opposition (Easterby-Smith et al., 2012). On reflection of this palpable example and the fact that the researcher is a long time snooker player who is strategically oriented, it can be concluded that the researcher's ontological view tends to be relativistic.

Referring to the research questions, a positivist, or critical realist would have sought hypotheses but these cannot be built on truthful answers. Thus, the outcome would have proposed a framework that might coincidentally be true or, most probably, false. Conversely, the pragmatist would have entered the research field to interact with participants and would thereby have guided the research in a certain direction. Although this method generates new knowledge, it would not have incorporated all related aspects into design the framework of an evaluation process because of its specific and iterative process that sequentially create knowledge without considering wider contexts (Lewin, 1958). However, the researcher may, of course, learn a lot about organisational structures and strategies as a result of deeper involvements. The constructionist, described as an integration with the post-modernism paradigm by Saunders et al. (2016, p. 142), is also involved (see number 4 in figure 4.2) but is equipped with available theory to combine aspects of relevant sources, such as scholars, professionals, organisations etc., which depict a rather holistic view. Easterby-Smith et al. (2012, p. 23) argue

that 'reality' is determined by people rather than by objective and external factors. Hence, the task of a social scientist should not be to gather facts and to measure how often certain patterns occur, but to appreciate the different constructions and meanings that people place upon their experiences.

Therefore, a constructionist approach was chosen as the most appropriate for this study because of its philosophical streams.

Arising from the literature review, the most appropriate approach was identified as being that which involved stakeholder interaction to collect data in the field; the aim being to

discover the different canvas block weights against which a business model could be evaluated and revised. Saunders et al. (2016) posit that the axiology relates to the researcher's values and ethics. They prefer interaction with respondents via direct interviews, for instance. Consequently, the author's worldview as a constructionist is underpinned by the relativistic ontology and subjective epistemology (Guba, 1990).

4.1.2 Approach to theory

The next layer of the onion, as outlined by Saunders et al. (2016), incorporates the use of theory. They propose three different stages from reasoning to research.

1. Deductive reasoning considers premises retained as true, thus the conclusion from the general to the specific must be considered logically as true. Data collection is used to assess theoretical statements associated with an assumed theory created by falsification or verification to reach a certain conclusion. A theoretical position that tests a theory through data collection is theory driven and uses the deductive approach (Saunders et al., p. 51).
2. Inductive reasoning presumes known conditions that are used to develop untested results from the specific to a general approach. Sampling is used to research a phenomenon, determine patterns and themes, and develop a conceptual framework that allows the design and construction of a theory. "To explore a topic and develop a theoretical explanation as the data are collected and analysed, your research project will be data driven and you will be adopting an inductive approach" (Saunders et al., p. 51).
3. Abductive reasoning takes into consideration a 'surprising fact' as a conclusion that is used to develop verifiable premises by interactions between the specific and more general to explain the conclusion. The data collection is used to verify a modified conceptual framework that creates new knowledge advances an existing theory (Saunders et al., 2016).

The journey through the literature revealed findings that repeatedly indicated differences in the importance level of blocks within the business model canvas. The review of agreed knowledge, combined with a variety of conflicting views, provided a set of premises where no or little knowledge is available (see the conceptual framework in figure 2.11). As such, agreed premises can neither be defined to generate untested conclusions from

the specific to the general approach, as described by the inductive logic, nor can an existing conclusion be used to develop its emerging and verifiable premises as proposed by the abductive logic.

This might have presupposed that in both cases the premises are known and usable to create conclusions. Therefore, due to the researcher's paradigm as a constructionist and the findings that emerged, this project used deductive reasoning; "deductive reasoning occurs when the conclusion is derived logically from a set of premises, the conclusion being true when all the premises are true" (Saunders et al., 2016, p. 144). The propositions of the theory, which require be assessment using data collection, presumed that key resources, value proposition, and customer segments were the most important business model blocks within the canvas. However, this conclusion, with its related premises, remained to be tested by the primary research.

4.2 Research methodology

As stated by Creswell, a research design is "a plan or proposal to conduct research, involves the intersection of philosophy, strategies of inquiry, and specific methods" (Creswell, 2009, p. 5). Indeed, Saunders et al. (2016) argued that a research design is a general plan that answers the emerging research questions of a research process that is comparable to a journey.

Based on the literature findings, as portrayed in the conceptual framework, combined with the researcher's constructionist paradigm and deductive reasoning, the research questions and objectives were used to justify the research methodology.

Saunders et al. (2016) proposed in the research onion six different methodological choices. These are: the mono method quantitative, mono method qualitative, multi-method quantitative, multi-method qualitative, mixed method simple, and the mixed method complex. Other scholars focused just on the quantitative, qualitative, and mixed methods approach. In this case, Saunders et al. (2016) further distinguishes between data collection techniques. A mono method defines a single data collection technique, such as using only interviews, while the multi-method considers various inquiry techniques, including questionnaires, interviews, observations, etc.

Quantitative research is defined as a “relationship between variables, which are measured numerically and analysed using a range of statistical and graphical techniques. It often incorporates controls to ensure the validity of data, as in an experimental design” (Saunders et al., 2016, p. 166). In contrast to the quantitative approach, “qualitative research studies participants’ meanings and the relationships between them ... may use a single data collection method, such as semi-structured interviews, and corresponding qualitative analytical procedure. This is known as a mono method qualitative study” (Saunders et al., 2016, p. 168). The mixed methods approach, however, combines the quantitative and qualitative data collection methods and analytical procedures. It is often used where the combination of numerical data and participant meanings are required to answer the research questions (Saunders et al., 2016).

Based on the nature of this study’s research questions and objectives, as outlined in section 1.2, measurable data cannot be used to test a hypothesis and answer the importance levels of each canvas block, since an objective reality does not exist and will instead be subjectively created by unknown factors. In contrast, the research objectives required the input of participants experienced and advanced in the study’s topic. It is clear that talking about business models or value proposition does not necessarily mean that all participants will be versed in it. Therefore, the data collection techniques used to identify the importance level of each canvas block required subjective, individual, and qualified meanings of sources, thus enabling the researcher to construct a theory. The mono method qualitative approach was deemed the most appropriate having taken into account the researcher’s paradigm, theoretical lens, and specific data collection techniques from specific individuals. Indeed, Bansal and Corley (2011) state that although qualitative research is characterised by methodological differences, however, independent of the chosen method, it is crucial that the methodological rigour and theoretical contribution can be demonstrated.

Pertaining to the research onion, three layers have been peeled off in order to advance to the next layer, the research strategy. In fact, it remains to define which inquiry method within the qualitative approach ought to be used. A general plan regarding sampling from selected participants in the relevant field, required in order to address the research questions and test the theoretical propositions, will be defined later.

4.3 Research strategy

Based on the research onion, this section describes a plan of activities to reach a goal. It may be associated with the researcher's philosophy and theoretical approach. Sometimes open borders exist between research paradigms, approaches, and strategies. Indeed, it was used in particular to answer the research questions and address the research objectives, as described by Saunders et al. (2016) who provide eight different strategies aimed at collecting data in different ways:

- Experiment: uses quantitative data to test predicted hypotheses instead of answering research questions.
- Survey: works with questionnaires to make quantitative comparisons via statistics about population behaviour.
- Archival and documentary research: relies mainly on secondary data, such as documents, publications, reports, press releases, etc., and can be used within a case study strategy.
- Case study: may use quantitative data but more often qualitative data in a real-life setting to understand the context of a phenomenon in order to develop a theory.
- Ethnography: qualitative studies to understand cultures or the social world of a group.
- Action Research: develops qualitative data through an iterative action cycle process of inquiries that aims to provide solutions for an organisational problem.
- Grounded theory: qualitative inquiry to inductively generate a theory that is grounded on a broad range of data produced by social actors.
- Narrative inquiry: uses qualitative data collection from a story wherein the participant is the narrator and the researcher the listener. It "investigates the connections, relations and social built definitions that appear naturally within narrative reports in order "to understand the complex processes which people use in making sense of their organisational realities" (Musson, 2004, p. 42).

4.3.1 Study's strategy approach

In contrast to the study's topic and emerging research questions, the experiment and survey strategy has been excluded due to their quantitative nature. The importance levels

of each canvas block cannot be quantified since agreed and valid input parameters do not exist. While the ethnography and grounded theory strategies use the qualitative approach due to the focus on the culture of dedicated groups on the one hand, and inductively generating a theory on the other hand, both strategies were also eliminated. Because of the study's nature that requires it to address deductively the importance levels through opinions from specific sources, the archival and documentary research, case study, action research, and narrative inquiry strategies were mainly considered due to their qualitative database. However, they differing in the degree of researchers' engagements and the type of collecting and using data. The biggest extreme of engagement was the action research as it attempted to generate new knowledge in team meetings by solving problems iteratively. On the other hand, the archival and documentary research used secondary data that would have not enabled the collection of expert opinions, while the narrative inquiry tried to avoid discussions and preferred instead informant narrations.

As the German automotive industry has already begun to change and it was impossible to predict which business model would be the most successful, the approach to collect the opinions of different and concerned stakeholders in a real-life time setting has been chosen in order to develop a context-related theory. This approach used deductive reasoning from the opinions of various experts from broad to specific views in order to subjectively construct the importance levels. Therefore, to develop the theory, a single case study strategy supported by archival and documentary records was conducted due to its real-life setting and context-related phenomenon (Yin, 2014). It focused upon a sector level of the German automotive industry and aimed to gather as much information as possible from related stakeholders. Further, the case study also considered how a changing business environment created the requirement for a revised business model. As such, the unique case study was not about to develop new business model elements, it rather focused on a change in the business relations within the automotive industry by identifying different importance levels of each business model element that led to a revised business model.

Another method to distinguish the research strategies is provided by Yin (2014) in an overview - as shown in table 4.1 - which explicitly highlights the relevant situations by addressing such questions as the 'form of research questions, required control of behavioural events, and the focus on contemporary events'.

Table 4.1: Relevant situations for different research strategies

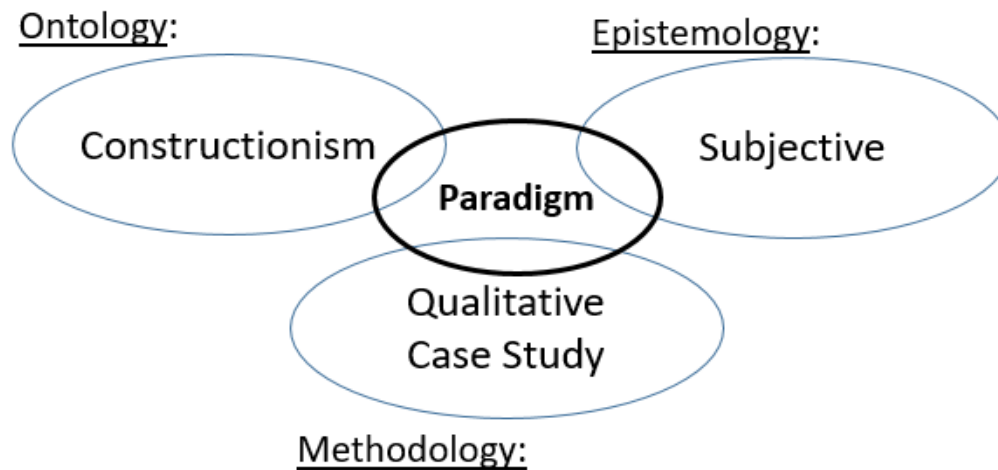
Method	Form of Research Question	Requires Control of Behavioural Events?	Focuses on Contemporary Events?
Experiment	How, why?	Yes	Yes
Survey	Who, what, where, how many, how much?	No	Yes
Archival Analysis	Who, what, where, how many, how much?	No	Yes/no
History	How, why?	No	no
Case Study	How, why?	No	yes

Source: Yin (2014, p. 8)

According to Yin (2014, p. 2), “a case study investigates a contemporary phenomenon (the ‘case’) in its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident”. Different to other case types, the case study research may be related to a change process within an industry sector and can be used when undertaking an evaluation that arrives at a converged conclusion. He further emphasises that a case study is the appropriate strategy, in contrast to the others “when (1) the main research questions are ‘how’ or ‘why’ questions; (2) a researcher has little or no control over behavioural events; and (3) the focus of study is contemporary (as opposed to entirely historical) phenomenon” (Yin, 2014, p. 2).

At this stage, the research settings have discussed and justified the researcher’s ontology and epistemology, as well as the approach to theory, which was identified with the deductive reasoning. Further, the research methodology has been discussed and analysed as the ‘mono method qualitative study’ that applies a ‘case study research strategy’ in order to deliver appropriate responses to the research questions, as summarised in figure 4.3.

Figure 4.3: Research Paradigm



Source: Author's own construction

4.3.2 Research methods

Apart from many other scholars who proposed similar methodologies about the process of collecting data within a field of study, Creswell (2009) defined (1) quantitative research with measurable variables that can be numbered and statistically analysed, (2) qualitative research using data from participants that can be interpreted into building a theory, (3) mixed methods research that combines the inquiry process of quantitative and qualitative research. Depending on the chosen methodology, the research methods include the techniques and procedures to collect and analyse the data, such as interviews, observations, surveys, etc. It was a more visualised and structured way to illustrate the required process steps to collect information and data in the field, as proposed by Saunders et al. (2016).

Due to the nature of the single case study strategy characterised by its uniqueness (Saunders et al., 2016), several authors offered three principal sampling strategies to obtain qualitative data (Yin, 2014; Saunders et al., 2016; Creswell, 2009). Apart from the other methods used to obtain quantitative data, the interviews, observations, and secondary sources were applied as frequently used qualitative methods. The interview is a conversational method between two or more people in which the interviewer asks concise and neutral questions. With regard to its qualitative nature, it has been divided into semi-structured, in-depth, and focus group interviews. In this context, secondary data from documents, surveys, and multiple sources were often used to support the primary

inquiries, although it may be used on its own as a method. The observation, however, was connected with watching the ongoing development in the field of study in order to be part of its real-life setting (Yin, 2014).

By analysing the research questions, it has been stated that it was necessary to have the prerequisites of (1) specific knowledge about business models, (2) experiences in the automotive industry, and (3) advanced expertise in E-mobility. Various stakeholders, who delivered inputs about strategy, change, and innovation, were considered for advanced discussions in order to converge their opinions later into a similar view. In so doing, the research objectives have been addressed from different angles and from qualified informants.

Hence, direct or participant observations have been excluded due to their limited interaction method and the absent observational possibilities. Semi-structured, in-depth or focus group interviews were principally applied, however, Saunders et al. (2016) distinguished further between exploratory, descriptive, explanatory, and evaluative research purposes. In this context, they note that exploratory purpose is used for an inductive approach, often in the development of grounded theory. The descriptive purpose aimed rather to use structured interviews in order to “test statistical propositions or hypotheses” (Saunders et al., 2016, p. 392). The explanatory purpose uses semi-structured interviews in order to understand why relationships between variables exist. In an evaluative study, however, “semi-structured interviews may be used to understand the relationships between ones evaluation and effectiveness of criteria” (Saunders et al., 2016, p. 393). Additionally, in order to identify the most appropriate data collection method, the authors propose the application of a semi-structured interview,

- “where there are a large number of questions to be answered
- where the questions are either complex or open ended
- where the order and logic of questioning may need to be varied”

(Saunders et al., 2016, p. 394).

The best research method to answer the research questions and meet the research objectives was judged to be the open-ended semi-structured interview approach, which uses the evaluative purpose. This came about because the research questions ask ‘how’

and are in their nature semi-structured and formulated to receive a large amount of opinions and statements - as well as being characterised with high complexity. The triangulation of data sources is a primary strategy that supports the case study research paradigm to observe and examine the phenomena from multiple perspectives. Collecting and comparing these data improved the quality based on idea convergence and result confirmation (Knafl and Breitmayer, 1989).

Secondary data from documents has been used for this research method in order to understand ongoing developments and their related real-life context in this area of study.

4.3.3 Sampling strategy and time horizon

In light of the theoretical propositions (section 2.6.2) and the conceptual framework that required application in order to answer the research questions, the single case study used three main interview sources and relevant automotive documents. Indeed, because of the study's complexity, it was necessary that the chosen sources were equipped with advanced knowledge and experiences about business models. Otherwise, an identification of importance levels would have falsified the outcomes as a result of inequality in knowledge. To analyse the qualitative data from the interviews and documents, the data triangulation method was defined as it “helps to strengthen the construct validity of your case study. The multiple sources of evidence essentially provide multiple measures of the same phenomenon” (Yin, 2014, p. 121). In contrast to Saunders et al. (2016), Yin (2014) did not recommend a minimum sample size. He claimed that the use of multiple sources increased confidence in the accuracy of the case study. By this, "you should at a minimum have queried the same participant several times or on several occasions – which would then serve in its own way as a set of multiple sources” (Yin, 2014, p. 122).

Consequently, the sampling strategy uses the triangulation method from relevant sources that purposively searches for data saturation.

- As explored in detail in section 3.1, the chosen cases of three leading suppliers, namely ZF Friedrichshafen, KSPG, and Leoni reflected the themes due to their different product portfolios and dependencies from the ICE. These inquiry sources from leading and affected tier-1 suppliers offered a more in-depth insight into their current strategy regarding alternative technologies. Instead of randomly choosing tier-1 suppliers, ZF, KSPG, and Leoni have been purposively selected due to their different change

progresses and dependencies from the ICE and OEMs. Therefore, business development experts at lower management level delivered diverse information about their priorities, reinforcing the importance of change. According to findings from all three company websites, (see section 3.1), the following was gleaned: ZF has recently launched an e-mobility system house and applied the ambidextrous approach; KSPG on the other hand faces one of the biggest threats as its product portfolio depends almost entirely on the ICE. As such, it was interesting to understand its standpoint with regard to the planned strategy. Leoni enjoyed a rather uncritical situation, because its product portfolio can be used in other applications. Therefore, Leoni seems to be focused on a business model innovation that uses the ambidextrous approach within an existing business field. Due to its advanced and uncritical business model situation, and the many failed attempts of the researcher to agree on an interview, Leoni has not been considered further as a data source.

The developed R&D competencies in the B2B over many years of these tier-1 suppliers offered a diverse understanding of their views on the importance levels of the business model blocks. However, due to new business opportunities and arising competition, the sampling may have contained biased responses since company representatives were limited in presenting their real opinions. Other tier-1 suppliers would have delivered similar insights into their strategy as well. However, the purposely-selected informants were operating in similar business conditions, such as being leading organisations within the TOP 100, dependencies on ICE, and different approaches towards change, strategy, and innovation. Further, based on the recommendation of Saunders et al. (2016), a defined sample size provided sufficient convergence or concordance to make further research unnecessary.

- Germany has many advanced and independent research institutes in several research fields, but only a few research alternative technologies. The Karlsruhe Institute of Technology has an outstanding reputation for advanced technologies, especially in drive systems. Due to ongoing sponsorship provided by OEMs, students and professors were very much advanced (KIT, 2015). Another source of sampling was the ZHAW - Zurich University of Applied Sciences. This advanced university is “concentrated on important societal challenges, with a particular focus on energy and social integration” (Piveteau, 2017). A professor from this inquiry source has been

chosen due to their advanced energy research and ethical connections with regard to OEM behaviours. As the literature review found many articles suggesting that even when the benefits of alternative propulsion systems were evidenced, the constraints of the overall energy balance, plus the OEM lobby, prevented the breakthrough of modern technologies. Therefore, the professor was approached in order to understand the influences of OEMs from the energy and ethical perspective. Indeed, the meeting was scheduled as an interview, however, it ended up in an interesting discussion that was not recorded. Hence, following the request of the professor not to include this interview, this meeting has not been used although important comments from the discussion were taken into consideration.

Nevertheless, both institutions researching alternative technologies were in regular contact with the automotive industry. As the study has developed in a direction that required very specific and advanced knowledge, professors from these institutions revealed the latest developments in the automotive industry that benefited the canvas block ranking. Of course, this dimension of inquiry considered the technical and ethical perspective that would have influenced a business model, however, it also provided a presumptive direction of current R&D activities.

- Management consultants were regularly in touch with numerous companies due to their business models, which provide advanced solutions in many areas. Of course, they were not permitted to spread confidential information about clients. However, they have acquired special knowledge about certain company strategies over many years, as experienced by the researcher during a meeting with Zeppelin and Ernst and Young. Inevitably, they gathered valuable and tacit knowledge that created intrinsic beliefs. This angle of inquiry provided a common understanding, which has been discussed and worked out by experts whose converged expertise was used to sell them to clients.

This was, for a constructionist, a challenge as the interview techniques required the tacit knowledge to be revealed as well. Nevertheless, the knowledge sourced from consultants was essential for the researcher as they were regularly confronted with company problems in their daily life. For this, the consultants were obliged to provide immediate solutions in order to commercially sustain the business. Hence, the commercial axis of inquiries considered the whole business model canvas and

provided an external perspective on the importance levels. However, consultants were generating revenues with such business models by supporting firms during the change process. Therefore, the outcome from these interviews may have been subjective or even incomplete.

Time horizon:

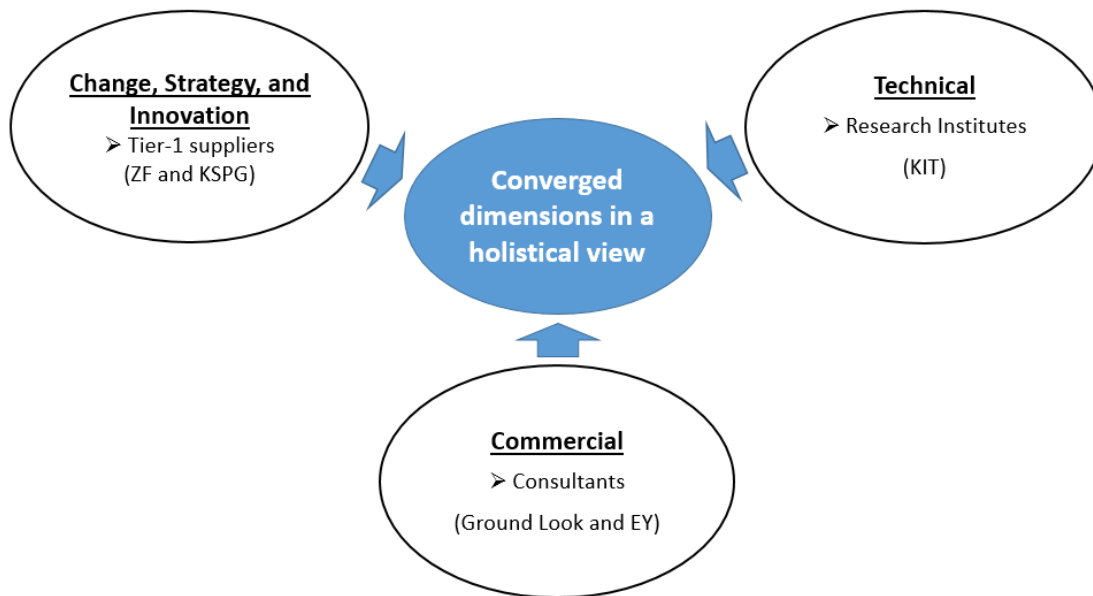
The fifth layer of the research onion demands the clarification of the research time horizon. Saunders et al. (2016) propose, therefore, that the study be undertaken at a particular point in time or was a representation of several events over a certain time. They define the latter as a longitudinal study, while a study undertaken at a particular time is a cross-sectional one.

Both time horizons could have been used for a case study, however, due to the ongoing change in the automotive industry and the risk of being too late, the case study interviews were conducted in a short time period. Otherwise, many events and unforeseen developments in this changing business environment could have led the researcher to incomplete results.

Summary:

The three categories of the case study inquiry considered different dimensions of the triangulation method to converge them into the importance levels of the business model elements. The industrial view upon the three tier-1 suppliers revealed current activities in terms of change, strategy, and innovation. Two research institutes, however, provided a more objective and technical perspective of current activities to move further on in this business field, while two consultants delivered the commercial dimension due to their expertise, as visualised in figure 4.4.

Figure 4.4: Sampling with different focuses



Source: Author's own construction

It could be argued that chosen sample sizes would not be sufficient to develop a conclusion. However, due to the limited time horizon and difficulty in accessing informants, the specific inquiries provided diverse opinions from important contributors, instead of collecting non-qualified data from unqualified sources. Indeed, Saunders et al. (2016) suggest performing between 5 and 25 semi-structured interviews for general studies depending on the nature of the research questions.

Based on the constructionist paradigm, the five conducted interviews were semi-structured due to the conversational approach in order to satisfy the needs of inquiry and retain a friendly and non-threatening atmosphere. Upon the agreement with the informants, the outcomes from the voice recording and interview protocols were transcribed to build context-related chunks (Yin, 2014). Instead of using software such as Nvivo, which codes the frequencies of words as in a statistical analysis, the constructionist prefers to manually code directly into the transcripts through side-comments. This enables the capture of context related words with similar meanings, which is coded later on to real patterns (Miles and Huberman, 1994).

Having arrived at this stage of the research strategy and methods, the presented plan comprehensively addressed the research questions. The questions required informants who had special expertise, explicitly and manifold chosen sources, and who were

contemporary in order to triangulate the findings into a coherent conclusion. More extended procedures could have further strengthened the outcomes. That said, due to the given time horizon, interviewee accessibility, and the limited resources available to the researcher, the discussed research strategy and sampling method were finally chosen, as summarised in table 4.2.

Table 4.2: Research strategy and sampling

Sampling strategy and methods				
Methods	Research Questions	Research Objectives	Inquiry source	Triangulation method
Interviews	How important is a value proposition that creates value to sustain and potentially build upon competitive advantages?	To critically assess the importance level of a value proposition that perceived as being of key importance for customer demands		> five semi-structured, open-ended interviews by using an audio-tape, an interview guide, the conceptual framework, non-disclosure agreements (NDA), with the transcriptions afterwards
	How significant is a business case in a revised business model?	To critically determine the impact of a business case that would be acceptable for profit-generation by tier-1 suppliers	<u>Research Institutes:</u> One professor from KIT <u>Tier-1 suppliers:</u> Two business experts of leading automotive supplier, namely, ZF, and KSPG	
	How essential is an organisational infrastructure to produce a value proposition?	To critically appraise the contribution of organisational infrastructures that produce an effective value proposition	<u>Consultants:</u> Two consultant from Ground Look Consultant and Ernst & Young	
	How relevant is the customer expectation for a value proposition?	To critically identify the relevance of customer expectations that are equipped with channels and relationships to assist such a value proposition		
Documents	All identified research questions		<ul style="list-style-type: none"> o Reading published interviews o Automotive congress o News articles o Automotive reports 	<ul style="list-style-type: none"> > Recordings in my diary > Collect relevant Articles

Source: Author's own construction

4.4 Primary data collection

Now at the core of the onion, this section illustrates the process by which the primary data were collected in the field. It represents the initial preparation phase and researcher's thoughts about how the questions were developed. The interview questions were based on the research questions and aligned to the key themes around the concluded findings from the literature review in chapter 2.

Upon the preparation phase, the interview guide (refer to Appendix 1) provided the guideline for conducting the interviews in the field. Further, it described the method of how to approach the informants to collect the data via semi-structured interviews. Afterwards, the collected data were transcribed, analysed, and interpreted to produce context-related chunks. Finally, these chunks were used to manually code the findings in an excel sheet in order to allocate them to each business model block afterwards.

4.4.1 Initial preparation and interview questions development

As described in the research settings section (4.1), the research questions have emerged through the findings from the literature review. By this, the influence factors developed the importance levels differently, as visualised in figure 2.10. Therefore, a section in the interview guide considers categorising the semi-structured interview questions, thus, to test the theoretical statements. The interview guide helped to structure the interview and ensured that no important information was missed before, during, or after the interviews. It further ensured "that the order of questions is likely to be logical to your participants and that the language you use will be comprehensible" (Saunders et al., 2016, p. 403).

Based on the chosen interviewees and their specific expertise, the purpose of researcher's interview guide was twofold. Firstly, to guarantee that given interview guidelines and rules were not jeopardised and, secondly, to build a common foundation that offered usable responses. Therefore, the interview guide was divided into (I) a preparation phase, (II) aspects to be considered during the interview process, (III) the semi-structured interview itself, and (IV) the closing steps.

(I) The preparation phase included the initial approach to interviewees in order to explain the study's background with its current findings. It further included the agreement to a face-to-face interview in which the researcher submitted a cover letter to the participant in advance (Appendix 2), the conceptual framework, and research

aim. The oral explanations, combined with the main information regarding the research, generated a sense of trustworthiness, piqued the informants' curiosity, and served as an advanced foundation for the interviews. A checklist that ensured the researcher's appearance, functionality/readiness of technical appliances, and documents was used to complete the preparation phase.

- (II) Although it can be argued that this part belonged to the preparation phase as well, the aspects to be considered during the interviews was to remind the interviewer of the ethical guidelines and philosophy. Hence, the nature of the questions was formulated to follow the qualitative case study approach. Furthermore, behavioural aspects that indicated that the researcher should remain calm, polite, and not become irritated were also essential. Due to possible translation errors, the major language was determined as English. However, at some points, the researcher clarified a specific or explicit issue in German, his own native language.
- (III) The face-to-face interviews were constructed in eight steps. Firstly, mutual introduction with some small talk aimed to relax the atmosphere in order to mitigate invisible barriers. Next, an explanation of the research topic with its aim and research questions reconfirmed the study's background. In this context, the interview procedure respected the university's ethical guidelines (see Appendix 5), and the voluntariness of the interviewee sought for the upcoming questions. Third, the general questions were not chronologically ordered. They were used to determine the background and informant knowledge. In this way, informant expertise about business models, value creation, and e-mobility were assessed instead of more detailed or specific inquiries. Fourth, with respect to alternative technologies, the open semi-structured questions were constructed in a way to solicit data from the broad to a more detailed view. Due to its semi-structured nature with its demand to open a conversation that guides the inquiry to its depth, every key question was directly linked to each research question. By this, the key questions were used to open the discussion about the importance level of each business block. Due to the researcher's paradigm, probing questions were used to investigate responses in detail that were relevant to study's topic, (e.g., that is interesting; tell me more about ...; why do you think so; what do you mean with ...). A different procedure would not have allowed an understanding of the reasoning around evaluating importance levels.

Despite this general evaluation method, the fifth step incorporated the external influence factors of strategy, change, and innovation. With this, the informants were requested to evaluate canvas block importance levels in consideration of each influence factor. Indeed, in such a combination the importance level differed to the general method. By this, the respondents became conscious of their different evaluation methods that could provide a non-biased assessment, as proposed with high = very important, medium = relevant but not decisive, low = could even be neglected. The sixth step inquired individual and general opinions in order to close the interview session. It was planned to elicit recommendations and/or contradicted opinions from the participants about tier-1 supplier business models. The subsequent step was to request further comments, recommendations, and remarks that were relevant for the researcher. Finally, the face-to-face interview reached its end at the eighth step.

(IV) The closing section contained the oral confirmation of the subsequent transcription phase and the planned completeness of the interview protocol, as illustrated in Appendix 3. Furthermore, a non-disclosure agreement that confirmed confidentiality and anonymity was signed directly after the interview in order to preserve trustworthiness, as depicted in Appendix 4.

4.4.2 Study's reflection

At this point, it was necessary to wait for a while to critically reflect on the study's progress. Based on the initial readings, many sources claimed that without a unique value proposition the business model would have difficulty surviving in and upcoming markets. Under such conditions, the remaining business model elements were considered to adapt to the decided value proposition. However, reading through a wider range of different sources revealed that there has been an interesting change regarding the discussion themes after 2014. Until 2014, most articles referred to the probability of changing to alternative propulsion systems, while afterwards the themes changed and articles mainly discussed how to switch to the environmentally friendly systems. Therefore, the findings arising from the latest literature review shaped a different picture than initially assumed. It has shown that the value proposition is still very important, however, the key resources in terms of R&D, which 'invents' the value proposition, achieved an even higher importance level. By this, the key themes have been defined with importance levels that set the key

resources, value proposition, and customer segments in this sequence as the focal points (refer to section 2.6.2). The generic of the concerned tier-1 suppliers in chapter 3 confirmed the various change progresses, indicating the perplexity of the most appropriate strategy. The BeP case, for instance, discussed innovative ideas, although it was too early for this concept. The recipe for tier-1 suppliers to transform an existing business model into a revised one, and to place resources in the most effective situation, has not yet been described.

Based on the conducted interviews and collected data from selected interviewees, the next section reflected the method of transcribing, analysing, coding, and interpreting the findings to produce empirical statements.

4.5 Qualitative data analysis and interpretation

Yin (2014) proposes five different analytic techniques that ought to be thoroughly and introspectively worked out to ensure compelling case study analyses. (1) The ‘Pattern Matching’ logic uses a congruence method that “compares an empirically based pattern – that is, one based on the findings from your case study (...) or with several alternative predictions” (Yin, 2014, p. 143). (2) The ‘Explanation Building’ technique follows the goal to construct an explanation about the case. It is used to explain causal sets of relations of phenomena to explain why something is happening. (3) A ‘Time-Series Analysis’ considers a predefined period in which the empirical data are used to draw conclusions thereof. This can be directly compared with the time-series analysis conducted in experiments. (4) ‘Logic Models’ is an analytic method that uses

matching empirically observed events to theoretically predicted events. Conceptually, you therefore may consider the logic model techniques to be another form of pattern matching. However, because of their sequential stages, logic models deserved to be distinguished as a separate analytic technique from pattern matching (Yin, 2014, p. 155).

(5) The ‘Cross-Case Synthesis’ applies to multiple case studies. The synthesis incorporated different separate studies and can be used even for quantitative techniques.

Based on the literature findings and the methodology approached to test theory, the research collected empirical data to compare informant opinions about the importance levels of the canvas blocks against the findings from the literature. Thus, the ‘Pattern Matching’ logic and ‘logic models’, according to the definition provided by Yin (2014),

have been identified to analyse the collected data. However, due to the congruence method that considers the data empirically within the triangulation method, every data source is treated equally and its matching patterns. Therefore, 'logic models' with their sequential stages can be excluded; the 'Pattern Matching' logic that compares every source congruently only from different perspectives against the predicted theory has been identified as the most useful procedure.

4.5.1 Reliability and validity

Saunders et al. (2016, p. 726) define 'Reliability' as "the extent to which data collection technique or techniques will yield consistent findings, similar observations would be made for conclusions reached by other researchers or there is transparency in how sense was made from the raw data". 'Validity', conversely, is described as "the extent to which research findings are really about what they profess to be about" (Saunders et al., 2016, p. 730). A more simple definition is provided by Easterby-Smith et al. (2012), who claim that a constructionist might justify the quality of data with the following questions:

> Data reliability: Would another constructionist come to the same conclusion?

> Data validity: Did I consider all relevant perspectives?

With regard to the pattern matching logic, Yin (2014) and Saunders et al. (2016) assert that initially an outcome from the literature review ought to be stated in the theoretical propositions that require testing. Indeed, the theoretical propositions have been defined upon the literature findings and aligned with the research questions presented in the conceptual framework. In this way, the key interview questions were linked to the conceptual framework and used as a basis for the analysis. By this, the data utilisation commenced "with an initial set of codes derived from your theoretical propositions and conceptual framework, linked to your research questions and objectives" (Saunders et al., 2016, p. 594). Next, the codes were allocated to the business model blocks and sorted into patterns, which were then evaluated twofold, as detailed described later on in STEP 5. Indeed, the data analysis has been designed in such a way in order to use an evaluation process that could test the theoretical findings from the literature.

Based on the recommended pattern matching logic of Yin (2014), and the proposed analysis method from Saunders et al. (2016), the applied procedure used to perform a

detailed analyse of the transcribed data, building relevant chunks, and making sense of them are listed subsequently in a step by step guide provided by Loefgren (2013):

STEP 1: Review all interview protocols and read the transcripts

Reviewing the interview protocols created directly after the interviews offered the researcher an overall impression about the conducted interview and also served as a way to remember very important statements. It further synthesised the researcher's observations during the interview with the transcripts in order to validate the plausibility of collected data with the subjective observations. Indeed, not every incident or extraordinary gesture was recorded in the interview protocol, but the most relevant occasions were captured as outlined in an interview protocol example in Appendix 6.

In parallel, reading every transcript one by one offered a comprehensive picture of the interview. It further enabled the researcher to make notes about the overall impression in order to capture contextual phrases. By then reading the transcripts - as illustrated in an extract of a semi-structured interview transcript in Appendix 7 - very carefully line by line, the conditions were in place to continue with the second step.

STEP 2: Label relevant 'chunks'

In this step, each sentence, phrase, word, or section was coloured yellow in order to highlight chunks that provided an indication to an importance level. In so doing, opinions, processes, differences, concepts, activities, actions, or other indicators were considered relevant. Furthermore, repeated sentences, surprising comments, or important comments that were explicitly stated by the interviewees were also marked as relevant. These phenomena were unbiased and considered important due to their connection to the evaluation of importance levels. The colour marking method has been extracted as an example from a transcript in Appendix 8 in order to present the researcher's question and separated chunks from interviewee responses.

STEP 3: Label the most important codes

At this stage, the reading focus was only on the labelled chunks. Indeed, it supported the following coding because of the highlighted sections. The coding itself was directly carried out in the transcript by adding side-comments to most important words or sentences - depicted as an extraction in Appendix 9. These side-comments have been

chosen in a broader context, as they were initially provided by Osterwalder and Pigneur (2010). Thus, they have been considered in comparison to each business model block and then consolidated to specific codes. Of course, some codes did not have a direct link to every canvas block, however, their meaning or interpretive statement enabled at least delimited allocations. In other words, this procedure conceptualised extracted words, phrases, sets of words, and meanings to codes in order to ground the outcomes on a qualitative evidence base. Hence, step 3 was an essential procedure that extracted the most important statements to codes as a basis for the next step.

STEP 4: Label codes to the canvas blocks in an excel sheet

The defined codes from the transcripts have been transmitted in an unbiased manner into an excel sheet, one by one. In order to distinguish the canvas blocks or categories from one another, different colours were chosen in a visualised logic. The ‘value proposition’, the centre of the canvas, was assigned the colour ‘gold’ to highlight an individual canvas element, while ‘customer expectations’ and its related blocks were marked with green colours divided into different brightness ranges. This coloured element demonstrates the connection to customers, and associates a positive perception from the customer side that resulted in a warm colour for the ‘revenue streams’. The left side of the canvas, the organisational infrastructure, received the colour blue, again with different brightness ranges. This colour has been chosen as a result of the initial findings in the literature review. To conquer a ‘blue ocean’ requires new ideas that may end up in a ‘golden’ value proposition but also in ‘grey’ costs, a not so desirable colour. Indeed, the decision to use such a colour mode supported the coding because of this mnemonic. In this way, collected data were structured to mark every single code with the dedicated canvas block colour as depicted in the excel table in Appendix 10. Hence, the basis for evaluating the importance levels of each block was achieved and served as a guide for the decisions taken in the next step.

STEP 5: Decide importance levels based on frequencies and individual weights

This step was the key procedure to make sense of the data. Therefore, it has been divided in two consecutive evaluation sub-steps.

5.1. Firstly, the frequency of the coloured codes of each interview was simply counted and divided by the total amount of codes. The result in percentage expressed the

frequency of codes commented on by the interviewee, as shown in Appendix 11. The more specific certain knowledge interviewees had acquired about the importance of the business model, the more it is been anchored in the mind. In this way, the frequency of codes implied a kind of intrinsic belief in interviewee opinions. Although the simple counting of codes cannot be representative at this stage, it provided at least an individual and average perception of the candidates.

5.2. Secondly, and the most relevant analysis procedure undertaken, comes the horizontal evaluation through every respondent. In contrast to the simplified counting of codes, this process summed up all equal or similar codes in the same context from every interviewee in a ranking that considered how often a code has been mentioned overall by interviewees. By this, identified and similar meanings of the codes were clustered into converged categories that have been subject to unbiased definition by the researcher. Apart from the connection to the canvas blocks, the codes were weighted upon their individual importance from respondent perspectives, as illustrated in Appendix 12. Thus, the triangulation method of using “multiple sources of evidence essentially provide multiple measures of the same phenomenon” considered a different angle of evidence as proposed by Yin (2014, p. 121).

By considering both sub-steps, the evaluation of the importance levels was twofold. The individual opinions counted the frequencies of codes and submitted a subjective voice. The diagonal counting of the codes, however, provided a converged view about a non-connected opinion from all interviewees.

STEP 6: Write up with a neutral voice in the Chapter ‘Findings and Results’

Finally, the basic coding process was finalised. It used two dimensions to analyse the data from the field. The coding that used the individual frequencies of the codes in connection with the horizontal weighting procedure of codes provided an interdependent view to test the theoretical propositions from the literature review. By this, both methods were a contrasting juxtaposition to identify a tendency towards equal importance levels, one rated in percentage and the other in code frequencies. Indeed, another constructionist may have used a different approach to deliver a reliable conclusion. However, the chosen analysis method considered the usage of one code in two different analysing perceptions that minimised the risk of delivering invalid findings and results.

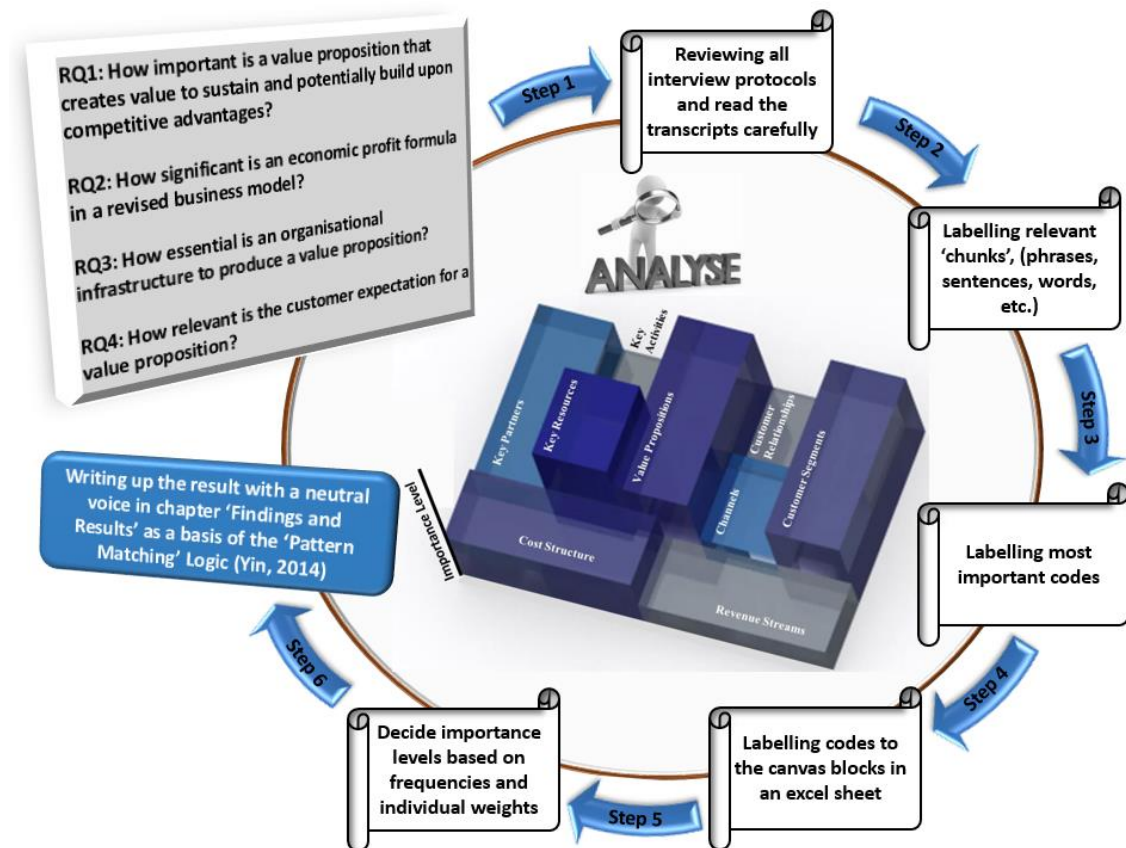
Based on the recommendation of Lofgren (2013), the findings and results are described in chapter 5 using a neutral voice and without any interpretation by the researcher. In chapter 6, however, the interpretation of the results is then discussed in detail.

Documentary Analysis:

The documentary analysis is used to compare ongoing developments from published interviews, automotive magazines and reports, and newspapers, along with the emerging findings in an ongoing process to contradict non-logical conclusions and generate new potential ideas. New developments or other directions are recorded in the researcher's notepad and allows for him to visit the field again in the case that the initial interview guide ought to be amended.

In summary, based on the 'Pattern Matching' logic provided by Yin (2014) and proposed analysis techniques from Saunders et al. (2016) and Easterby-Smith et al. (2012) - which has been applied by Lofgren's (2013) step-by-step guide - the approach as to how transparency is achieved from the raw data in order to make sense of them, can be summarised in a sketch, as illustrated in figure 4.5.

Figure 4.5: Qualitative data analysis process



Source: Author's own construction

The applied qualitative data analysis process was grounded in the research questions and systematically executed in six steps. The centre of the analysis process illustrates only the different heights of each canvas block, as an indication for the concluded result of the thesis in chapter 7.

4.5.2 Generalisation

Some scholars describe the term 'Generalisation' in slightly diverse ways. Easterby-Smith et al. (2012) provide a simple question to address the term generalisation: Are the diverse dimensions sufficiently inferring in the same context? Creswell (2009), conversely, argues that this term is used in a limited way in qualitative research. This is because the case study's inquiry method and its related findings cannot be generalisable to other external places, sites, or individuals. To some extent, they only can be generalised into a broader theory, or used to apply to other settings, as recommended by Saunders et al. (2016, p. 717). Yin (2014) in case studies, however, used the term analytic

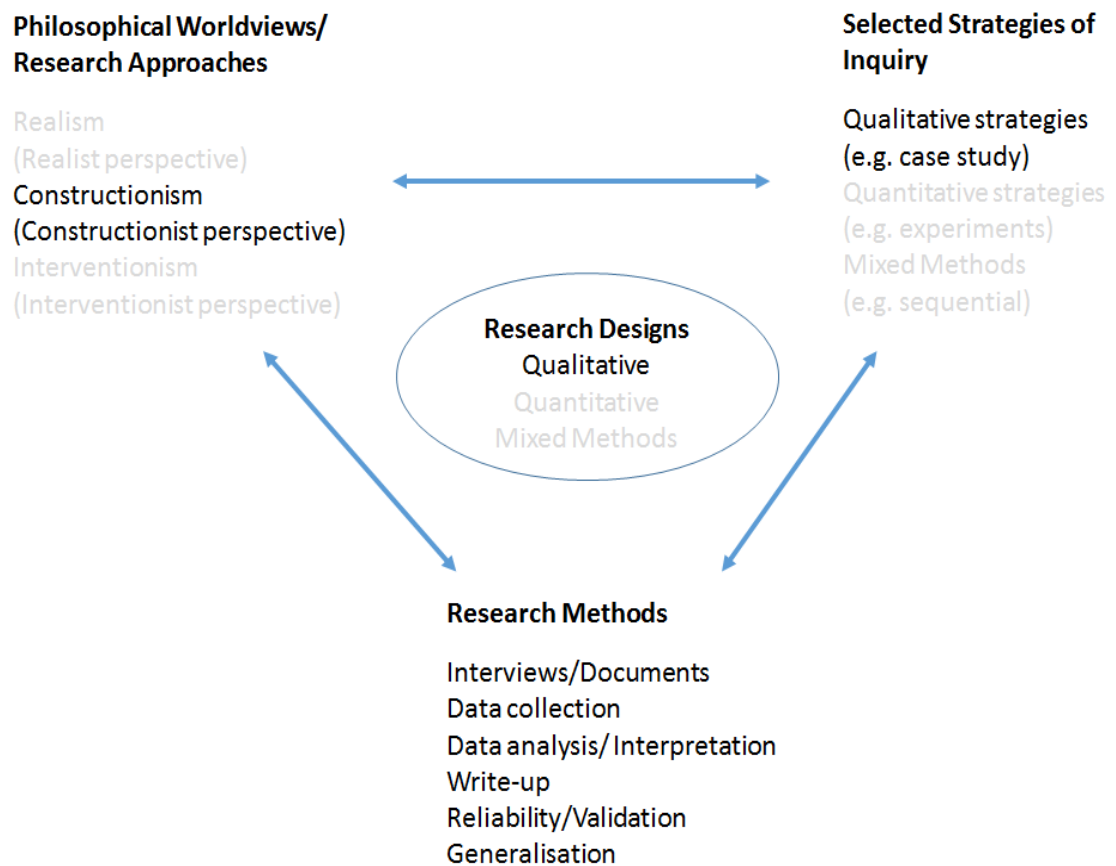
generalisation to argue that the findings can be generalised to “other concrete situations and not just to contribute to abstract theory building” (Yin, 2014, p. 41). However, such a generalisation is grounded on the theoretical propositions that flew into the research design of the empirical case study’s findings. On the other hand, Yin (2014) and Saunders et al. (2016) also warn that the subjective bias of a constructionist does not justify a generalisation to predict the same conclusion in another context.

Based on the scholars’ statements, the result of this study that identified importance levels in the business model canvas cannot be generalised for tier-1 suppliers. Every tier-1 supplier relied on different business models and developed individually their core competencies over many years. As described in chapter 3, the cited companies resided in different development or strategy stages and therefore used different evaluation approaches. However, the findings cannot be generalised to allow any tier-1 business plan to be evaluated but can be used to evaluate the priorities on which their business plans are based. Furthermore, it provided a general view on the differences of each canvas block that can be used as an ‘anchor’ to compare the study’s findings with companies’ planned strategies. Indeed, the methodology applied in this chapter may also be used by other researchers but

a fatal flaw in doing case studies is to consider statistical generalisations to be the way of generalising the findings from your case study. This is because your case or cases are not ‘sampling units’ and also will be too small in number to serve as an adequately sized sample to represent any larger population (Yin, 2014, p. 40).

At the end of the methodology and methods chapter, the discussed research settings, research methodology, research strategy, primary data collection, and qualitative data analysis and interpretation can be summarised in the adapted figure 4.6, provided by Creswell (2009).

Figure 4.6: Interconnection of Worldviews, Strategies of Inquiry, and Methods



Source: Amended from Creswell (2009)

The illustrated qualitative research design depicts at a glance the interconnection of worldviews, strategies of inquiry, and methods. The researcher's constructionist paradigm guided the work to a case study that used the deductive triangulation method to collect data from the field. By having used a purposive sampling method via semi-structured interviews from tier-1 suppliers, professors, and consultants, the data analyses were based on the pure frequencies of individual codes and those codes across all interviewees to make sense of the data. Although the data analysis used diverse dimensions to test the initial propositions inferred from the research questions, the case study findings and results, as discussed in the next chapter, cannot be generalised. Rather, the methodological approach in a similar context may be generalised in a broader theory.

4.5.3 Limitations

Despite the proposed and justified research strategy, other constructionists may use different methods to research data from the field. The chosen sources and the method to interpret the data could potentially imply other outcomes. Therefore, a critical review of the conducted primary research can be summarised as four main limitations:

Limited time

Due to the study's topic that involved research in a very volatile environment of change, the planned period to collect data from the chosen interviewees was only possible as a kind of snapshot. Hence, this snapshot reflected only an indication of the beginning of a disruptive change in the German automotive industry. With a longer time available, the possibility to inquire from more data sources would have certainly increased the quality of the study's analysis.

Interviewees' availability

In total, more than twenty potential interview candidates were approached to deliver their related inputs but only six were finally available. Interestingly, one candidate interview resulted in an open discussion in the end. As a result, it was not taken into account, however, upon the respondent's agreement the ideas and remarks of the conducted discussions were used in the following chapters. Indeed, the study triangulation method to collect data from different and purposive sources exacerbated the availability of contributing participants. On the other hand, the sample size was not about a fixed number of interviewees, it considered rather the delivered quality and deduced conclusions, as suggested by Yin (2014).

Interviewees' knowledge about business models

The term business model was interpreted by every interviewee according to different understandings, as may be confirmed by the cited expressions in section 2.2.1. Although all participants knew about the business model canvas and the basic function of each canvas block, a standardised and valid perception was not yet recognisable. Of course, as previously mentioned already in section 4.3, the study required participants with advanced knowledge about business models. Therefore, the initial clarifications of the

term business model at the beginning of every interview aimed to consolidate the diverse knowledge.

Researcher's skills

Arguably, the researcher's skills in terms of conducting the interviews properly can be questioned and criticised. Based on the open-ended questions and semi-structured nature of the interviews, the question style, and iterative circles that aimed to approach the deepest point, could be performed differently by a seasoned interviewer. Moreover, acquired knowledge during the journey of this study seduced the researcher into occasionally using context specific expressions, which were not explained in further detail in order not risk bias. This, and the lack of experiences on the part of the researcher, may be seen as qualitative limitations of the researcher's skills with regard to the primary data collection.

4.6 Ethical rationale

Following the University of Gloucestershire's ethical guidelines, as outlined in detail in Appendix 5, the respondents were previously informed of their voluntary involvement in the study, their rights to refuse to answer, and to withdraw statements. For issues of anonymity and confidentiality, identifiable information, such as locations and names of interviewees were changed. A briefing about the possibility to decline or leave the session ensured trust and relaxed the atmosphere.

Gathering data from people by approaching them in diverse ways demands the respect of ethical principles. With regard to the interviews with tier-1 suppliers, professors, and consultants, the respondents were frankly informed about the planned use of the questionnaires. In the case of individual comments, the researcher was obliged to ensure confidentiality. Specifically, the planned interview with one academic became a discussion that was not recorded despite having been initially confirmed. This is because the ethical guidelines require the explicit agreement of respondents before commencing to record the interview. Besides, the attempt to build relations with respondents during interviews could have proved embarrassing, resulting in responses becoming unreliable and possibly implying the mistrust of the researcher. Consequently, the procedure of informing participants in advance, confirming their willingness, and ensuring transparency was conducted with respect to the ethical guidelines.

Chapter 5 Findings and Results

This chapter presents the findings from the conducted interviews in an organised, objective, and thematic way. As stated by Baxter and Jack (2008), the reporting of a case study demands the capability of the researcher to convert statements about complex phenomena into a format that is understandable for readers and presented in a neutral voice. They further argue that there is no commonly agreed way to present a case study. Thus it is not the intention of this chapter to interpret meaning. The results are presented in a 'neutral voice', leaving interpretation of meaning and implication until the subsequent 'Discussion' chapter. However, many writers do present a narrative story. It can be provided either as a chronological report or by addressing the theoretical propositions that centre the research questions.

Due to the conducted triangulation methods surrounding the themes and research questions in the previous sections, the structured presentation to compare the findings with the theoretical propositions has been grounded in the conceptual framework, as presented in figure 2.11.

Several other presentation methods, such as interviewees or responses, etc., would also have been valid to structure the chapter. However, using the main elements of the conceptual framework provided the most comprehensive approach to report in an organised and concise manner.

Therefore, the next section reflects interviewee meanings about business models and the value creation process, while the following four sections address the business model elements and its dedicated blocks of the canvas model. In adherence to ethical guidelines, the names of the interviewees have been changed.

Next, the following section revealed informant opinions about strategy, change, and innovation in the context of the importance levels. Finally, the final section provides the participants' evaluation of the business blocks, along with general recommendations for tier-1 suppliers.

5.1 Interviewees' background regarding business model and value creation

In the light of the conceptual framework, this section has been aligned to the areas of agreed knowledge emerging from the literature review. All interviewees were asked the

same questions by the researcher to enable a common understanding of how they describe the business model and value creation process. Although this part of the interview did not directly contribute to the evaluation of canvas block importance levels, it assessed rather knowledge about business models and value creation processes from different backgrounds.

(1) **Huber**, a senior manager in the Merger & Acquisition (M&A) group of ZF Friedrichshafen, for example, deals with the setting up of joined companies, such as joint ventures or discusses licence models with partner companies. He works very closely with the board of management and supervisory board when it comes to the acquisition of additional companies or other business units.

Huber's argument around the business model stood in relation to the company's proposition that benefits customers based on key strengths and takes care of environmental factors. A business model is *"really based on an idea, a unique idea, and I think in this regard there is the term of a unique selling proposition (USP) very important from which you can harvest the returns from your idea and the business model"*. Whereas, the value creation offered to customers takes the form of the goods or services they need in terms of a system solution.

We offer full solutions to customers ... as a very important element of our strategy. Supplying system solutions provides to the customer the opportunity to focus on different things, such as marketing, full vehicle knowhow, and the specifications of such a vehicle in order not to worry so much about the components that go into a vehicle. So, to reduce the value chain of the customer.

2) **Zeppelin**, a consultant mainly for the automotive industry and a board member of three companies within the industry said about business models that a company has to *"identify the needs of the customers, in parallel with the possibilities to combine them technically and resource-wise, in a way that the customer is satisfied"*.

As such, a value creation process satisfies two elements, the customer and market demands. However, this process is limited by company resources and the ability to change the organisation in such a way as to anticipate future demand.

(3) **Hinterberger**, a senior manager of cooperate strategy and development and head of Corporate strategy for Rheinmetall automotive, associated a business model with the 7-K-model or 7-C-model of Horvath & Partners, and also with the business model canvas.

Although a clear opinion about the function of the business model has not been provided, it can be described as the core of the business and ought to be a company's visualisation of "*what you are doing or what you want to do*".

The value creation process was associated by **Hinterberger** with Porter's value chain to create value. However, apart from the business model canvas these "*value creation activities fit pretty much into the organisational infrastructure of the business model canvas*".

(4) **Dachdecker**, a professor at the Karlsruhe Institute of Technology (KIT) who chairs a group on hybrid and electric vehicles, focuses in particular on the electric motor and power electronics of e-vehicles needed to run the drivetrain.

Dachdecker defines the business model from technical and price standpoints with something that people actually want to purchase. In other words, where customers are willing to pay for technical innovation at adequate prices. With regard to the value creation process, a clear definition has not been provided.

However, **Dachdecker** described it as the need to manufacture batteries for e-vehicles in Germany. This value creation process in the car industry could be essential for tier-1 suppliers in Germany to compete with the Japanese and Tesla.

So that may be a way or an area, and everything you need in between, like e.g. cables, plugs, sensors. You need many sensors for electric motors and for power electronics as well. That may be an area where the supplier industry can step in.

(5) Another consultant from Ernst and Young (EY), **Begel**, who is an advisory in the automotive industry for OEMs and dealerships, supports his clients in terms of how to sell cars in the future.

Begel answered the question about a business model with a counter-question: How does a company think about making money in the future? In this way, he subdivided this question into: who is your customer? How is your product designed, and how much does it cost? How much investment do you need to produce it? In the end, how you are going to make money? Therefore, the value creation process decides on the differences for which the customer is willing to pay, against the costs of tier-1 suppliers.

Obviously, all informants delivered different opinions about business models and value creation processes. There has been no evidence of a universal agreement among the

participants. However, some indicators or factors were commonly mentioned and are vital to highlight.

None of the respondents described a direct connection between the business model and value creation process, as if both were seen independently from one another. Only **Hinterberger** used Porter's value chain as an element of the business model. **Huber's** explanation regarding the value creation process, however, was very similar to the value constellation model provided by Michel (2010) on network-based activities. Another interesting finding was about the customer perspective. Almost all participants answered that the business model or value creation process has the purpose to satisfy customer demands, but only when suppliers' economical benefits are assured.

Apart from the findings relating to general opinions of the business model and value creation process, the next sections build on the coded data and vital statements from the informants in order to present the findings of each theme.

5.2 Findings related to value propositions

The term 'value proposition' was described by all participants as something that does not presently exist. It has very often been mentioned that companies must invent or deliver something new. Almost everybody highlighted that tier-1 suppliers must differentiate through innovations in the future automotive industry. In this context, they used key words such as unique selling point, uniqueness, newness, or innovation, to awake the unknown need of customers.

Zeppelin provided a nice picture to deliver an example of his meaning about the value proposition. *"A good value proposition is pretty close to the development that is occurring if you look back in twenty years. The best value proposition is the one that is closest to what people will need in twenty years looking back"*.

Indeed, the other informants also underlined the very high importance level of the value proposition but associated it directly with an existing customer base, as for instance, in this comment provided by **Huber**:

I think the value proposition is really the heart of a business model, because if you want to play in these new technologies you need to think about what you can ultimately offer to the OEMs. It is very important in the new upcoming

technologies, because now it is a bit like a gold-digging atmosphere where everyone wants to be in e-mobility or autonomous driving.

Begel and **Dachdecker** even proposed that tier-1 suppliers should enter the battery businesses, platform technologies, or perhaps car market. On the other hand, **Huber** warned that tier-1 suppliers would enter into direct competition with their OEMs when changing their business model from B2B to B2C. Therefore, the value proposition requires being in a partnership with the OEMs “*supporting the customer in their own business ideas by supplying either goods or services*”.

In a similar expression, **Zeppelin** used a ‘trumpet metaphor’ to compare the upcoming value proposition challenges with the current changes in the automotive industry.

The development in the future is looking like the shape of a trumpet that opens more and more the later someone comes. One has always to update the expectations and see what is happening compared to what has been expected. So never get too far out of the trumpet, but you have to have the trumpet in mind, and a good idea of what is at the end of the trumpet.

The better such a development can be forecast, the better and more differentiated will be the value proposition. He further predicted that,

from my perception of the medium to long term, the individual car is not disappearing but there may be applications where you need a different car to go to work compared to a holiday trip with the family for driving, for instance, through the Alps. Therefore, I can easily imagine that there will be a basic car for each person and dedicated cars for individual purposes, like driving through the Alps or driving the children home.

In the light of existing customers in the B2B business, **Hinterberger** talked about a value proposition that is also differentiated in a similar context. He argued that suppliers stand mainly in the role of fulfilling customer demands, regardless of their specific problem. They have to

offer the best product and the best service and whether or not it is the best depends on the purchasing criteria of the customer. Therefore, if the customer is looking for the cheapest product, you have to be the cheapest one. If the customer is looking for the smallest, tallest, most powerful, and fastest component with the highest quality and lowest maintenance efforts, you have to deliver it.

Based on the question ‘what kind of a value proposition might be perceived as of key importance for customer demands?’ **Hinterberger** answered that the automotive industry is going to satisfy just customer needs: “*I need this, I need it now, I need it cheap, I need it good, that's it*”.

In contrast, **Dachdecker** counter-argued that companies risk losing their innovative edge if they only fulfil customer need, since this can be achieved by the competition. However, an organisation can be only

innovative by creating new products nobody else has. Alternatively, it could also be innovative - taking the battery as an example - in the production process of the organisation. If a company is able to produce at the lowest cost better batteries with higher density in comparison to someone else - because of one's organisation and production technology - you are going to be a winner. Actually, there are two ways in my opinion to do that: the technology, what we call innovation, and also on the product standpoint.

Ultimately, **Begel** delivered, in the context of customer needs, a clear proposal to tier-1 suppliers that they should not remain just tier-1 suppliers but also become OEMs in order to touch customers directly. Thus, they should change to service mobility providers.

Even though, some codes could have been organised differently, most of the comments were embedded into categories, like innovation, conquering a blue ocean, and the customer perspective. With other words, identified categories reflected the interviewees' meaning of a value proposition throughout the whole interview.

Zeppelin, Begel, and Dachdecker, the two consultants and the professor, were rather aligned towards entering a blue ocean, as they predicted new technologies and changing markets. Meanwhile, **Huber** and **Hinterberger** mainly connected their opinions of the value proposition to OEM demands, thus in the red ocean. This 'observation' position of tier-1 suppliers has been strengthened by **Hinterberger**, who stated,

our customer is Volkswagen but they do not know what the mobility of the future will look like. They have no idea, they are trying to shape it, and they create studies about autonomous driving as well, but every time it looks different.

Conclusively, every participant highlighted the very high importance level of the value proposition, either from an individual perspective or collectively. The needs for tier-1 suppliers to initiate change from the perspective of customers, conquering a blue ocean, or becoming an innovation company were underlined multiple times.

5.3 Reporting about economic profit formula

Based on the researcher's question about the definition of the economic profit formula or business case, none of the informants had difficulties in understanding its purpose. Due to the different expertise of the participants, however, the explanations were slightly

different. More than the half of the interviewees connected the cost structure with all expenditures within the company, and the revenue streams with price times the volume.

A general definition was delivered by **Begel**, who explained that a

cost structure means how much money do we need as a company to create a product or to offer a service. Revenue streams on the other side mean how much money customers are willing to pay for my product or service.

Indeed, the informants were a bit surprised about such an obvious question being posed but the mechanism in the business case can be more critical, as assumed.

Zeppelin pointed out that the “*cost structure is a question of optimisation of your internal processes. The revenue streams are the basis for your cash situation (...) most companies do not perish by making losses but from running out of cash*”. At the end, the company’s business case must demonstrate that profit is generated and cash is not running out in order that a value proposition can be financed.

Huber even said about a business case:

it is not that much a separate influencing factor on the value proposition but it is more like a resulting factor. When you are looking at the value proposition and your key resources that you put into your product ... what comes out is the cash flow or the profit stream and therefore, it is not an input factor. It is rather an output factor ... that you have to manage the whole time.

Begel simplified the purpose of a business case with regard to e-mobility as such that customers are also willing to pay for every value provided to them. Even though “*we have all these positive factors on one side, like environmental friendly, no noise, no dirt, whatever, but they remain still too expensive*”.

Indeed, all informants provided similar meanings about the output role of the economic profit formula, either in a direct comment or indirectly expressed. Nevertheless, quoted propositions revealed that even best value propositions do not guarantee business model success.

Consequently, codes in the vertical direction have been rather limited. Some were linked to OPEX, the improvements of the manufacturing processes. Hence, the costs achieved a much higher value than revenue since costly manufacturing processes would be handed over to customers.

These findings have been confirmed by the cross coding to the categories ‘focused on costs and financial power’, as summarised in the middle field of the table in Appendix 12. Indeed, the economic profit formula analysis of the different groups revealed that the importance level of a business case has been assessed as being much lower than the value proposition. However, costs were perceived to be more important than revenue streams because of their comparative nature among similar products to attract customers.

5.4 Contribution of organisational infrastructure

The participants found this element of the business canvas model rather easy to explain. The main answer stream associated organisational infrastructure with something that is directly connected with the internal activities of the organisation. However, the majority struggled with the distinction between key activities and key resources, while key partnerships found universal agreement on the organisational relationships with direct partners, such as sub-suppliers, service provider, or other institutions. Hence, referring to the definition of Osterwalder and Pigneur (2010), the researcher provided upfront their rough descriptions of key activities and key resources during the interview. In this regard, the interviews became better organised in order to concentrate in more detail on the importance level of each canvas block.

Begel, Zeppelin, and Dachdecker argued in common that the intangible asset is the most important factor in an organisation. By this, humans’ knowledge and existing expertise is the enabler of a unique selling point as a kind of one-time action; for instance, like an invention that leads to a patent (**Hinterberger**).

Furthermore, **Begel** stated,

the most important thing I would identify are the key resources and there I am thinking about labour. Do we have the right people in our team? Do we have people who can deliver the product or service we want to create? And this is pretty much interlocked with the key activities, because you can just do the key activities if you have the right people on board.

Similarly, **Dachdecker** talked about strong competition in the ‘red ocean’ and highlighted the conditions to achieve uniqueness in the value proposition. He argued that a value proposition requires “*knowledge in your company that nobody else has, but you have to build up knowledge first. If you are producing a commodity, then where is the value added?*”

Aside from the importance of qualified labour, **Zeppelin** delivered a broader context of key resources:

key resources are the things you can put into your process in order to make your business. This starts with the right people in terms of amount, this continues with a question of how they are educated and what are their abilities? How you organize them? Goes further on where you get the money you need for your investments. From the own revenue or from the equity partners? Hence, every element you need, from knowledge over people, over technologies, over know-how is for me a company's key resource.

In general, their opinions differentiated between key resources and key activities regarding company assets. Key activities were seen as everything available within the organisation to manufacture a product or provide services, thus, outlined with tangible assets, including existing competencies, machinery, factory building, auxiliaries, etc. While on the other hand, key resources were vital to support tangible assets and treated as the enabler to create a value proposition. An attempt to simplify the meanings of each canvas block has been provided by **Hinterberger**, with “*intangible, tangible, or repetitive work versus one time, internal versus external*”.

Interestingly, the single coding evaluation of the organisational infrastructure has rated the key resources a bit higher than the key activities, while the key partnerships were rather seen in the background. Although the participants were convinced about the necessity of having knowledge and expertise available prior to the creation of a value proposition, the outcome of the individual coding showed a different result, as the horizontal coding.

Nevertheless, the allocation of the codes to the category ‘R&D’ achieved the highest ranking. Due to these differences, the element 'organisational infrastructure' cannot be evaluated against the other elements, rather the individual canvas blocks were considered independently. Therefore, the key resources and key activities were perceived by the interviewees as more important than key partnerships.

5.5 Presentation of customer expectations

The element 'customer expectations' was divided into detailed questions about each single canvas block. The questions around customer relationships, channels, and customer segments were explained in context to the value proposition. However, the researcher

inquired of the knowledge of the participants by using open and disconnected questions in order to ensure it remained unbiased.

Each participant talked about customer segments as the most relevant block within this element. Channels and customer relationships were rather kept in the background: they even had difficulties to understand and explain their functions respectively. Regarding this business model element, three different perspectives were identified.

Interestingly, both managers of the tier-1 suppliers argued that customer segments could be principally differentiated by regional, premium, or mass-market upon the approach of the OEMs. They view customer segments depending on OEM activities.

Channels were defined as how suppliers remain in regularly contact with the OEM, while customer relationships can be described as key account management.

We have dedicated personnel only talking to a customer or sometimes even on a R&D and engineering level ... but that is one of the crucial elements of a company and one of the key advantages of a tier-1 supplier that we do have the direct access to the OEM (Huber).

The professor, however, did not comment directly on the researcher's questions, arguing instead that the company "could not do everything that customers need". It must be clear about its business focus and in which segment to deliver the value proposition. In this context, and based on the case of the failed BeP model, **Dachdecker** emphasised expressly that

in order to make this work - the Better Place model, [refer to figure 1.7] - the problem is that all car manufactures have to agree on the same battery. At least, on a very limited number of different types with the same size, same mounting and same plugs. Have you ever talked to OEMs? They never agree on anything. Never ever. Not even inside one company. If Volkswagen does it in this way, Audi is going to do it another way.

Interestingly, **Zeppelin** and, in a broader context, **Begel** underpinned the changing business environment in the transforming automotive industry. They expect that digitalisation in upcoming mobility will change the business landscape completely

Zeppelin even provided an extreme scenario to illustrate his thoughts.

The traditional abilities of car manufacturers and suppliers will be reduced in the future. What is coming is the integration, the software and the sensors, the fast computers, the interchange, the car-to-car communication. Companies are networking more and more together. No company has all the abilities that are

needed to produce a car right now and in the future other abilities are demanded, like the communication, the sensors, the camera systems, and the communication between cars on different levels. As an extreme position, I could imagine in the future that the dominant car manufacture is a software company that has a daughter, called BMW, producing the hardware for them. You come to the situation that the financially most powerful companies are those who are needed to build the car of the future, so it may easily be that the historical car companies will be an element of the leading software company.

Individually scored, the customer segments achieved the highest score within this element. Although the coding of one consultant achieved a slightly higher result in comparison to the others, the average ranking has shown that its importance level was at a similar stage as the key activities. This has rather not been reflected in the horizontal evaluation as the categories ‘market behaviour’ and ‘market type’ were ranked at the lower end. Obviously, all interviewees felt that the customer relationships and channels were not so important.

Aside from key partnerships and revenue streams, both canvas blocks were perceived at the lowest importance level. This has been confirmed by the cross evaluation method, as the categories ‘networking and communication’ were subject to less discussion (see Appendix 12). This raises the question of who initiate the change to come out of the red ocean, either the tier-1 itself, the OEM, or the market (see section 6.4.2).

5.6 Statements about strategy, change, and innovation

Based on the conceptual framework (refer to figure 2.11), this section has been considered to evaluate the interviewees’ thoughts on the influence factors, strategy, change, and innovation in order to assess the variety of conflicting views. After the single evaluation process of each canvas block, the researcher requested the interviewees review their statements in the situation that a tier-1 supplier would consider one of these influence factors.

It aimed to identify changes in the importance level ranking in light of specific organisational circumstances. Indeed, the participants found this approach difficult to answer, but they universally agreed that these factors would have different impacts on the canvas blocks. Nevertheless, the researcher’s inquiries began with the clarification and role of each influence factor.

Principally, it has been commonly agreed that strategy is a plan that guides company direction. **Hinterberger** provided a detailed explanation: “*strategy for me is a high level plan to achieve certain objectives. A strategy consists of five elements: mission, vision, values, objectives, and measures*”.

Conversely, **Zeppelin** commented that “*strategy is a basic decision of a company based on the proper evaluation of the market, the customer needs, and the own possibilities of how to lead the company in a successful future*”.

On the other hand,

change is a mixture of the need coming from different elements from the markets or customer, your financial situation, the modernisation of the entire world. You cannot remain long-term as a successful company if the others are moving and a good element of change is if you are always a little bit ahead of what the main stream does (Zeppelin).

Furthermore, **Huber** warned that

if you neglect change and if you neglect what is ongoing in the market, or if you neglect all your customers' feedback that e-mobility and autonomous driving will gain importance ... then you will ultimately go out of business. There are prominent examples where this happened in the past, for example, Nokia or Kodak.

Regarding business model innovation, more than the half responded in terms of innovating single canvas blocks. “*Business model innovation means a kind of business model re-creation*” (**Begel**), whereas **Hinterberger** defined the innovation even with developing a new business model.

Apart from the rather vague feedback for each factor, three of the five interviewees argued that these influence factors were interdependent and hardly likely to divide without a concrete case, as stressed by **Zeppelin**: “*I would only see different importance of all these blocks, if I know the situation of the individual company, its market, and technologies. Then the importance levels might be different but not in general*”.

In dependence on such factors, the commonly agreed influences on the business blocks have not been identified in a valid and concise way. Rather, different weights among these influences and a sequential process to apply these factors were recommended by the majority of the respondents, especially the tier-1 supplier managers.

In this context, **Hinterberger** delivered a palpable expression:

The interdependences between strategy, business model innovation and change is at the end like strategy for me, what is above everything. Within strategy, I think about what do I want to do and I think about business model innovation and I could conclude that I have to go for a new business model. I need to take with me the entire organisation on this journey to explain why we change the business model, because there is a strategy behind.

Consequently, the influences of the factors ‘strategy, change, and innovation’ on the business model blocks were in a certain way admitted by the informants, however they were seen as dependencies in specific cases. Indeed, company strategy has been evaluated higher than the other influence factors.

5.7 Interviewees’ evaluation and recommendations for tier-1 suppliers

Arriving at the last part of the interviews, firstly the researcher asked the interviewees about their subjective evaluation of each canvas element or block. Secondly, the inquiries about general recommendations for tier-1 suppliers were considered to compare their direct proposition with the previously analysed comments. The aim, of course, has not been to simplify the empirical research but instead to verify their previous opinions with the summarised conclusions.

Interviewees’ evaluation

Four of the five interviewees responded that the value proposition is the most important element, as underlined by **Dachdecker**. *“The value proposition for the customer is in my opinion the most important. If you cannot persuade your customer that you have something to offer that nobody else has, you are not going to sell a product”*.

Only **Zeppelin** refused to provide an importance evaluation due to his prior remark of a specific case. Regarding the organisational infrastructure, most described the key partnerships and key activities as being rather in the background.

However, **Huber** and **Begel** emphasised the high importance level of R&D within the block ‘key resources’. Customer expectations, comprised of three blocks, were scored in total by three participants at the same level as the value proposition. Within this element, the customer segments were highlighted as being more important than the other blocks.

Only **Dachdecker** assigned a lower rating to the customer segments, since *“if you have really a good product then you have new customers coming in automatically”*.

Recommendations for tier-1 suppliers

All participants provided very interesting and supportive recommendations to tier-1 suppliers. Similarly, both tier-1 supplier managers suggested that it is not appropriate to be nervous during time periods of big change, and comment on the need to invest very carefully into something that fits the organisation.

Huber argued, therefore: *“develop a very clear strategy, take in into account your own position in terms of resources, capacities and capabilities, and then, consequently follow this strategy that will lead to innovation and change”*.

Apart from the direct suggestion provided by **Begel** to *“keep your eyes open, take a look to the end customer, to the market, and do not believe everything the OEMs [say]”*.

Zeppelin added to the previous thoughts a kind of an observation strategy.

Be aware that the market of mobility is changing in different ways. Watch for a mid- and long-term change that requires your individual product. If you expect that your product will be needed in cars of the future as well, everything is fine and continue as you did. If you expect that your individual product will be obsolete for the future of mobility, set up a process that identifies within a relatively short-term - with all what you have, as people knowledge, organisation, technology, and machinery - a profitable area of the market, of another market perhaps, where you can successfully survive. If not, decide fast on exit strategies.

Interestingly, **Dachdecker** doubted that tier-1 suppliers would face big problems with the upcoming change since many other parts, like wipers or car parts that are always needed, will be necessary in the new automotive industry as well. *“Bosch and Conti, for instance, they are making drivetrains, they [are] making power electronics, they are making electric motors, and they have large development groups in this area already”*. Therefore, tier-1 suppliers would identify certain business areas to enable survival, but tier-2 and tier-3 suppliers are really in danger since they deliver very specific and individual parts.

Results

This chapter has presented the findings from the interviews conducted using a neutral voice that guided the following themes.

- Major streams have set the value proposition to the highest importance level. Apart from the influence factors, a business model of tier-1 suppliers required the assessment

of the value proposition in terms of ‘innovation, conquering a blue ocean, and the customer perspective’.

- Almost on a similar level as the value proposition, the key resources have emerged from the informants. In particular, employee knowledge, expertise, and educational background were mentioned as the enabler of a strong value proposition.
- Less important and on a similar level, the key activities and customer segments were identified afterwards. The organisational performance was perceived as being of medium importance because of its ability to produce the value proposition. The customer segments meanwhile stood in relation to the value proposition, as existing or emerging markets may be changed or created by them.
- Customer relationships and channels within the element ‘customer expectations’, in addition to key partnerships and the element ‘economic profit formula’ were evaluated at a lower importance level and thus perceived in the background, as summarised in table 5.1.

Table 5.1: Business model evaluation of the interviews

Business model elements	Organisational Infrastructure			Value Proposition	Customer Expectations			Economic Profit Formula	
	Key Partnerships	Key Activities	Key Resources		Customer relationships	Channels	Customer Segments	Cost structures	Revenue Streams
Managers of tier-1 suppliers	Low	High	High	High	Low	Low	Medium	Low	Low
Consultant	Low	Medium	High	High	Low	Low	Medium	Medium	Low
Professor	Low	Medium	High	High	Low	Low	Low	Low	Low

Source: Author’s own construction

The table shows the different inquiry sources from the triangulation process. The other columns have been chosen in the same way as in the literature review. It uses the business block elements divided into their related canvas blocks in order to compare the practical outcome with the theory. Indeed, the table overview provides a first indication about practical differences against the theoretical findings.

Based on the evaluation of the interviews, the next chapter will discuss the theoretical and practical implications of the primary research against the literature findings.

Chapter 6 Discussion

This chapter is structured in a more integrated approach. Instead of using every business block one by one to discuss the implications derived from the comparison of theoretical and practical factors, it is instead composed around the key themes. It differs from the previous chapter because it addresses relevant and objective statements from the theoretical and empirical to discuss their implications.

Therefore, this chapter will commence with areas of agreed knowledge and will progress through the business model and value creation process in order to identify the impact to the canvas model.

Based on the findings of the primary research against the theoretical results, next, the variety of conflicting views will be used to conclude with the implications of strategy, change, and business model innovation for the canvas model. Arguably, both sections do not directly strand to the emerging themes, however, their contribution to the implications of the key themes could not be neglected.

The main part, the implications for the key areas of the business model canvas, is structured upon the research findings to draw links between the primary research and the literature review outcome. Hence, the discussion around the key themes within this section ends with the evaluation of the importance levels and its effect to the canvas model.

The last section of the chapter ‘discussion’ takes the previous discussions into consideration to present the main implications for the whole canvas model. Therefore, the practical part ends with a model building approach in order to provide the study's contribution.

Finally, the identified limitations are presented in the conclusion of the chapter.

6.1 Reviewing the areas of agreed knowledge

Based on the literature review and interviews, the terms ‘business model’ and ‘value creation process’ have commonly been used as though their specific meanings are comprehensively understood. However, the findings in the literature presented different interpretations, with interviewee feedbacks even underlining minor but important deviations.

6.1.1 Business model in general

The authors listed in table 2.1 write mainly about a business model as having a function or concept to achieve something for the organisation. Interestingly, most of them used the terms ‘business’ and ‘model’ together in order to describe a certain function, whereas, the informants varied in their definitions as well. They commonly defined it with a function to, as stated by **Zeppelin**, “*identify the needs of the customers*”.

Can the term ‘businesses’ not be interpreted independently from any supplier and customer relationship? In addition, what about the association of the word ‘model’? In the minds of most scholars, a ‘model’ is the visualisation of a complex concept or function illustrated in a simple and precise way, such as the business model canvas delivered in 2010 by Osterwalder and Pigneur. However, this model fulfils a visualisation of complex blocks, but has it incorporated authors’ meanings as well, as cited in table 2.1?

Indeed, neither theoretical functions of a business model, such as the aim of organisations to generate profit, create, deliver, and capture value, nor processes to build and sustain competitive advantage were explicitly visualised or somehow recommended. Similarly, the informants answered with the functions of the business model as well. For instance, **Begel** simply mentioned that a business model describes the process of how a company “*makes money*”. In fact, no informant referred to the business model as a visualised frame. Instead, they described it as a function or even a process.

Therefore, the questions that emerged related to the key characteristics of the business model. Could it be associated with a process, concept, type, or just a visualised model? Although it has been theoretically and practically agreed that the business model reflects all business activities around an organisation, a common definition of the key characteristics has not yet been identified.

The business model is the core of the entire set of business activities, and is the company’s visualisation of its intention, as described by **Hinterberger**. Insofar as research outcomes confirmed the theoretical streams in general as the basic understandings, associating it with functions and processes, the concepts of business model use differed. Such conceptual approaches have been underlined by the different phrases of participants, for instance, “[to] *offer full solutions to the customers*” (**Begel**).

6.1.2 Value creation process of tier-1 suppliers

Neither in the literature nor in the research results has a value creation process been equated with the main features of the business model. In other words, the business model could be conservatively aligned with a future-oriented value creation process, and vice versa: an innovative business model frame could be combined with a classical value creation process, as proposed by Porter (1980). The questions remained open about the competitiveness of tier-1 suppliers in the transforming business field and whether the business model and value creation process need to be matched in a certain way.

Apart from the rather vague definition of **Hinterberger**, manager opinions of the two tier-1 suppliers commented that OEMs were increasingly handing over more and more their values, functions, expertise, and designs to tier-1 suppliers in order to improve their value-added activities. Thus, tier-1 suppliers became not only responsible for the functionality of a module or segments, e.g., filter systems, brake systems, and so forth, but also for the administration of tier-2 suppliers, as supported by Humphrey and Memedovic (2003). It implies that the areas of core competence or capability have changed over the years.

ZF has been organised for delivering system solutions to release customers' value chain, so that they were able to focus on other fields, “*such as marketing, full vehicle know-how, and the specifications of such a vehicle*” (**Huber**). Similar to this statement from Porter's (1980) value chain, until the formulation of Michel (2010) and Wirtz's (2013) definition of a value creation process, a kind of value constellation process has been assisted in the theory. It indicates that value activities have improved in terms of reducing waste over the years.

Indeed, tier-1 supplier feedback on the value creation process seemed to be rather B2B oriented. Thus, a kind of a competition exists in ‘red oceans’ as companies attempt to improve the values of their OEMs, as submitted by Porter's value chain and system. On the other hand, both the consultants and the professor looked outside the box by recommending other possibilities for creating value. In response to the questions about the value creation process and general recommendations to tier-1 suppliers, their meanings could be compared with innovations and new products for upcoming market demands.

For instance, **Dachdecker** argued that the value creation process within the car industry could be essential for tier-1 suppliers in Germany to compete with the Japanese and Tesla, but a major component of the electric motors will not be delivered by suppliers.

This indicates that important values of an already reduced value chain would perhaps be kept at the OEMs. Therefore, their opinions suggested looking for a 'blue ocean' based on company competencies. However, to create value that would require changing the whole organisation in the sense of a value constellation approach, as provided by Norman and Ramirez (1993), Wirtz (2013), and Michel (2010), has not been recommended.

The secondary sources proposed network-based activities as a value creation process, whereas the primary statements have been bundled within the frame of creating value for customers. Although the majority of informants recommended seeking new business opportunities, **Huber** stressed the need to use company competencies via a succinct proposition: "*cobbler, stick to your last*".

Hence, the practical feedback implied an augmented view due to each company's individual background and the usage of existing competencies. Indeed, start-ups may rather have the possibility to identify values that could easily be used in a value constellation, whereas long-term established enterprises could rather not do so, as per a remark by **Zeppelin**.

Nevertheless, a combination of exploiting existing values to support the creation of new values in a value constellation process could be a feasible approach in order to ensure company profitability, as stressed by almost all participants.

6.1.3 Impact on the canvas model

The investigations of both knowledge areas have shown that a business model expresses all activities in a kind of concept around the organisation, while the explicit functions and processes in terms of its value creation method cannot be unified. Of course, this can also be an explanation for the fact that business model functions were not explicitly described by Osterwalder and Pigneur (2010), instead only depicted in a canvas for creating, delivering, and sustaining value. Indeed, the interviews with their diverse sources indicated different approaches that support companies' individual business standpoints.

Therefore, the main impact derived from the primary research confirmed that a business model could be compared in general with the business model canvas of Osterwalder and Pigneur (2010), but only in visualising complex business activities and not in describing functions and processes. Moreover, it cannot be used for every organisation, since individual business situations require different approaches.

For profitability reasons, it has been recommended to identify internal competencies while supporting the creation of new value in a value constellation approach. Consequently, the research in the light of new technologies required an extended view on original understandings.

6.2 Contrasting the variety of conflicting views

Reflecting on the findings from the literature review, this section is structured to use the research outcomes in the same order to discuss the main implications of the discovered influence factors. The main implications of discovered influences on the business model canvas of strategy, change, and innovation were considered to contrast the variety on conflicting views.

6.2.1 Strategic outlook

By reviewing the different outcomes from the interviews, strategy was more importantly evaluated than the other influence factors. **Hinterberger** even highlighted that “*strategy for me ... is above everything*”. This has also been submitted by many authors, such as Morrissey et al. (2016), Madina et al. (2016), and Helms et al. (2016). These scholars claim that a value proposition should be provided to customers through innovative strategy. In fact, most scholars require the strategy before developing vision and mission statements. In contrast, Budde Christensen et al. (2012), Noel and Sovacool (2016), and Borup (2014) cited in the case of BeP that its vision was guided into a strategy to reduce vehicle CO₂ emissions in order to improve the world.

Instead, **Zeppelin** argued that “*strategy is a basic decision of a company based on the proper evaluation of the market, the customer needs, and the own possibilities of how to lead the company in a successful future*”. This could be rather compared with the vision created by technological change. Schwedes et al. (2013) and, in a similar context, Tongur

and Engwall (2014) and Parson et al. (2014), suggest that a technology change could be seen as the driver of a new strategy.

The questions, therefore, arose as to whether companies should in the first instance have a vision driven by technological change and then a strategy that concludes with a value proposition; or begin with the value proposition upon technological change to create an innovative strategy that guides the vision. Even though the theoretical findings suggest a value proposition upon an innovative R&D to be an appropriate strategy, the timing must be right to react to technological change with a flexible business model in such dynamic environments, as suggested by Helms et al. (2016).

Obviously, the research statements provided different views and opinions about what comes first, but universally agreed on the high importance of strategy. Furthermore, the term ‘strategy’ appeared somehow in context with a kind of recipe that could be used for progressing in certain steps. Is a strategy really a high-level plan or a defined process, as argued several times by **Huber** and **Hinterberger**? Alternatively, is strategy rather a signaller that activates internal business model blocks for the best possible business processes in order to cope with external challenge, as extracted from the literature and argued by **Zeppelin**?

Indeed, strategy was associated as being important by both knowledge areas. The research, however, has provided an extended perception against the original understandings. Strategy was partly highlighted as being more important than the other influence factors. Admittedly, the rather controversial feedback from the interviews could not be used to claim that the research would have found different meanings than the theory.

Apart from the opinions of **Huber** and **Hinterberger**, the strategic approach and the timing around reacting to technological change with a flexible business model caused different implications for the business model canvas. Thus, the original understandings have been reconfirmed.

6.2.2 The role of change

During the journey through previous research (refer to section 2.5.3), and after the direct discussions, the word ‘change’ has been used in many different contexts. It has often been

used in relation to markets, customer behaviour, or technology change, and also in the context of change that may happen only within organisations (**Hinterberger**).

In fact, both sources confirmed that change described the process of perceiving specific conditions differently than before. On the other hand, it has not been clarified whether such a process considers mainly activities that are completely finalised or just seen as something that might perhaps occur. For instance, Wirtz (2013) argued that change management must deal with the increasing dynamics of the economy, while **Hinterberger** referred to change as something that “*I do in my organisation*”. Based on this palpable example, has there been a conflict in the understandings of change? Could it be even that strategy and change can be easily mixed due their similar characteristics?

Indeed, besides the other authors, Kaas et al. (2016) provide (see table 2.4) a scenario of change that delivers assumptions about four trends, thus future-oriented. **Zeppelin** argued, however, that change is comparable with observing markets and customer behaviours in order to be able to react accordingly. In this context and based on the example of the VW diesel scandal, as discussed by Lienkamp (2016), such an incident unexpectedly enhances customer doubts that the emission reduction of combustion engines could really achieve the target.

Lienkamp (2016) argues that government activities are stepping up the promotion of clean cars and the independence of natural resources, pushing the German automotive industry lobby into the background. Of course, the deduced consequences direct OEMs and tier-1 suppliers to reconsider their strategies. However, **Dachdecker** was doubtful about the perceived OEM strategies, as they differed very often from each other. He further argued that they never agree on one common standard, not even internally.

Therefore, a strategy may be in place, but for such unforeseen incidents, it ought to be adapted accordingly. It illustrates that a strategy could be adjusted based on change and change does not necessarily need to follow strategy, as indicated by **Dachdecker**. This contradicted to the higher importance role of strategy, as outlined in the previous section. Instead, the propositions of Wirtz (2013) and **Zeppelin** were appropriate, as companies must deal with the increasing dynamics of the economy.

Although contradictory opinions and unclear definitions about strategy and change were synthesised from both the literature and empirical research, the impact of change on the

business model canvas supported a flexible and dynamic business model. However, the empirical findings did not confirm the outcomes from the theory, in which the influence factor 'change' placed key partnerships, key resources, and costs at the focal point. It remained rather open as to which business blocks obtained stronger influences by change. Hence, change could occur to tier-1 suppliers without having a strategy in place. In this, the business model must be designed in such a way that enables flexible and dynamic reactions to upcoming challenges. External forces, such as political, market, or scandals were identified as essential drivers for change that then had a direct implication on strategy afterwards.

As such, the participants' differing opinions implied that the influence factor, change, could not be suggested as highlighting individual blocks.

6.2.3 Understanding business model innovation

As in the previous sections, this part is used to discuss the influence of business model innovation in relation to the importance evaluation of the canvas blocks. The literature offered several sources about the importance of innovating a business model, as opposed to the innovative processes of individual canvas blocks. Indeed, a clear distinction between OpEx and business model innovation was not explicitly identifiable during the interviews. Instead, participant opinions about innovating a business model assumed that they saw OpEx as an innovation for the entire model. Nevertheless, context-related and specific arguments were used to contrast the practical view against the theory.

Three of the interviewees stated that business model innovation was considered as improving the performance to approach competitive advantages. Until 2014, this was supported by Zott and Amit (2010), Wirtz (2013), and Bohnsack et al. (2014) as well, who further add that business model innovation is required to innovate every single canvas block.

A combination to assist both definitions, however, is provided by Tongur and Engwall (2014) who posit that both technological innovation and business model innovation could be required at the same time. Comments by **Begel** and **Hinterberger** confirm this, as they explained that innovation stands for newly creating the business model. "*Business model innovation means a kind of business model re-creation*" (**Begel**).

Previous discussions up to 2014 illustrate that the term ‘innovation’ was understood as the act of creating something new. However, consensus was not reached as to what part or function of the business model required innovation. Indeed, this could be an indication that the business model definition was not uniform due to the optimisation processes within the organisational infrastructure of tier-1 suppliers. Apart from other business areas, tier-1 suppliers did perhaps develop individual understandings of innovation due to their B2B model over many decades.

Begel and **Hinterberger**, partly supported by Tongur and Engwall (2014), compared innovation with the improvement of the entire model. It seemed that the involved players focused greatly on the established business models, which required innovation. Whether or not this has been the consequence of Porter’s value chain or system model, or instead due to the disseminated opinion that value is sequentially created, remain to be discussed.

Arguably, in the recent past, related articles have more often delivered the idea of altering the complete business model into a flexible system that requires continuous adaption to arising needs, as proposed by Helms et al. (2016). Furthermore, for service providers, leaving the red oceans and conquering a blue ocean, which creates a stronger network of providers and consumers within the value constellation, has also been recommended.

Apart from the theoretical streams, the empirical findings have set the value proposition and key resources as being very important (refer to table 5.1). In several statements, the participants mentioned that tier-1 suppliers must look for new markets or products and thus it is necessary to have qualified people in place (**Zeppelin, Dachdecker**). As such, technological innovation by R&D represents the enabler of a value proposition that implied a reconfiguration of the business blocks dependent on the market or product.

Hence, based on the informants’ recommendations to the tier-1 suppliers, the feedback on the topic of approaching blue oceans (in the context of new markets or products) implied that business model innovation could be compared with a flexible and dynamic business model.

Indeed, the theory after 2014 proposes a flexible business model to react continuously to customer demand. Upon this, ‘innovation’ influences were mainly identified on the key resources, costs, and partnerships.

However, the majority of the respondents indirectly highlighted the key resources and value proposition as the most influenced blocks. Consequently, the discussion about business model innovation delivered augmented insights but still closely related to previous thinking.

6.2.4 Significance to the canvas model

Based on the individual discussions about strategy, change, and business model innovation, the contribution of the theoretical and practical parts has been synthesised into two main significances.

- The theory obviously experienced a paradigm shift in 2014 that has not yet been really effectively communicated to involved players. Prior to 2014, strategy was associated with something that stood on the highest priority of an organisation, while change and innovation were rather viewed as the consequences.

After 2014, the importance of change and innovation shifted due to the increasing number of unforeseen events. In addition, the number of involved players contributing to the value creation process also increased. This led to increased networking through ICT in a value constellation environment. Hence, strategy and change have been equalised and depending on the individual case, each factor has a specific weight to every single block (**Zeppelin**). The business model innovation, however, represents the re-creation of the entire business model by R&D, along with a value proposition that was not confirmed by the theory in this way, as extracted from the majority of participants.

- The understanding about strategy, change, and innovation highlighted many different facets, with no consensus between theory and practice. In fact, many scholars and, in part, the interviewees argued that strategy is a plan deduced from a vision and mission in order to later follow the objectives. Commonly, what companies do in the future is caused by what it has done in the past (Grant, 2015). However, the same author also admits that “as the business environment has become more unstable and unpredictable, so strategy has become less concerned with detailed plans and more about guidelines for success” (Grant, 2015, p.15).

Surprisingly, the specific influence of each factor that enabled the evaluation of the importance level of each block could not be determined. The more unstable and

unpredictable market conditions become, the more it leads to further difference. This commonly implies that a business model should be flexible and dynamically organised. In other words, depending on the specific business situation, these factors imply different importance for each block.

6.3 Implications for the key areas of the business model canvas

Apart from the external influences around the business model canvas, as discussed in the previous sections, this section turns its attention to the balance of the evidence base in the business blocks discussion post-2014. Hence, the business block elements, with related blocks, are the focus of the discussion chapter.

However, this section is structured based on the outcomes from the ‘findings and results’ chapter. By this, the identified importance levels from the empirical research were used to define the headlines of each sub-section. In light of the business model canvas, the outcomes from the practical and theoretical data were further addressed around the key themes in order to provide the most important contribution for a revised or ‘augmented’ canvas model.

Therefore, the processed empiricism, as illustrated in Appendices 11 and 12, and important statements from the interviewees were used as the main focus in the discussions. This main part, supported by the previous sections, could be acknowledged as the backbone to the identification of the main implications to the business model canvas, as summarised in the section that follows.

6.3.1 High importance of value proposition and key resources

Vertical analysis resulted in an average value of 35.3% for the value proposition, while the key resources were ranked at 19.8%. At the other coding dimension - horizontal - most codes were bundled into the category ‘research and development’, including human knowledge, ‘know-how’, intellectual property, special knowledge, research power, new technology, and new development. The second largest amount of codes were allocated to the category ‘Innovation’, which considered all phrases associated with something new, as deduced by the following codes: unique selling point, uniqueness, solution provider, innovative constellation, service, and newness.

Apart from the two higher categories – ‘conquering a blue ocean’ and ‘customer perspectives’ – which will be discussed later, both of the highest ranked categories focused mainly on organisational infrastructure. Interestingly, because of its future-oriented alignment expressed by newness and uniqueness, this organisational infrastructure meaning could not be compared with company structures in place nowadays, as submitted by Osterwalder and Pigneur (2010).

Zeppelin delivered in this context that a good value proposition assumes what might happen in twenty years, while a best value proposition predicts what consumers want to have in twenty years. **Huber** tried to limit the areas of development already, saying that nowadays the automotive industry is changing and everybody wants to be somehow part of this change. More concretely, **Dachdecker** said, *“because of one’s organisation and production technology - you are going to be a winner. Actually, there are two ways in my opinion to do that: the technology, what we call innovation, and also on the product standpoint”*. A very important dimension about appropriate timing that must necessarily be considered as well, highlighted by **Zeppelin**, is that late entry into this business field points to greater challenges to overcome. A regular update of expectations and real-life events is essential.

The literature prior to 2014, on the other hand, held that business model innovation is dependent on the value proposition and decides the success or failure of the company (Wirtz, 2013; Böhmman et al., 2013). Moreover, many sources, such as Osterwalder and Pigneur (2010), Schlick et al. (2011), Michel (2010), Norman and Ramirez (1993), provided a more generic view because a value proposition could be invented, created, produced, and delivered to satisfy explicit customer demands. Although most scholars emphasised that a supplier ought to move to the customer perspective in order to identify new business opportunities, only a few, like Kim and Mauborgne (2005), talked about creating a customer demand that could only be achieved by innovative technology.

The latest sources, however, argue that a business model for the energy sector “differs in several regards from established business models” (Helms et al., 2016, p. 356). They argue further that timing could be determined as a core characteristic to create flexible time-based business models. However, these require ICT support. In this context, Morrissey et al. (2016), Madina et al. (2016), and Helms et al. (2016) suggest that a value

proposition in a flexible and dynamic business model could be recognised as the consequence of an innovative strategy. Indeed, their interpretations of an innovative strategy contain the flexible and dynamic nature that could be used to react to specific needs of both the market and customers.

Based on the outcome of the coding process and the important statements that have found support in the latest theoretical findings, the data were converged to following questions:

- Could a unique value proposition be created without highly-skilled human knowledge?
- What kinds of conditions are required to become a dynamic and flexible organisation that leads to a successful value proposition?
- Is it advisable for tier-1 suppliers to conquer a blue ocean based on visible customer requirements, or is it rather necessary to create unknown claims through new value propositions?
- How important is the time-factor in terms of sustaining a dynamic and flexible organisation?

Indeed, several statements emphasised that human knowledge and existing expertise is the most important factor in an organisation and the enabler of a unique selling point (**Begel, Zeppelin, and Dachdecker**). **Begel** even associated ‘key resources’ with highly-educated people, and made demands with questions and an interesting statement. He questions the constellation of the right people working in a team and is further concerned about their capabilities to deliver a product or service offered by the company. As such, having the right people working in the organisation is essential for key activities to be carried out.

In this context, **Dachdecker** completed the understanding of key resources and underpinned the need of *“knowledge in your company that nobody else has but you have to build up knowledge first. If you are producing a commodity then where is the value added?”*

In terms of the right timing, **Zeppelin** underlined, *“Be aware that the market of mobility is changing in different ways. Watch for a mid- and long-term change that requires your individual product”*.

The analysis of the horizontal coding process revealed that ‘conquering a blue ocean’ and ‘customer perspectives’ were almost as important as the previous aforementioned categories. Although these categories have been rated as important, based on the perspective it seemed to be that each category stood in contradiction to the other. Another explanation would not indeed clarify that the available customer perspective showed a blue ocean. Due to the previous discussion, a blue ocean has been proposed that could not be recognised yet by customers today.

Based on the discussions about the value proposition and key resources, the main implications to the business model canvas could be converged twofold.

- i. The empirical findings of two analysing dimensions have shown that a unique value proposition is connected with key resources, explicit human education in terms of high-level knowledge. In this way, such intangible assets within an organisation could be the enabler in differentiating towards a blue ocean that has not been demanded from the customer, instead awakes an unknown demand.

Hence, this implied that the theory has been augmented by the very high importance of organisations’ knowledge and a market observation instead of a customer perspective.

- ii. Based on an identified and unique value proposition, a tier-1 supplier ought to adjust in a dynamic and flexible way to enable a product or service. The research identified that the procedures within the organisation afterwards must be flexible in order to fulfil such a demand in a given but predictable time. Since the new business fields were very much supported by ICT, a value constellation approach may be inevitable.

Nevertheless, a continuous market observation to react in the mid-or long-term period related to the product life cycle was recommended by **Zeppelin**.

Hence, the emerging practical view of a flexible organisation has been reconfirmed with the available theoretical knowledge. However, the timing aspect contributed additionally to this knowledge.

6.3.2 Medium importance of key activities and customer segments

The empirical analysis has placed the key activities and customer segments on the medium level of importance. At the individual evaluation method, on average, key

activities achieved 11.3%, while customer segments were rated at 10.9%. Both values achieved almost the same value. However, some of the individual rating was rather different.

For instance, four participants floated around 10% for customer segments, while **Begel** saw these at 15.2% - even more important than the key resources. On the other hand, four evaluated key activities at around 13%, while **Huber** held them rather in the background.

Of course, it could be argued that the average evaluation would not be sufficient for an empiricism, therefore, the cross evaluation in terms of categories were used upon the provided inputs from Osterwalder and Pigneur (2010) additionally. By this, the identified codes were used to create categories upon their meanings. For key activities, 'OpEx-driven', 'core competencies', and 'organisational performance' were bundled to reconfirm code weight as a medium importance level.

With regard to customer segments, 'market behaviour', 'customer focus', and 'market type' were identified with less codes than key activities but still in the middle of the importance levels. Indeed, for the cross evaluation of categories against the vertical appraisal of informants, the majority showed no big deviations; rather, individual opinions could be interpreted in different ways, as discussed in 2.4.2 and 2.4.4 theoretically and in 5.4 and 5.5 methodically.

Key activities:

The responders in the main commented mainly that the key activities covered internal tangible assets, such as existing competencies, machinery, processes, buildings, auxiliaries, etc. In other words, it comprised of all internal activities required around manufacturing a product or providing service to fulfil customer demands.

Apart from the more general explanations, **Zeppelin** illustrated his opinion about the role of key activities rather as the consequence of product or market requirements. If a company predicts that its product will still be needed in the future, then it can proceed as it has done. If not, it should then establish a process within a short period to conquer profitable business areas or even new markets with its available key resources in order to survive successfully.

The literature identically talked about key activities, as they were understood, as the core competencies of an organisation that concentrates on value creation processes to react to customer demands (Osterwalder and Pigneur, 2010; Osterwalder et al., 2008; Wirtz, 2013).

Arguably, there has been a universal agreement about the function of key activities, as tangible assets consisting of core competencies, processes, machinery, etc., were the basis to produce a value proposition. However, an important addendum to the previous statement by **Zeppelin**, “*if not, decide fast on exit strategies*”, prompted the question about the feasibilities of tier-1 suppliers.

Indeed, the tangible assets of tier-1 suppliers have developed over many decades so that core competencies and other assets were tailored to the specific products or services. As such, this implied that existing, thus specific, key activities were rather limited in terms of their flexibility to react to other products. Unless new products or services required similar core competencies, a tier-1 supplier could face serious problems.

Customer segments:

Every interlocutor expressed that the customer segments were the most important block within the element 'customer expectations'. Both representatives of the tier-1 suppliers limited the scope to the demands of their OEMs and, by this, differentiated between regional, premium, or mass-market demands. The others, on the other hand, offered a much broader scope and highlighted the upcoming business challenges, as **Begel** stressed: “*keep your eyes open, take a look to the end customer, to the market, and do not believe everything the OEMs*”. Perhaps this explains why **Begel**'s evaluation was rated higher than the others. He stressed the opinion that companies should be ‘looking out of the box’ to identify new business opportunities.

In contrast, the professor warned that a company “*could not do everything what customers need*”. For instance, in the case of standardising batteries, the OEMs do not agree on one standard that could be provided to suppliers. “*They never agree on anything. Never ever*”, as likewise confirmed by Noel and Sovacool (2016).

In consideration of the fact that relating to upcoming propulsion systems the value creation is in continuous decline, as pinpointed by Di Bitonto (2015), the question arose as to whether a particular customer segment could still be clear, identifiable, and constant.

Undoubtedly, the fewer value creation processes required by a vehicle, the more expertise remains with the OEMs in order to maintain their competitive advantages. **Zeppelin** and **Begel** delivered in this context a scenario wherein they expect that digitalisation in upcoming mobility will change the business landscape completely and it is not yet known which kind of ability will be required.

Nevertheless, Zeppelin still provided a kind of prediction for the future as he commented on the ICT. He predicts that the ICT consisting of software, sensors, and fast computers are required more and more via car-to-car connections within a network. Therefore, no company as yet has all of the capabilities to meet the future demands required from communication, sensors, and camera systems.

Congruently, **Begel**, **Dachdecker**, and **Zeppelin**, did not deliver a concrete proposal for supporting a specific customer segment, such as mass-market or niche market. Instead, they seemed to be rather uncertain and provided therefore an outlook on general possibilities in the future. As Helms et al. (2016) argue, flexible business models must be supported by ICT; the empirical study on customer segments implies that diverse approaches with regard to increasing digitisation will be needed in any case. This calls for a value constellation approach in order to create an unknown blue ocean.

Consequently, the empirical study delivered new thinking. Instead of looking for existing or new customer segments, tier-1 suppliers ought to consider what kind of differentiated products or services could be required for new technologies, as underlined by **Dachdecker**: *“if you have really a good product then you have new customers ... automatically”*.

6.3.3 Low importance of partnerships, relationships, and channels

This sub-section discusses the low scoring of the canvas blocks in the data analysis process. Therefore, key partnerships of the element ‘organisational infrastructure’ and customer relationships with channels of the element ‘customer expectations’ were combined to identify their individual implications. The coding process per interview produced for all three blocks an average value of around 3.8%, while no block achieved a higher importance than 10%.

However, **Huber** offered the highest scores, while the professor almost neglected their importance at all. A similar picture evolved by the weighting process of the codes. Each

block achieved only one category with limited amounts of codes, as concluded with networking to key partnerships, customer retention to customer relationships, and communication to channels.

Interestingly, all three categories could be associated with the method and type of information flow to external sources, either to sub-suppliers or to customers via the available exchange techniques. The other canvas blocks could be rather affiliated to something comparable to a static and concrete nature. It seems, from the perspective of the participants, that it was unimportant to highlight, given that these methods and types of information flow to external sources within the business model would be automatically created from the other blocks.

Channels:

Certainly, the limited information during the dialogues revealed that channels were defined with the mode of how a supplier stands continuously in contact with their customers, as similarly proposed with the physical interfaces between suppliers and customers by Osterwalder and Pigneur (2010), Christensen et al. (2008), and Osterwalder et al. (2014).

In contrast, the literature viewed channels depending on a service oriented strategy as being more important, since they could provide upon regular information exchanges a flexible and effective response to the dynamics within the energy sector (Helms et al., 2016). However, it could be discussed whether the characteristics of channels were considered as a function to react to change – see detailed discussed in 6.3.1 – or as a function to generate new possibilities.

Zeppelin uttered the expression ‘communication’ many times, for example “*car-to-car communication ... the sensors, the camera systems, and the communication*”, but only in the context of potential business opportunities.

Hence, the empirical study surprised the researcher, as communication, information, and exchanges were not felt to be very important. Instead, it implied that channels were deduced as the outcomes out of the static blocks.

Customer relationships:

Based on the four principles provided by Osterwalder and Pigneur (2010), customer relationships were proposed as direct interchanges between suppliers and customers. By this, suppliers support with personal assistance by offering human availability, services to solve customer problems, exchange knowledge, or creating values in cooperation with customers.

Apart from the rather vague feedback from the consultants and professor, an identical voice in terms of the key account management was provided by the tier-1 suppliers.

Huber explained that his company has appointed employees to engage in regular exchanges with the customer, even about issues related to R&D and engineering. This can be seen as a key advantage of a tier-1 supplier due to the direct access to the OEM every time.

Whether or not such a close relationship to the OEMs could be seen as an advantage remained to be clarified later. However, this statement, and the fact that specific key account managers for customers existed, indicated the growth in dependency from the OEMs over many decades.

Arguably, in addition to dependence on the static blocks, key relationships were the same as previously supported by the literature.

Key partnerships:

Based on Osterwalder and Pigneur (2010), key partnerships could be separated into different partnerships, such as strategic alliances between non-competitors, partnerships between competitors in a co-competition, and joint venture relationships. In fact, the previous knowledge and common understanding about business models provided a rather clear distinction between partnerships and customer relationships. It has been necessary when costs could be optimised by sourcing from a cheaper supplier base, and when technologies were missing (Kim and Mauborgne, 2005).

However, recent developments of the value creation process, such as the value constellation process could easily confuse the partnerships with customer relationships. Therefore, **Dachdecker** was not worried about tier-1 supplier partnerships because of their alliances. He cited Bosch and Conti, for example, to illustrate their huge R&D efforts

in the developments of drive systems, electric motors, and power electronics. However, he stressed the risk of tier-2 and tier-3 suppliers, as they deliver very specific individual parts.

Consequently, the discussion about the low importance levels of channels, relationships, and partnerships guided the discussion into two main implications for tier-1 suppliers.

(1) In contrast to the classical value creation process, the borders between such intangible blocks were disappearing more and more. In fact, communication and information exchange within companies were not mentioned as being important, but instead these factors were focused on emerging business opportunities.

(2) This low importance could be the result of the dependency on the static blocks, as underlined by Kim and Mauborgne (2005). Dependent on R&D that creates the value proposition to a flexible customer demand led to a process in which an organisation structures its partnerships, relationships, and channels in a kind of a value constellation.

6.3.4 Low importance of economic profit formula

Another low-scored sub-section was appraised by both data analysis methods. Cost structures achieved in the vertical assessment a value of 8.2% in average, while the category ‘focused on costs’ in the horizontal dimension was labelled by words around costs in various definitions. On the other hand, the lowest value at 3.3% on average was achieved by the revenue streams, which have been summed up in the category ‘financial power’ around funds and income streams.

Interestingly, four participants expressed by individual coding that the importance of costs against revenues were obviously perceived to be much higher. Moreover, **Huber**, **Begel**, and **Dachdecker** did not even see a real necessity of revenue; rather they indicated mainly the necessity to control the costs in any case.

Vice versa, **Zeppelin** indicated instead an evaluation process where revenues are seen as being more important than costs. He argued that “*cost structure is a question of optimisation your internal processes. The revenue streams are the basis for your cash situation; ... most companies do not perish by making losses but from running out of cash*”. Well, it indicates that if you are running out of cash, the company products are not competitive anymore or are even obsolete.

It seemed that **Zeppelin** was still ‘swimming’ in a red ocean, as he connected costs with OpEx, thus the optimisation of companies' internal processes. On the other hand, **Begel** and **Huber** counter-argued that business cases, especially cost structures, are the result of the key resources and value propositions. **Huber** stated:

When you are looking at the value proposition and your key resources that you put into your product ... what comes out is the cash flow or the profit stream and therefore, it is not an input factor. It is rather an output factor ... that you have to manage the whole time.

Customers are not willing to pay for a value proposition that is in fashion, modern, or unique when the costs are too high, as misinterpreted in the case of BeP (Noel and Sovacool, 2016). Even the best value propositions do not guarantee the success of the business model. “*We have all these positive factors on one side, like environmentally friendly, no noise, no dirt, whatever, but they remain still too expensive*”, as asserted by **Begel** about e-mobility.

In consideration of these propositions, the question emerged regarding the equality of both blocks or about a kind of dependency among them. As such, it is questionable as to whether a company becomes profitable in the case of the most innovative and best value proposition.

In fact, the BeP business case failed due to very low sales, investments that were too high, and costs. Notwithstanding, Christensen et al. (2008) recommended a business case that determines the price at first and then the costs in order to elaborate the profitability afterwards. As such, and based on the previous discussions, this proposal had some limitations.

If a company defines the price without knowing its cost structures, it could as a result face the risk of losing competitiveness, even though it has conquered a blue ocean. Indeed, the mainstream of respondent answers highlighted the importance to knowing the costs of product manufacture. Of course, investments and all other related expenditures must be equally distributed onto the product, as illustrated by the case of BeP.

Consequently, the costs achieved a much higher importance value than the revenues, since manufacturing costs are handed over to the customers. Therefore, a competitive cost structure could be the basis for gaining revenue streams, especially when the product conquers a new business field.

As a result, an essential implication can be extracted. The cost structures have been classified as being more important than the revenue streams. Due to their downstream nature, they ought to be calculated based on the value propositions in order to determine the product price.

Revenue streams were perceived as the related consequences of costs. For this reason, and even contradictory to a few opinions of the interviewees, the main stream of the research confirmed that the cost structures obtained a higher importance level than the revenue streams.

6.3.5 Effect on the canvas model

In this sub-section, the previous implications of each business block are consolidated into an overall view to discuss the main effect upon the canvas model without consideration for the influence factors. The findings of the literature, as identified and presented in table 2.5, were used to contrast against the more dominant force, the primary research.

Table 6.1: Findings of the literature - table 2.5

Business model elements	Organisational Infrastructure			Value Proposition	Customer Expectations			Economic Profit Formula	
	Key Partnerships	Key Activities	Key Resources		Customer relationships	Channels	Customer Segments	Cost structures	Revenue Streams
Strategy	Medium	Low	High	High	Low	High	Medium	Medium	Medium
Business model innovation	High	Low	High	Medium	Low	Low	Medium	High	Medium
Change	High	Low	High	Medium	Low	Low	Low	High	Low

Source: Author's own construction

Admittedly, the concluded evaluations in the summarised 'literature table' were individually assessed in dependence of each influence factor. Therefore, the theoretical implications delivered an even more compacted picture than the discussions so far in this section.

Nevertheless, in order to juxtapose the importance levels from the theory with the primary research, the prevailing theoretical valuations between the influence factors have been used as the final theoretical rating. On the other hand, the implications deduced from the empirical analysis, as discussed previously, were also summarised in table 5.1.

Table 6.2: Findings of the primary research - table 5.1

Business model elements	Organisational Infrastructure			Value Proposition	Customer Expectations			Economic Profit Formula	
Business model blocks	Key Partnerships	Key Activities	Key Resources		Customer relationships	Channels	Customer Segments	Cost structures	Revenue Streams
Managers of tier-1 suppliers	Low	High	High	High	Low	Low	Medium	Low	Low
Consultant	Low	Medium	High	High	Low	Low	Medium	Medium	Low
Professor	Low	Medium	High	High	Low	Low	Low	Low	Low

Source: Author's own construction

Prior to the next section that focuses on the main impact on the whole model by taking into account all influences, the following conversation aims mainly to offer an overview, as summarised in table 6.3.

Table 6.3: Syntheses of theoretical and practical implications

Business model elements	Organisational Infrastructure			Value Proposition	Customer Expectations			Economic Profit Formula	
Business model blocks	Key Partnerships	Key Activities	Key Resources		Customer relationships	Channels	Customer Segments	Cost structures	Revenue Streams
Theoretical implications	High	Low	High	Medium	Low	Medium	Medium	High	Medium
Practical implications	Low	Medium	High	High	Low	Low	Medium	Low	Low
Synthesised implications	Low	Medium	High	High	Low	Low	Medium	Low	Low

Source: Author's own construction

The highlighted boxes in the row 'synthesised implications' present the differences from the practice against the theory. At this stage, the summary of the research so far indicated

that the business model canvas could not be understood as a standardised model where the single blocks gain equivalent importance, as asserted by Osterwalder and Pigneur (2010). Instead, the individual blocks developed in sequential dependencies based on a specific approach, as outlined and contrasted later by the chosen cases from the industry. However, the implications for the key areas of the business model canvas provide a kind of universal recipe about how to approach the evaluation process using the importance level method.

In fact, the following discussions about this evaluation process could not be defended as a problem-solving tool for tier-1 suppliers. Instead, it is considered helpful for concerned companies to initiate their related business activities.

Based on the synthesised implications of table 6.3, interviewee evaluation, and recommendations to tier-1 suppliers (see section 5.7), the model achieves different levels of importance reminiscent of a project structure. Apart from the theoretical implications, such a project can be used as a contribution to practice.

The key resources even achieved a slightly higher value than the value proposition in the overview, although the value proposition was often highlighted by the informants as the most important block. In this context, Dachdecker argued that the value proposition for the customer is the most important as the company cannot sell a product that is not unique to them.

In contrast, most argued that to offer a value proposition that no other company can, it is important to have unique R&D capabilities in the first place. In this way, could it be, for instance, that a concerned tier-1 supplier hires young engineers with specific knowledge about ICT into the existing organisation? Or a company that introduces a new future-oriented department with knowledge coming from diverse settings that focus mainly on new technologies and new business opportunities (as proposed in an ambidextrous approach by Fojcik, 2013)? Could it even be the company uses a mix of both versions in order to transfer new arising opportunities regularly within the existing organisation?

In fact, there were various approaches to generate a value proposition by diverse and future-oriented thoughts. However, to flexibly conquer a blue ocean untouched by others, a diverse and dissenting team equipped with ICT knowledge could obtain the highest success probability. This implies that without new ideas originating from innovative and

highly educated people, companies would continue to fight in red oceans, as stressed by **Zeppelin**.

Therefore, a value proposition could be seen as the consequence of R&D activities, but on the same importance level. Likewise, the static blocks, such as customer segments and key activities, have been seen as the consequences of a decided value proposition. Of course, which customer segment derived from it by the company in order to adjust its internal competencies depends upon which blue ocean ultimately emerged. Obviously, the impact to an economic profit formula could not be calculated without knowing what kind of product or services the company plans to offer customers.

Previous discussions have several times highlighted the fact that tier-1 supplier opportunities were aiming to awake unknown customer demands. In consideration of a unique value proposition that could either be an innovative product or a service that facilitates unknown demands, the main issues for companies related afterwards to their subsequent steps.

Arguably, the theoretical rating scored 'costs' as of high importance, while the revenue streams achieved a medium level. In contrast, the primary research showed low importance for both blocks. Admittedly, the economic profit formula could decide on the launch of a new project, independently of a specific strategy. In the case that costs would be so high that even strong revenue streams would not be sufficient to generate profit, it would not be judged positively.

Therefore, although costs achieved a higher importance than revenue streams and it could influence decisions about the launch of a project, the business case must be calculated upon certain input factors. The implications of the previous sources showed that such input factors were coming from a value proposition that creates a customer segment, with costs deduced from the organisational infrastructure to fulfil the project.

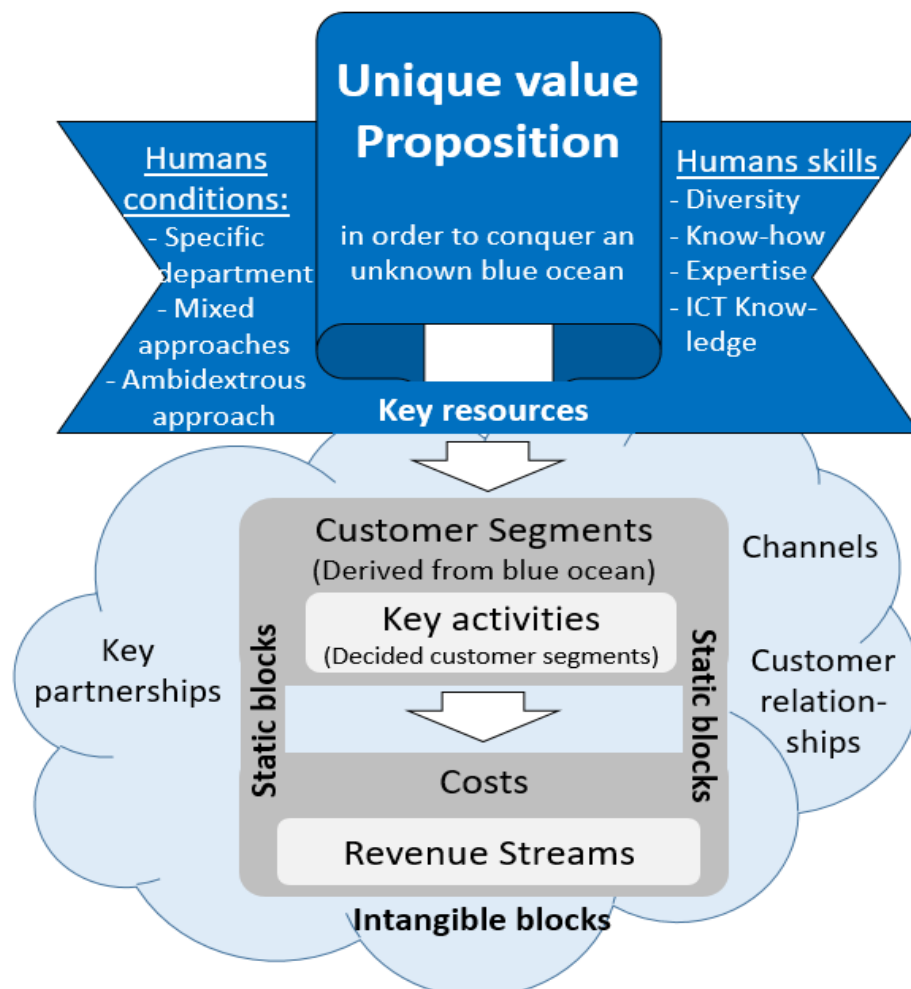
The practical implications of partnerships, channels, and relationships have been rated at low level. Only the partnerships were evaluated by the literature as being important. This has mainly been influenced by the importance of the value constellation approach, as provided by Michel (2010). However, **Zeppelin** argued in a similar context that such constellations could only be realised when the company knows what kind of values it could provide to customers. Moreover, even if it could provide a value proposition, and

with a business case approved by the board, partnerships are necessary to improve efficiency in terms of costs, logistics, and other inefficiencies within a newly launched project.

This, along with the other opinions of the interlocutors, called for an importance level that could be downstream evaluated. Hence, these blocks have been named by the researcher as intangible due to their communication and information nature to external sources, either to customers or suppliers.

Due to the different stream complexities, figure 6.1 depicts a visualisation of the discussed effects to the canvas model as a kind of extended framework of table 6.3 depicted in a project flowchart.

Figure 6.1: Implications to a non-influenced evaluation process



Source: Author's own construction

The figure illustrated in blue the high importance level of the key resources and the unique value proposition (refer to 2.4, 5.1 and synthesised in 6.3.1) created by the skills of humans and the conditions provided to them. By this, a specific department offers the environment to inspire new ideas. The mixed approach considers the possibility to combine internal and external engineers, while the ambidextrous method highlights the independence of the team from the daily business. Indeed, human skills could be enhanced by different methods, such as training, seminars, courses, etc. but they must be aligned to ICT knowledge. A diverse team that has been equipped with know-how develops particular expertise due to its different and constructive contributions in the field of ICT.

Deduced from a unique value proposition that conquers an unknown blue ocean and a particular customer segment, the key activities are required to identify organisations' tangible assets (section 2.4, 5.4, and 5.5 discussed in 6.3.2).

Based on identified costs and investments derived from the key activities, the revenue streams were calculated in a kind of static procedure, as shown in the grey boxes (2.4 and 5.3 converged in 6.3.4). Upon such a decided business case, the basis for optimising the processes via communication and information to external sources is presented in the light blue cloud in order to reflect a kind of value constellation process (2.4, 5.4, and 5.5 discussed in 6.3.3).

Indeed, figure 6.1 reflected a process for tier-1 suppliers that has been sequentially applied, instead of the business model canvas as submitted by Osterwalder and Pigneur (2010).

At this stage, the implications for the key areas therefore provided the first step to a newly emerged model building approach.

6.4 Main implications for the whole canvas model

Arriving at the end of this chapter, this section comprises the implications that have emerged from areas of agreed knowledge, a variety of conflicting views, and the key areas of the business model canvas. As such, it merges findings regarding understandings of business models, value creation, strategy, change, and business model innovation with the canvas elements to present the study's contribution as a whole.

Hence, this section is structured based on the knowledge variety converged into a model building approach in order to present the contribution to knowledge.

6.4.1 Consequences for the variety of knowledge

The research on business models in general has revealed that many different expressions and explanations were used to approach unified understandings. However, due to open trading borders between emerging nations that reinforced globalisation in recent years, more dynamic and flexible business activities complicated the approach to an agreed universal meaning.

Indeed, Porter's value chain was developed in a time where the relationships between suppliers and customers were still visible and identifiable. Models, like B2B, B2C, etc., therefore, supported the idea to allocate clear roles to every party that involved in any kind of business relation. Moreover, values were not created as linear anymore, as discussed in section 6.1; instead a networking creation process has obtained popularity in the value constellation model.

Even though the business model canvas has become more attractive in recent years, certain feedback and responses in the field, however, indicate that the model has not yet achieved a breakthrough. Therefore, a universal business model that uses a predefined value creation process has not emerged. Instead, a flexible and dynamic association for the term 'business model' seems to be more realistic in order to approach a common understanding. Moreover, the value creation process cannot be argued in connection with the business model, instead its process depends on the key resources and value proposition.

Consequently, the research on business models and value creation offers an augmented understanding, since the process for both depends on situational business cases.

The universal opinion from the literature revealed that strategy is the basis to define the change process and, if needed, business model innovation as well. Actually, this thinking has also been confirmed by the tier-1 suppliers but was denied by the other participants. They argued that the influences of these factors depend on a certain business case. As such, every individual case required different approaches and could set therefore the focal point on one of them.

Remarkably, the cited cases in chapter 3 illustrated different approaches, despite only being presented from public sources. For instance, ZF used the ambidextrous approach and launched a new division explicitly dedicated to e-mobility. It could be argued whether or not it was following a strategy, but a big 'change' in the organisational structure has been established.

Another case concerned Leoni, a tier-1 supplier for cables and electronic elements. Likewise, it followed the ambidextrous approach but in an established division. In this case, it used existing business blocks to innovate its organisation for new business opportunities. A more serious case was that of KSPG due to its strong dependence on the combustion engine. Admittedly, it was not visible at all, as to which direction it intended to align its business fields. However, the feedback of the interview confirmed that they were working on a strategy in order to determine the change process afterwards.

The cited cases have underlined different approaches. Whether or not all commenced with a strategy in place could be questioned, but there is no evidence that these influence factors should be sequentially ordered. Instead, it has frequently been highlighted that their individual applications were dependent on the value proposition.

Apart from the cited cases, to discuss the main consequences to the key canvas model blocks a more palpable example was used, that of BeP. Noel and Sovacool (2016) argued about the BeP case that problems in hiring qualified labour, insufficient marketing, and limited management skills meant that the project was not properly managed. A BeP employee once stated that “everything we needed to go right went wrong. Every cost on our spreadsheet wound up being double, every time factor took twice as long. There was nothing normal about BeP” (Noel and Sovacool, 2016, p. 379).

Shai Agassi initiated the BeP project driven by a vision to make the world a better place. Its strategy decided to launch the pilot projects in Israel and Denmark due to the environmentally friendly attitude in both countries, as outlined in detail in 1.1.3 and throughout 2.4. While many sources offered different reasons for its bankruptcy, including an immature market, too high costs for the swapping station, or an inappropriate vehicle model, a very important factor – customer readiness for this blue ocean - was mentioned only in the background. Instead, how would have the case developed when Shai Agassi would have taken into account highly-educated employees enabling the

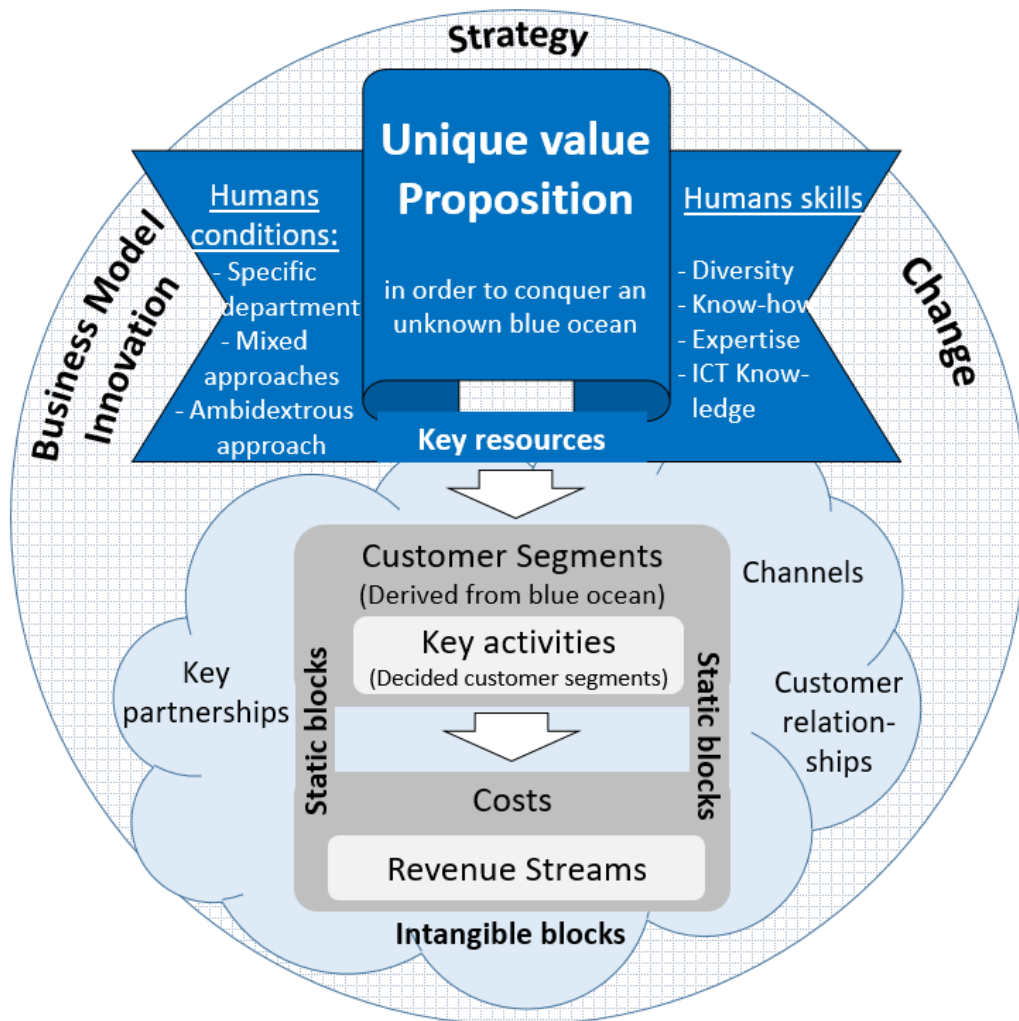
unique value proposition in order to attract a real customer demand? Indeed, this question remained unanswered but it illustrated the risk of what can happen when a strategy driven by a vision is followed without flexible and dynamic correction. Initial investments into a highly-educated team with diverse expertise in, for instance, knowledge about markets and customers, business case skills, and advanced ICT technology, would perhaps have recognised in advance that customers would not simply be impressed by just feelings, as commented on by Borup (2014).

Consequently, due to the increasing interdependencies among the various players, and the invisible business opportunities that require fast reaction times, the influence factors rather moved into the background. Of course, it cannot be claimed that they became unimportant but the classical notion of initially having a strategy with vision and mission in place could be questioned.

6.4.2 Model building approach and contribution

In summary, the investigation of the main dimensions – business model and value creation process, the influence factors - like strategy, change, and business model innovation - combined with the canvas blocks guided the researcher to a result that is consolidated in figure 6.2, the business model matrix.

Figure 6.2: Business Model Matrix



Source: Author's own construction

The business model matrix has been developed by the researcher in order to express an ordered scheme underlying a construction diagram, which could be used as a revised business model. In fact, it differs completely from the business model canvas but was mainly initiated by the primary research.

As an extended view to figure 6.1, in which the influence factors and business model foundation were added, this model has been time- and situationally-oriented designed. Apart from the discussed sequential process in 6.4.1, the theory obtained a very important and new contribution to knowledge. In comparison to the conceptual framework (see figure 2.11), the practical outcome suggests a completely different picture as the theory has previously recommended.

Instead of initially using the strategy, change, and business model innovation to take part in the upcoming technologies, based on the discussed evidence a vice versa approach has been recommended.

Apart from the conceptual contribution, a tier-1 supplier could use this framework to approach an unknown blue ocean in order to elaborate on the inputs for a business case in the sense of a practical contribution. Based on a profitable business case, it would be then necessary to decide whether the strategy, change, or just the business model innovation ought to be applied. Therefore, these factors were placed on a matrix in the model to illustrate their equal priority, but close to the value proposition.

Finally, the static and the intangible blocks – associable to the value constellation process - guided the influence factors on a business model platform that is similar in shape and grid to a matrix. By this, the matrix could be associated with the flexible and dynamic nature of a business model.

6.5 Limitations

The discussion chapter displayed several limitations; firstly, the rather restrained participant feedback about strategy, change, and business model innovation. However, it could be argued on the other hand that these limitations have been exactly the support to set the influence factors to the same levels. Indeed, when an expert did not offer his opinion to a question vehemently, it could be a sign for a general disagreement around the meaning.

Secondly, although the researcher addressed more than twenty sources to obtain more interviews, the five interviews conducted were sufficient in the available time for the following reasons.

(1) The complexity and the uniqueness of the research demanded a deep knowledge about business models, in particular the business model canvas. A few times, addressees admitted that they refuse their participation due to a limited knowledge on the topic.

(2) The triangulation method has been used to capture different knowledge dimensions, but even because of some contradictory opinions among them, the major streams were recognised to justify the chosen sample size. Indeed, the conducted interviews did not contradict in such a way that would have demanded further inquiries in the field.

(3) The pace of current innovation in the German automotive industry could have emerged in different feedback depending on the ongoing education of the individuals.

Chapter 7 Conclusion and Recommendations

Having arrived at the final chapter, the challenges are mainly focused on including the study's entire findings into the thesis conclusion in order to agree on a revised business model and the contribution to knowledge. This chapter consists of five sections structured as follows.

Initially, a reflection on each chapter is presented, affirmed the reasoning used throughout the thesis. It takes into consideration the main parts of the study, such as the research problem, research questions and objectives, concluding and theoretical propositions from the literature review, researcher's paradigm, methodology approach, empirical findings, and results, as well as the discussion chapter. This provides a critical evaluation of the research project with regard to the three main dimensions of the conceptual framework, in addition to the deducted key themes. Therefore, the study's framework is guided by the business model canvas.

Briefly, the purpose, methods, and results are scrutinised to address the study's reliability and validity. To justify the generalisability of the study, the cited cases from chapter 3 are used to conclude its practical connection to the industry.

This is followed by a key section that provides the key messages of the research in terms of its conceptual and practical findings, painting a picture of the approaches and usages of a novel evaluation method framework. Indeed, they could be accepted as the contribution to knowledge of the thesis.

The 'reflection and learnings' section critically evaluates the researcher's personal development throughout the thesis process, highlighting the lessons learned. The revisit to teamwork, with support from fellow students and the supervisors during the endeavour led to the researcher's acquired knowledge. In awareness of this, a recommendation for the researcher's further development enables the conclusion of the personal reflection and learnings section.

Finally, the thesis ends with some recommendations for further research.

7.1 Critical reflection of the different fields of knowledge

In fact, the study was undertaken at a time where the German automotive industry faced a disruptive change from internal combustion engines to the environmentally friendly propulsion system, as impressively illustrated by Lohmann (2009) in figure 1.1.

Due to the very dynamic and fast changing environment in this field of study, it was decided not to choose a topic that analyses breakthroughs of new propulsion systems; instead, a more constant topic enabled a fundamental and reproducible research.

Hence, the following sub-sections are so designated in order to critically reflect on the purpose of the study, which has been grounded on a constant and disseminated model. This, and the findings of the literature review, is considered to mirror the methods used to collect data in the field of interest. Of course, the researcher's worldview would have resulted in varied outcomes. Therefore, this sub-section reflects the reasoning of collecting knowledge in practice.

At the end of this section, the revisited theoretical and practical streams are converged to provide an overview of the study's implications.

7.1.1 Purpose of the study and theory

Change in the German automotive industry has been triggered by external 'PEST' forces. In the axis of the political forces, the Kyoto protocol has been founded in order to reduce global emissions to mitigate the greenhouse effect, which has been identified as the main driver of climate change. The EU, and therefore Germany, is one group within the unified 'Kyoto' nations that has been committed to strictly follow the convention. Germany's contract with the EU demands adherence to environmental regulations transmitted to its industry with committed targets.

Another external force has been identified with the economic and environmental influences. Driven by the Kyoto convention and the EU demand to achieve a 20% improvement in emission reduction, increased renewable energy, and improved energy efficiencies, the target for the German automotive industry has been settled at a CO₂ emission reduction down to 95g/km by 2021 (European Commission, 2016).

Socio-cultural forces have emerged from greater connectivity among users enabled by the internet, smartphones, and other media, and has opened up new possibilities in terms

upcoming mobility. Such a digitalised technology permits an approach to the development of autonomous, driverless, and shared mobility. Indeed, the car could face a transformation from status symbol to pure transportation system, which would have a strong influence on the lifestyle behaviour of customers. On the other hand, it could be argued as to whether the technology dimension was driven by the previous forces.

Notwithstanding, exploitation of the limited natural resources, stricter emission regulations, or a better efficiency factor in alternative systems were identified as the dynamism of change towards the electric battery, fuel cells, and several hybrid variants.

Whether strong political forces, environmental constraints, change in mobility behaviours, or advanced technology forces, the German automotive industry has been in a disruptive transformation that greatly influences the decades' dependent tier-1 supplier industry and their business models. Many authors have indeed argued that the ICE still has a lengthy future, as the current engine technology has not yet been exhausted.

Apart from ongoing minor improvements to reduce further the ICE's emissions, the physical limit of its emission reduction was specified, since the ICE always requires a certain amount of fuel that inevitably emits CO₂ due to the combustion process. Moreover, identified actions in comparison to costs – refer to figure 1.4 – could not even compete with alternative technologies.

Hence, carmakers logically face the situation of deciding between two options. Either, continuing to invest a lot of money in the ICE to gradually reduce emissions to the physical borderline or direct funds to new alternative technologies in order to achieve a zero emissions policy.

In fact, a move towards alternative technologies implies a dilemma for tier-1 suppliers because of the specific components required in an ICE. However, tier-1 suppliers with a product portfolio removed from the ICE were not directly concerned and only confronted with product innovation due to the advanced requirements of e-vehicles. Because of the need to focus, it has been necessary to undertake this study regarding suppliers directly confronted by products around the ICE.

These tier-1 suppliers, operating in a comfortable zone within the B2B of ICEs for many years, followed strategies mainly aligned to OpEx. Their main concerns were to decrease cost and improve the value chain, since OEM demands were foreseeable and projectable.

This, of course, evolved into business models designed based on the required values in a static and compact frame. Indeed, several sources from the literature have indicated the equalisation of tier-1 supplier business models with the business model canvas.

Whether the business model canvas was invented upon the value chain of a B2B remains unanswered, but its usage was confirmed by the respondents within the primary research. Hence, the risk of capture within a static business environment without participating in future demands was obviously recognised by concerned suppliers.

However, it remains rather questionable as to whether the business model canvas is the appropriate model to help concerned suppliers to survive disruptive change, given Osterwalder and Pigneur's (2010) major recommendation 'to visit the doctor just for regular checks'. Moreover, in the case that they are aware that change is required, it also remains open as to how to change in the most appropriate way.

Related to previously mentioned constraints and in consideration of the failed BeP model, the issues that arose related to the validity of the canvas model, the necessary process of how to use it, and the approach to change. Arguably, another approach would not have provided such a basis on which to ground the study upon the shoulders of the last, accepted, authors.

Therefore, the research problem and aim – refer to section 1.2 – has been formulated in such a way as to provide to the top management of tier-1 suppliers the possibility to critically reflect on their current business models. Depending on the highlighted risks to tier-1 suppliers, the research problem stressed the demand for a competitive business model in the light of alternative propulsion systems, while the research aim was so defined to deliver the process of how to conduct business model evaluation.

Simplified, the aim was chosen in order to submit to top managers a framework against which their business models can be evaluated.

Instead of creating or deleting the business blocks of the canvas, the approach to understand each importance level of the block and to weight them developed a project that concentrates on very important factors from the beginning, instead of wasting company resources on irrelevant activities. Hence, the research questions, as cited in section 1.2, aimed to prove the importance level of each canvas block within the identified

elements. Only then, in opposition to the static canvas, a flexible and dynamic process could be used to regularly evaluate competitiveness for upcoming challenges.

Conclusively, the contextual background illustrates the changing business environment of tier-1 suppliers driven by strong external forces and the risk of losing the connection to the e-mobility era. Upon the submitted business model canvas and its static nature, the study's introduction outlined the research problem and aim to support tier-1 suppliers with an evaluation process against which current business models could be proven on their competitiveness. Indeed, the research questions deduced from the aim were used to scan the related literature about existing knowledge and guide the research of the thesis according to the research objectives. Therefore, the research objectives can be revisited in order to briefly discuss to what extent each has been met:

- To critically assess the importance level of a value proposition perceived as being of key importance for customer demands

The value proposition, together with the key resources, can be assessed by the highest importance level as perceived from the customer perspective. The outcome of the theory shows that the key resources were ranked higher as the value proposition, while the practical implications consider that the value proposition without key resources cannot meet customer demand. As such, this research objective delivers the very high importance level of the value proposition, but only in connection with the key resources as perceived from the customer perspective.

- To critically determine the impact of a business case that would be acceptable for profit-generation by tier-1 suppliers

The impact of a business case determines the realisation of a project but can be subject to a lower evaluation in comparison to the others due to its 'output' nature in processing more important input data. Throughout these chapters, the business case has obviously been perceived as the decider as to whether to realise a project. However, the business case is not important in order to guide a tier-1 supplier organisation towards alternative technologies. Instead, it is used to visualise the profitability of an endeavour. Hence, its impact on a revised business model is lower than those of the other blocks.

To critically appraise the contribution of organisational infrastructures that produce an effective value proposition

Arguably, organisational infrastructures can only be appraised with their individual blocks. Besides the great importance of key resources, key activities achieved a medium importance level due to its dependent nature of producing the value proposition, while key partnerships remain as their consequences. As visualised in the business model matrix (refer to figure 6.2), the key activities are needed to realise a unique value proposition, while the key partnerships support the organisational infrastructures along with the other canvas blocks. As such, this objective has not been fully met as the designated blocks within this element achieved different importance levels.

- To critically identify the relevance of customer expectations that are equipped with channels and relationships to assist such a value proposition

The relevance of customer expectations in assisting a value proposition can be identified as being of low to medium importance, since a determined customer segment provides the necessary inputs to calculate a business case. Although the theoretical propositions from the literature review highlight that the ‘channels’ are rated as of medium importance, the empirical study, however, concludes it to be at a low level (refer to sub-section 6.3.3). This, and the evaluation in the light of the influence factors, identifies the relevance of customer expectation as the consequences of the key resources and the value proposition. Hence, this research objective has been fulfilled as the relevance of customer expectations in assisting the value proposition has been identified (refer to sub-section 7.1.3).

Literature review

The literature review was structured into three dimensions that analysed agreed knowledge about business models and the value creation process. Secondly, the dimension of the ‘variety of conflicting views’ investigated the influence of known management instruments on the single blocks of the canvas model. Thirdly, the comparison of the BeP model with the canvas model enabled a theoretical importance evaluation.

The evidence suggested that the lack of a common definition and understanding of a business model. Even though, it became gradually important and more frequently used in the new economic boom from the beginning of the 21st century onwards, the purpose and

underlying functions of the business model was rather vague. However, in a broader context the majority of authors described the function of the business model as creating, delivering, and capturing value to customers. The business model's primary function, in addition to some advanced applications, was deduced in the classical value creation process provided by Porter (1985).

The consolidated clues recommended that a business model be aligned to particular customer demands. Apart from some approaches to incorporate management instruments within a strategy, as submitted by Hamel (2001) and Wirtz (2013), every citation revealed a supplier perspective that was doing something for customers. Therefore, additional evidence advised that the key function of the business model was to generate profit and 'added value' to customers. Indeed, it underlined the supplier position in front of customers instead of understanding what customers could demand from their perspective.

Another approach of the review was conducted in order to understand the value creation process from suppliers to customers. In fact, inspired by Porter's 1985 value chain and his value system of 1998, many different types of business models that described the business relationship between suppliers and customers emerged to explain the value creation process. As such, linear creation processes, in addition to the combination of linearity and parallelism, were determined in types, such as B2B, B2C, B2O, and B2S, to satisfy visible customer demands. Although OEM values have gradually been transmitted to suppliers, the approach of a more flexible value system seemed to no longer be sufficient in fast changing business environments.

The theory of the network-based value creation process, or so-called value constellation, was first offered by Norman and Ramirez (1993). They argued that different economic actors, such as suppliers, business partners, allies, and customers, could work together in order to co-produce value. As such, a value creation process in terms of new service application emerged that led to borders among involved stakeholders, which were not so clearly distinguishable anymore.

In 2013, Wirtz argued that a paradigm shift transformed the linear value chain into a microprocessor metaphor due to increasing digitalisation and interdependent relationships among involved players. By this, values were not 'delivered' anymore. Instead, they were co-created with the customer. A comparable approach related to

emerging e-mobility was provided by Guille and Gross (2009), the Vehicle-to-Grid (V2G) model. They argued that an ‘aggregator’ could play a central role and has the agent function to manage involved stakeholders, such as appropriate infrastructure and relationships with the government and energy provider.

Hence, the indications suggested that a classical value chain approach was difficult to sustain for tier-1 suppliers due to its dependency character. Instead, playing an involved role as a co-creator for e-mobility enabled a competitive advantage.

During the review of works about canvas model blocks, it could be stated that many accepted authors had already identified the value proposition as being very important. (Budde Christensen et al., 2012; Guille and Gross, 2009; Osterwalder and Pigneur, 2010; Wirtz, 2013; Osterwalder et al., 2014).

Based on the agreed barriers of e-vehicles, like cruising distance, charging time, costs, and infrastructure, the evidence underlined that a value proposition that addresses these barriers could obtain new business opportunities. In this regard, the value proposition was considered as a reaction to customer demand, either to fulfil tasks, solve problems, or generate profit. However, only Budde Christensen et al. (2012) and Kim and Mauborgne (2005) offered the theory that a value proposition could be compared with an unconscious benefit to customers in which an initial demand has yet to be created.

To analyse the functionality of the business model canvas, by contrasting the case of BeP, provided a deeper understanding of the failed model and theoretical implications around leveraging the importance levels. In fact, the review of a wider spectrum of the BeP case, proposed by different authors in several dimensions (Boomis et al., 2010; Budde Christensen et al., 2012; Farber, 2013; Noel and Sovacool, 2016), offered a deeper insight into the failed endeavour.

Therefore, this comparison within theoretical knowledge confirmed that the canvas model should not be used statically. Instead, a process oriented approach that sets the focus consecutively from one block to the next would have provided to Shai Agassi a different kind of guideline.

Noel and Sovacool (2016) noticed the absence of qualified and educated employees, along with experienced managers, to manage the project successfully. Further, the value proposition has been aligned to special markets where neither the understanding, nor

customer demand, have previously been identified. As a logical consequence, the costs were far beyond the planned budget and the necessary revenue could not provide an approach to break even in time, meaning that the shrinking financial funds caused bankruptcy in the end. Ultimately, a focus on key resources, the value proposition, customer segments, and costs consecutively would have guided the BeP case most probably to a different result.

Apart from a static comparison of a known case with the submitted canvas model, the method to contrast and incorporate accepted management instruments into the evaluation process, such as strategy, change, and business model innovation, has been a novel approach to identify importance levels individually.

Indeed, many scholars could argue that such an approach would not have been valid due to their individual nature. Inspired by Wells (2013), Böhmman et al. (2013), Wirtz (2013), and Kim and Mauborgne (2005), recent developments in the automotive industry have demanded, however, the analysis of a dynamic aspect that influenced the canvas blocks. Of course, since such influence factors have experienced a variety of conflicting views within the theory, the analyses were used to elaborate their standpoints in the emerging business fields.

The consolidated analysis of the influence factors, strategy, business model innovation, and change revealed interesting conclusions. In fact, the theoretical understandings of these factors were altered in 2014. Before that, the focus was talking on the change towards alternative technologies, but post-2014 saw papers discussing how to achieve the change.

This has been a paradigm shift, not only in terms of the changed topic but also about the role of strategy, change, and innovation. In the past, strategy was seen as a high-level plan guiding change and innovation. More recently, however, attention has mainly shifted to flexibility and dynamic and innovative business models that ought to be designed to react rapidly to changing environments; despite the value proposition still being perceived as the most important canvas block.

As such, some new business fields, such as services to customers or the electric infrastructure, were recommended as potential blue oceans. Further, the very latest articles strongly underline the fact that suppliers should participate in new technologies,

especially in domains of electrification, autonomous driving, mobility, or connectivity (Helms et al., 2016; Luthardt, 2017). However, they must be advanced in ICT due to the networking activities within the value constellation environment. Otherwise, big tech players, like Google, Apple, Uber, Tesla, etc., could gradually increase the pressure on the established carmakers that might finally lead to their exit.

Apart from the individual evaluation of each influence factor with the canvas model, recent signs suggest that suppliers should leave their established paradigm and conquer blue oceans in the domain of ICT in order to participate in areas of advanced technologies.

Indeed, such a paradigm change still requires searching for a value proposition from the customer perspective enabled by enhanced R&D activities. As such, customer segments could easily be reached via direct channels in a value creation process that co-creates value with involved players.

The value constellation process, however, requires diverse partnerships and related access to customers in order to partly hand over specific values.

Consequently, strategy is no longer deduced from past business experiences to forecast the future. Rather, it has been developed to a guideline of success, as asserted by Grant (2015).

7.1.2 Methods to collect data and primary research

This part of another field of knowledge completed the empirical research findings. In line with the identified research questions and objectives formulated around the aim to evaluate the importance level of each canvas block, the theoretical propositions were used in unbiased tests in the practical field. By this, and in order to define the most appropriate research design, it was necessary to determine researcher's philosophical worldview. To explain, a positivist could develop an interview guide driven by statistical evidence, whereas an action researcher, at the other extreme of the philosophical continuum in figure 4.2, would deliver a relativistic view without theoretical evidence.

Due to the topic's nature, in which a business model could be evaluated against the canvas blocks by constructing different weights to a revised business model, the constructionist approach was identified. Based on the researcher's long-term experience in snooker, this paradigm is underlined by the procedures applied in every game, and by the axiology that

prefers direct interaction with people to construct a relativistic reality. Hence, the researcher's philosophy as a constructionist was identified with a relativistic ontology and subjective epistemology.

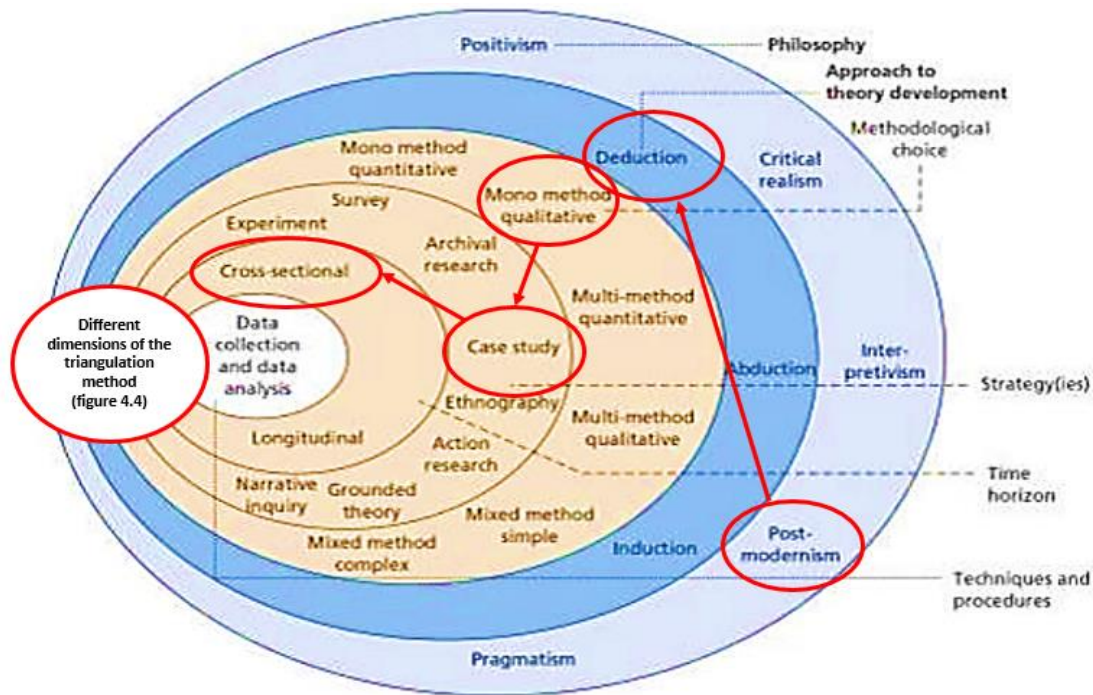
Based on the researcher's philosophy and the nature of the topic to collect data from a sector where different knowledge dimensions exist, a deductive approach to theory produced diverse meanings. Whereas, inductive reasoning premised available information to develop untested results from a specific to a general view. As such, qualitative responses from interviewees about their individual opinions and ratings in the sector were required.

Hence, the research design suggested approaching the mono method qualitative methodology in the sector as a research strategy that used a case study. Indeed, the elaborated justification in the methodology chapter highlighted that another inquiry method would not have collected such diverse data from different perspectives in a given time. Only then did sources directly or indirectly connected with the supplier industry deliver a balanced and objective picture. Focusing only on tier-1 suppliers, academics, related institutes, or other particular automotive sources would have delivered only subjective and belief driven opinions.

It was decided to use the triangulation method, therefore, which converges objective samples from concerned stakeholders to make sense of the data in a neutral voice. In this context, figure 4.1 was augmented with figure 7.1 to visualise the conducted methodological procedure of the study.

The red arrows and circles applied to the model of Saunders et al. (2016) helped to determine at a glance which applied process is required to arrive at the triangulation method, besides other known possibilities.

Figure 7.1: Study's methodological path



Source: Amended from Saunders et al. (2016)

The triangulation process was decided in line with the research problem and upon the proposed perspectives from the literature. As such, the environments in which the participants were focused defined the three axis of the triangulation method.

Tier-1 suppliers were chosen due to their strategy, change, and innovation experiences, while the technical dimension in terms of R&D focused on an advanced technical university. The commercial domain, which could also be used for the other perspectives, undertook inquiries from consultancies.

Although the chosen sources had different focal points, the interview guide was structured to use standardised questions. In fact, the semi-structured and open-ended questions to the five informants were generally formulated in order to construct a flexible interview. This and the previous cross-sectional approaches of the triangulation method, offered data in a holistic view acquired from different knowledge sources, experiences, and industrial backgrounds.

In this way, the researcher's paradigm was followed and unbiased approaches from different perspectives were used to construct a relativistic direction that considered stakeholder interests. Indeed, the researcher addressed more than twenty candidates but

due to limited knowledge about the business model canvas and the complexity of the research itself, many refused their participation. Saunders et al. (2016) underlined, however, that five interviews are sufficient for general studies as they depend upon the nature of the research questions.

The case study used pattern matching logic to address the reliability and validity of the research, as proposed by Yin (2014) and partly depicted in the qualitative data analysis process in figure 4.5. This process has been systematically approached and divided into six consecutive steps.

Based on the conducted interviews, which were recorded and transcribed, important chunks in terms of phrases, sentences, or words were highlighted to identify codes. These codes were transferred into an excel sheet and sorted based on the canvas blocks to the individual interviewee in a vertical direction. Afterwards, the individual rating was quantified in order to analyse the distribution of each canvas block. In fact, the horizontal average of each block then provided an average importance result across all participants.

To ensure the reliability and validity of the codes, a horizontal ranking of codes in the same context was used to identify their weight. By this, not only was the individual coding considered to achieve a result, but the horizontal evaluation provided an even common understanding of similar meanings.

Nevertheless, the twofold approach could be criticised in terms of its coding method. As a basis to make sense of data, it is true that a different researcher could interpret the statements differently. However, in the light of the researcher's paradigm, context-related and similar meanings were considered to create the codes as best as possible. Moreover, direct quoted statements from participants that delivered important messages were also taken into consideration.

For instance, such important messages were contrasted against the coding outcomes in order to verify contradictory meanings. While data reliability and validity were approached from several dimensions, a generalisation in terms of using the findings for every tier-1 supplier could not be confirmed. Instead, the approach and its underlying process to identify new business opportunities were considered to support concerned top managers.

Primary research

Apart from the important propositions of the interviewees about the importance evaluation process, which will be revisited later in this sub-section, some interesting consequences were extracted from the material.

None of the participants doubted the current risks for tier-1 suppliers in the changing environment. Each respondent responded to the questions as though a necessary reorientation has already been decided. None argued that the ICE would remain as the main propulsion system in the future.

They commonly agreed that alternative technologies have already penetrated the German automotive industry. However, when the entire penetration of the market with alternative technologies happens, and with which technology, remains unknown. In fact, as a result of the uncertainty about the direction in which the automotive industry may move, a commonly agreed opinion related to flexible and dynamic organisational structure. A start-up may easily identify blue oceans to conquer, whereas long-term established suppliers face obsolete and rigid organisational structures and cultures. These, plus the sense of enjoyment in a comfort zone under the umbrella of the OEMs, were perceived as the key barriers to change. It suggests that a generic vision incorporating the dogma that advises ‘never change a winning horse’ has been followed.

The main points about the importance evaluation process were deduced from the cited, and especially the expressed, participant statements and coding results. In this, the understanding of a business model has been described with all business activities being undertaken by the company and what it intends to do. A clear and universal description of the main function of a business model has not yet been delivered. Instead, participant feedback underlines the need to concentrate on the available core competencies used to fulfil current values to customers while creating new values within the constellation process. This ambidextrous approach, as posited by Fojcik (2013), enables companies to remain profitable within current businesses in order to finance new values.

Additionally, a unique value proposition developed by a highly-educated and diverse team was identified as the starting point to conquer a new and unknown blue ocean. Based on this, the customer segment could emerge automatically, as suggested by the professor, or may be directly developed depending on a demand that has not yet been identified.

The majority of the interviewees indicated that strategy, change, and business model innovation could be treated independently but in support of the value proposition and key resources. However, some voices still argued that strategy must first be in place in any case. Thus, the presumption prevailed that suppliers could still follow a plan to fulfil known and predictable demands. Otherwise, the strategy would be associated with change, and being subject to regular change.

Undeniably, all participants were uncertain about future mobility, dominant propulsion systems, and the deduced products that could be demanded by customers. As such, established and used procedures to satisfy customers at different levels experienced a paradigm change due to unknown and invisible demands.

In such an unpredictable business environment, suppliers must be very cautious about potential business opportunities. **Zeppelin** made this as he drew a picture wherein suppliers should observe the mobility market in different ways to identify whether or not the product could be used in a relatively short time. If so, then they can continue; if not, it would be better to quickly decide on an exit strategy. This proposition and the other comments highlighted the dramatic situation with which dependent ICE suppliers were confronted.

Therefore, the evidence suggests that suppliers should acquire knowledge in the domain of ICT. This can be achieved either by hiring highly-qualified engineers or educating diverse specialists in new technologies. However, such a R&D team should not be confronted with daily business. Instead, a separate unit could enable the preconditions that would foster the possibilities to conquer a unique value proposition, as shown in the example of Bosch and Conti by **Dachdecker**. In this way, such a team could manage the R&D works and value proposition to awaken a specific customer segment to provide the input factors for a business case. Only then, and based on required key activities, the worked out business case from the team could be presented for approval by top management. Subsequent processes, like the appropriate strategy, change, or business model innovation, would lead to the definition of potential partnerships required by the value proposition. Channels and customer relationships could then be factors to support the value co-creation in a value constellation process, either through direct connection with customers or the provision of industrial services.

The data collection through the triangulation method in the primary research resulted in the following main contributions.

(1) The business model does not describe an explicit function but the value creation process in a value constellation approach could support concerned tier-1 suppliers to overcome a dramatic business situation. Therefore, it is imperative to strive to become a flexible and dynamic organisation in which, for instance, the ambidextrous approach can be used to finance an unknown blue ocean.

(2) In opposition to the business model canvas, the static model may alter focus during change or the identification of new business opportunities in the relevant business model blocks. Therefore, a sequential and flexible process is recommended. As such, strategy, change, or innovation is individually tailored as a response to a unique value proposition. By this, an unknown blue ocean may be conquered that offers diverse customer segments. Only then, related costs emerging from the key activities can be used as inputs to calculate a business case.

This milestone in the process was important, as further endeavours decided the necessary strategy, change process, or business model innovation. A number of activities, such as required partnerships, communication channels, or special customer relationships, were evidenced by the interdependence nature of respondent feedback, and these have been considered to exchange values in the network.

(3) In fact, one enabler of a unique value proposition was the R&D capability. Without such important intangible assets, the supplier cannot participate in the digitalisation era, thus, ICT.

There have been several proposals to obtain such skills, by either recruiting the missing knowledge or qualifying internal specialists in new technologies. Without the appropriate and future-oriented knowledge and expertise in place, the tier-1 supplier will most probably fail in the e-mobility era.

7.1.3 Results of theoretical and practical streams

This sub-section offers a reflection on the theoretical and practical streams of knowledge. It contrasts the single main points to emerge from the study and identifies areas in which knowledge is confirmed or where augmented knowledge has been contributed. Moreover,

a compressed reflection of the tested theoretical propositions identifies areas wherein the practical part delivered novel insights against the theoretical.

As such, the problem statement guided the research aim, delivering the research questions and objectives. Reflecting the nature of the research questions, an investigation of the literature captured relevant and up to date knowledge about business models, the value creation process, and underlying logic of the business model canvas. Based on this, the influence factors of strategy, change, and business model innovation were confronted with the business model canvas in order to investigate their impact on the importance of each canvas block.

The empirical part of the study, however, used the emerging propositions within the designed conceptual framework to test them in the related field of knowledge. Various domains of knowledge within the automotive industry were chosen as a result of different stakeholder interests and diverse meanings. Therefore, the triangulation method has been purposely decided for data saturation due to the different knowledge sources, experiences, and industrial backgrounds.

Other methods could also have been chosen but the diverse sources provided a more objective picture than simply inquiring in one explicit area. Thus, the researcher's constructionist paradigm designed the interview guide with semi-structured and open-ended questions to elicit a relativistic view of participants chosen from the tier-1 supplier industry, university, and consultants.

The conducted vertical and horizontal coding processes, as well as the important quoted statements from the participants were used to make sense of the data in order to arrive at the theoretical and practical results. In order to illustrate the complex development of the thesis, the genesis flowchart in figure 7.2 was chosen to present it at a glance.

Figure 7.2: Genesis flowchart of the thesis

Research problem:

How might a successful tier-1 supplier business model be designed to sustain its competitiveness as they move to providing elements for alternative propulsion systems ?

Research aim:

This research aims to identify a framework of the most important business model blocks for tier-1 suppliers against which a business model could be evaluated in the new business environment

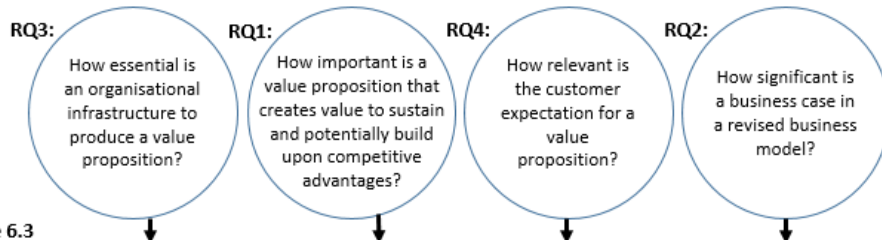
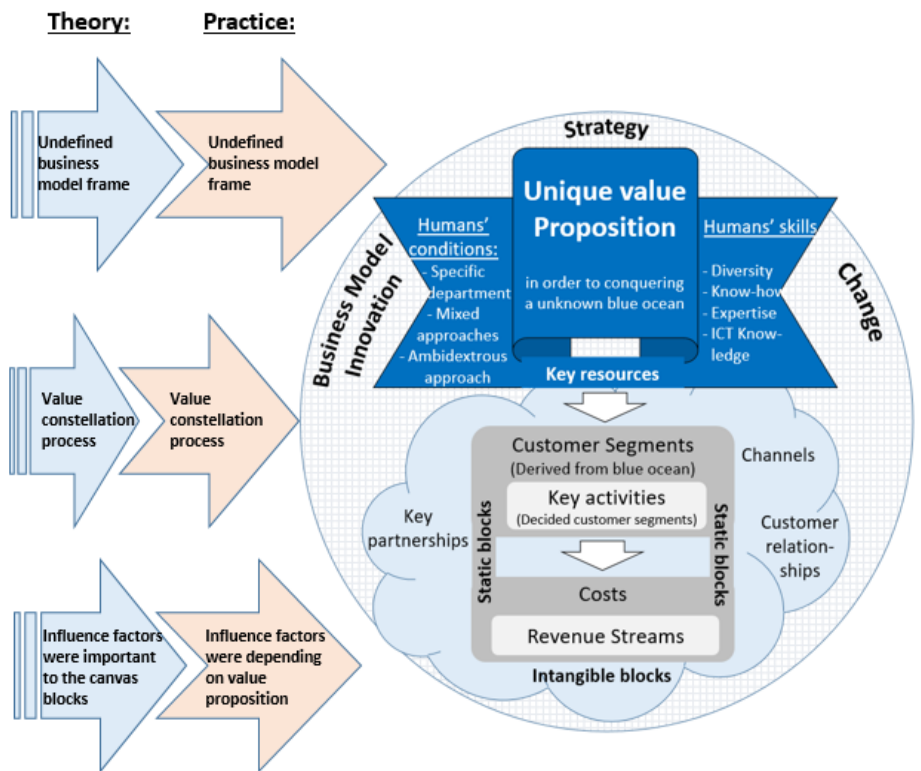


Table 6.3

Business model elements	Organisational Infrastructure			Value Proposition	Customer Expectations			Economic Profit Formula	
	Business model blocks	Key Partnerships	Key Activities		Key Resources	Customer relationships	Channels	Customer Segments	Cost structures
Theoretical implications	High	Low	High	Medium	Low	Medium	Medium	High	Medium
Practical implications	Low	Medium	High	High	Low	Low	Medium	Low	Low
Synthesised implications	Low	Medium	High	High	Low	Low	Medium	Low	Low



Source: Author's own construction

The genesis flowchart displays the undertaken steps of the whole thesis from left to right side at a glance. Deduced from the research questions and guided by the research objectives, the evaluation of the theoretical and practical streams, as shown in table 6.3, juxtapose the implications found in the literature against the empirical work.

As a result, the value proposition and key resources gained the highest importance levels, while key activities and customer segments ranked at medium level. Of less importance were the other canvas blocks. It could be argued, indeed, that such an evaluation method cannot be used to prove the reliability and validity of the study as a result of, for instance, too little data, invalid evidences from authors, or biased weighting of the blocks. However, the theoretical part developed in a direction that required greater reliance on the latest knowledge instead of using obsolete sources.

Therefore, publications after 2014 provide a better basis to compare with practice. It does not of course mean that sources before this time were irrelevant. However, the later work is vital to the contributions of the thesis as a result of its comparable basis to the primary research. The amount of data and the analysis method supported various methods to identify the discussed streams. Undeniably, more data from more interviewees and another research approach could have led to a more precise result, but the common flows following the interviews revealed no such discrepancies that required a revisit to the field. Furthermore, the interviewees were selected in terms of their qualitative contributions instead of interviewing many individuals without the required knowledge. Hence, the conclusion in table 6.3 about the importance level of each canvas block could be criticised; however, it is recommended based on evidence gathered.

In the light of the conceptual framework (see figure 2.11), the three sequential arrows in the flow chart take into consideration the influence factors, business model origins, and value creation processes. The investigation on the nature of the business model led to the discovery that all respondents agree on the non-definable function of the business model. Despite many attempts to create a key message under one umbrella, it was impossible due to the changing business environments. As creating, delivering, and sustaining values has been an approach used in the past to generalise meaning within the classical business model types, modern value creation processes operate under different rules.

As such, values are co-created by many different involved stakeholders and classical manufacturing processes are gradually replaced by services. Whether this is the result of, for example, overly expensive manufacturing costs in Germany, the consequences of globalisation, or even because of the influx of cheap products from emerging countries, will perhaps be clarified in future research. Nevertheless, for companies that wish to participate in alternative technologies, both the theory and empirical investigations recommend the value constellation process in domains like charging infrastructure, battery, or the e-motor.

The influence factors are the third arrow to finalise the conceptual model in figure 7.2, the business model matrix. In fact, the empirical research about these factors reveals that the vision and mission do not necessarily have to be embedded in the strategy. The vision can be developed by discovering an unknown blue ocean to be conquered due to the available or required resources. By this, to create a value proposition for customers, a process starts that, for instance, triggers change, or innovation without having a clear strategy in place. However, the feedback from the interviewees warned that such a procedure can only be utilised when the organisation has *“large development groups in this area”* that react flexibly and dynamically in time, as stressed in the example of Bosch and Conti by **Dachdecker**.

Nevertheless, the counter-argument suggests that just establishing a highly-qualified and diverse R&D team within an organisation is not sufficient to ensure success. Arguably, a technology change or knowledge extension to ICT may imply different cultural and organisational reactions that could motivate unpredictable and harmful employee resistance.

Based on figure 6.2 in the discussion chapter, integrated here in the genesis flow chart of figure 7.2, the underlying concept of the conceptual model incorporates the concluded findings so far. As such, the research aim was comprehensively addressed, since it has portrayed a framework within e-mobility against which top managers were able to evaluate their current situation using a flexible and dynamic model.

The main point of the genesis model illustrated the offensive characteristics against the passive and static canvas model. It may also be compared with an imaginary picture in which suppliers' individual standpoints are expressed. As, previously outlined, past

developments always placed suppliers downstream in the value chain to expect customer orders rather than trying a parallel, or even advanced, position beside customers.

Certainly many risks were identified, such as entering into potential competition with customers still providing attractive orders to their suppliers. However, **Huber** commented that his organisation was thinking and discussing this possibility, he refused this option finally with the comment: “*cobbler, stick to your last*”.

Anyhow, the clues of the primary research suggested a more aggressive attitude for suppliers, especially highlighted by the value constellation process. Or, as dramatically warned by **Zeppelin**, in a kind of black and white scenario that finally decides economic survival.

The flexible and dynamic business model matrix followed an offensive and project-oriented construct. An advanced R&D team, financed by profits generated from other business units, identifies potential market opportunities that are then guided into a unique value proposition, as highlighted in blue colour.

Emerging customer segments attracted by the ‘blue ocean’ in marketing campaigns, magazines, or other media could deliver, for instance, via surveys, interviews, or other inquiry methods, an idea of the revenues streams and required key activities. Thus, the costs, as the last static block, could be more reliably calculated than was the case at BeP, for instance. This completes the input factors for a best business case, as portrayed in grey and white in the rectangular block.

Arriving at this important milestone and following board approval, the value constellation process could then be used to define a strategy, change, or business model innovation, as highlighted in bold close to the value proposition and key resources.

At this point, and dependent on the chosen management tool, the light blue coloured cloud activates the respective intangible blocks to make the value constellation process work. The whole project is located on a round and meshed matrix to express the iterative nature of such a flexible and dynamic business model in terms of regular observations and adjustments to market developments.

It could indeed be argued that such a conceptual model can only be used theoretically and not in practice. In other words, an accepted generalisability requires its proven application

and conclusion mostly afterwards. Of course, the matrix remains to be tested in reality to clarify if it works.

The next section is therefore additionally introduced to bridge and evaluate this concept to an existing organisation confronted with the mentioned constraints in order to draw its practical conclusion and evoke a vivid image.

7.2 Practical bridge to the automotive industry

With regard to chapter 3 in which three different cases from the tier-1 supplier industry were evaluated according to their published web presence, the company KSPG was chosen to arrive at a practical conclusion about the matrix in the related industry. Leoni did not have such a critical product portfolio and used an internal ambidextrous approach in an existing division already. Whereas, ZF, with its broad product portfolio, had also launched a new division using the ambidextrous approach, the most critical and unknown question related to the endeavours of KSPG. As such, KSPG's product portfolio depended very much on the ICE and advanced visions, strategies, or other plans have not been explicitly displayed or mentioned. Accordingly, the next sub-section provides a proposal that has been concluded based on the web information and business model matrix.

7.2.1 Connection to the industry

The analysis of the published material assumed that KSPG is not yet ready for e-mobility. The absence of R&D competencies, a value proposition, or related vision statement presumes that visible endeavours towards alternative technologies have not been planned or even considered. Nevertheless, this 'blank sheet' provided a good foundation to draw a conclusion on the practical application within the industry.

Supposing that KSPG's current divisions are profitable and their profits could be used to finance a division or external team to the organisation named, for instance, 'alternative technologies', the matrix could be applied as follows:

Firstly, investing in the recruitment of qualified and diverse engineers. For example, a team should possess knowledge about ICT and e-mobility, business control, marketing, and research skills. It has been highlighted that they ought not to be connected with the daily businesses at all. Instead, they should scan the market for unique blue oceans

independently and without any commercial commitment. Only then could brainstorming in such a difficult and complex environment develop new ideas.

Following a team decision to follow up on such an idea, next, the analysis of a value proposition to attract customer interests must be quantified and potential customers approached. Indeed, since KSPG was active in the B2B over many decades, developed relationships with its OEMs could help to diagnose certain streams towards types of propulsion systems. Instead, it is rather not recommended to determine and serve direct business opportunities demanded by OEMs, unless existing competencies in the established divisions could fulfil such demands.

By leaving the red ocean, KSPG could organise its divisions based on different business fields. Once a new project has been released, the degree of adapting the complete strategy or only part of it, changing the whole organisation or only a division, and innovating just a single business block in established divisions remains to be decided.

Based on such a decision, the intangible blocks could be used to connect the value constellation process with related value stakeholders. Of course, established partnerships, relationships to customers, or channels must be critically reviewed and necessarily extended.

7.2.2 Approach to the generalisability of this thesis

The KSPG example has shown that organisational adjustments to flexible and dynamic suppliers, or even to OEMs, could be realistically approached. However, it requires that certain important steps be followed in order to use available resources in the most effective way, as proposed by the matrix model.

Nevertheless, the proposed case and described procedure did not justify a generalisability for all tier-1 suppliers. Instead, the underlying assumptions and necessity to critically evaluate the current business models in place could be used to generalise it for the entire tier-1 supplier industry in Germany.

Two main generalisations deduced from different examples from the related industry are as follows:

1. The cases of ZF and Leoni show that tier-1 suppliers must react and act in order to follow up alternative technologies. Apart from other tier-1 suppliers, both companies

published their e-mobility presence in any case. Thus, they have already tried to leave the red oceans by looking forward to conquer a blue ocean, either directly or indirectly. However, their cases cannot be used to recommend the same approach to all tier-1 suppliers. Rather, the awareness to react in certain ways and not to reside on the current standpoint is an important statement for generalisation in the tier-1 automotive supplier industry.

2. Well-known and commonly disseminated in the mind of all customers were the paradigm changes made in terms of attracting customers by big players, such as Tesla, Apple, or Uber. Many decades ago, the industry was aligned to satisfy visible customer demands until a certain point of saturation was achieved. This takes the form of a high-level plan named with a strategy striving to be the best, for example, in OpEx, quality, market shares, and growth rates among others.

Nowadays, however, customers are saturated and their real demands, which require satisfaction, are constantly more difficult to identify. As such, Apple penetrated the market with its smartphones even though customers had not demanded such technology. Tesla was driven by the vision to make the world cleaner by eliminating CO₂ emissions, but customers in this scenario were also not driven by an unsatisfied demand. ‘Uber’ customers, for instance, relied on taxis or other transport modes but a visible and required demand of the sharing concept was not demanded.

All three examples from the industry additionally show the generalisability factor in terms of awaking unknown customer demands, rather than investing in what may be demanded. Indeed, the discussed examples cannot be generalised to the tier-1 supplier industry as they are developed from different backgrounds and financial means. Nevertheless, the underlying methods that guided them to known success can also be used for tier-1 suppliers. This is an economic paradigm change and illustrates the necessity of conquering unknown blue oceans.

7.3 The framework of a novel evaluation method

This section is key to the conclusion chapter. It consolidates the whole thesis and presents the most relevant points in a precise and concise manner. The next sub-section contrasts the theoretical propositions that emerged as thesis themes. The last sub-section provides the key message and guides the contribution of knowledge. With this, the practical part

of the thesis ends finally in order to approach and conclude the lessons learned for the researcher in the following section.

7.3.1 Consolidation of the whole thesis

Based on the meaning of the thesis title, ‘A Business Model for the Automotive Tier-1 Supplier Industry: New Propulsion Technologies in Germany’, it has been necessary to test the more frequently used business model canvas of Osterwalder and Pigneur (2010). It has been presented in many articles, on the internet, and at conferences as a tool to evaluate established business models on its competitiveness in every business sector.

However, countless discussions about alternative technologies, Tesla’s e-vehicle, and EU regulations were but a few factors to realise that such a model could have difficulties to withstand fast development. Under such circumstances, the thesis has been in that way organised to prove that such a static model with equalised business model blocks did not encompass contemporary thinking.

As a response to external forces and new technologies, the research problem and aim were structured to provide a guideline to the top management of tier-1 suppliers with which they could approach a process to adapt to German market. Indeed, managers in the tier-1 supplier industry of other nations with similar limitations may also benefit in certain ways from the research outcome. The thesis conclusion does not consider any differences related to other nations or cultural dimensions as it has focused on the mechanism of general business activities. Arguably, the major conditions of the empiricism that are obviously different from those as described in the thesis would require new research.

A work on the prevailing drive technology, however, would have also made an important contribution, but due to the rapidly changing environment and innumerable innovations in this area, research on a solid basis about an evaluation process of business models has promised long-term benefits.

Whether or not the research outcome would have the same implications for other industries depends very much on their external business environment. That is, industries that still operate according to visible and predictable customer demands may find that the business model canvas could still be very helpful. However, in fast changing markets dynamic and flexible business models require the management of invisible and saturated customer demands.

In the light of e-mobility, the latest articles in the literature review revealed that companies have already become more flexible and dynamic in order to co-create value with various stakeholders. The primary research augmented the literature by proposing additionally that the influence factors ought to be in the background while concentrating on the value proposition and key resources. Hence, this and the conclusion about the project-oriented approach led to the emerging themes.

7.3.2 Emerging themes of the thesis

Emerging theoretical statements from the literature were divided into three propositions, as detailed in 2.6.2.

- (1) Necessary adjustments to R&D in terms of ICT and software competencies, acquired either internally or externally.
- (2) A unique value proposition that provides special services to customers in the domain of mobility could be an approach to conquer a blue ocean.
- (3) Customer segments and channels have been identified as input factors to calculate a business case.

Although the first and second statements were slightly revised after the primary research, the conclusion about the thesis themes recommended refined and concise statements.

- Strategy, change, and business model innovation have been confirmed as influence factors upon the business model canvas. However, they have been moved into the background as an emerged consequence of the value proposition.
- A highly-qualified and diverse R&D team that operates independently has been rated as the most important canvas block to a unique value proposition. This team ought to be equipped with ICT and software competencies to become the key enabler for an unknown blue ocean.
- Instead of using the canvas blocks statically, a project approach is recommended. In this sequential process flow, the key resource, value proposition, customer segments, and business case proposed the most appropriate approach. Instead, key partnerships, customer relationships, and channels were rather evaluated as the consequences of the previous steps.

- The investigated business environment demanded a flexible and dynamic business model that is able to adjust to changing market demands in a shorter time, and to create demands about which customers are unaware.

7.3.3 Contribution to knowledge

The key message to the decision-makers of concerned tier-1 suppliers has been summarised based on the business model matrix (figure 6.2) and emerging themes. Therefore, the extension of knowledge that had previously not existed is highlighted by two contributions.

Practical contribution:

Identify the current business model in place by comparing the business model matrix with it. Enter the domain of ICT and digitalisation by shaping a special team to develop an unknown business field that could be financed by profitable business units. Organise the new team separately in order to observe and readjust iteratively to market demands. Consequently, participate in the value constellation process, as co-creator of generated demands.

The thesis contributed to practice by offering a project-oriented framework for tier-1 suppliers that provided a novel evaluation method based on a unique value proposition and advanced R&D capabilities in the ICT sector to participate in the domain of alternative propulsion technologies.

Theoretical contribution:

The emerged business model matrix appears completely different to the theory suggested in figure 2.11. In comparison to the canvas model in this figure, the emerging conceptual model has a more flexible and dynamic appearance than the conceptual framework. As such, the theoretical contribution to knowledge can be defined as follows:

The thesis contributed to theory by closing the gap of an applicable model that helps concerned companies to understand and make the change effectively. As such, it offers to step out from the old worldview and look for blue oceans.

7.4 Reflection and learnings

Arriving at the end of the thesis, this section has been introduced to critically reflect on my personal development as a researcher, and revisit important anchors that advanced my knowledge as a practitioner. Therefore, the lessons learned in this section mainly consider the experiences with the action learning set (ALS) and my supervisors over the period of the dissertation.

Personal development

There have been many occasions when I realised that I have been in continuous development. For instance, I was promoted within this period to the directorship of a newly-founded company and as a result of this additional challenge, the double-tracked responsibilities increased my personal advancement in theory and practice simultaneously. In fact, it secured my intrinsic belief to handle all arising issues that have resulted with a greater self-confidence.

On the other hand, such double liabilities could have negative influences to the quality of each responsibility as well. I often found myself wondering if what I had done was really thorough and sufficient. Anyway, after a while I concluded to myself that my time has been used in the most effective way and both areas, the theory and practice, sometimes supported one another due to their similar nature.

Pertaining to the literature review and the methodological part in which the philosophical stance was been identified, two accepted and well-known scholars were kept my thoughts quite busy.

Kant's (1787) contribution about the different philosophical worldviews drove the need to see things from different perspectives, combined with Maslow's (1943) work about the hierarchical steps of need. The question about an underlying correlation of both theories would have been an interesting approach. This, and the identification of my own paradigm, led me to the approach to move across different perspectives in order to understand the literature in a relativistic stance.

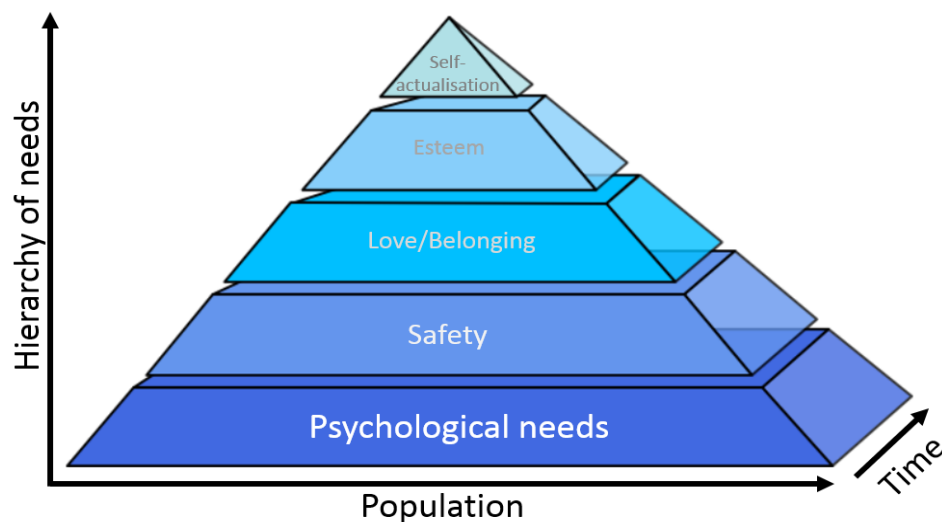
Hence, acquired knowledge and applied methods were important milestones to approach Maslow's (1943) self-actualisation stage. Although his pyramid has been criticised many

times in the literature, it has still provided a motivational frame that offers a lot of space for individual interpretations.

Arriving at the end of the dissertation, thus on my own self-actualisation, the question arose as to whether I have to reside on this peak until the end of my life? Rather not, because of very fast changing business environment nowadays.

Apart from other criticisms, from my point of view, the model is incomplete because it lacks a continuous 'change' modus. Therefore, the need has evolved to learn regularly in order to follow up on learning requirements, and thus to keep achieving stages, as modified with the time axis in the adapted Maslow pyramid below.

Figure 7.3: Iterative learning cycle based on Maslow's pyramid



Source: Amended from Maslow (1943)

Conclusively, Kant and Maslow helped me to step back for a while and reflect critically on my own personal development. Apart from many improvement steps, which were also important to my personal development, a major finding about my personality related to the relativistic stance that enabled me to draw sense out of different perspectives.

The reflective practitioner

Pertaining to the development as a researcher, I have mainly learned to reflect on situations critically and this has inevitably extended my knowledge. Schoen (1983) posited that a reflective practitioner presumes to know best about a topic, but this explicit knowledge was only relevant and important for this specific situation. Therefore,

Vaughan (2005) concluded that good critical thinkers are cautious about expert positions, particularly when they debate underlying knowledge.

As such, the process of reviewing the literature, observing ongoing developments in this field of knowledge, or inquiring knowledge from chosen experts, have all involved reflection by the researcher in different dimensions. A cross-sectional validation over many sources of knowledge has been a method to ensure a kind of plausibility. Regular ALS meetings in which the current stages of topic developments were discussed and analysed provided a critical reflection as well. Furthermore, the planned and regular audio conferences with my supervisors were very helpful in order to 'keep the topic on track'. Not only have their comments and recommendations been very valuable and far-sighted, rather their critical contributions about chosen procedures enforced my skills in terms of illuminating several and contradictory perspectives. By this, and with the arrival at this stage of the thesis, the important milestones of a reflective practitioner could be highlighted, as following:

Topic of the thesis

The final approach to the thesis topic has been a very important milestone. Due to ongoing debates about environmentally friendly technologies in Germany, combined with my more than 20 years experience in the automotive industry that taught me about the limitations of the ICE, a big change towards such technologies offered the chance for very interesting research. However, the taught elements in the module phase, exchanges with my tutors, and discussions in the ALS team brought me to the decision not to research the fast changing environment, but instead to choose a topic with a solid foundation. Hence, the research focus on the importance levels of the business model canvas was proposed and finally accepted.

Literature review

Unexpectedly, the literature revealed a lot of interesting material on my topic. However, the risk of using these unsystematically and, through this, omitting important authors became more critical during the efforts to develop the conceptual framework. Sometimes I felt that I could write endlessly about meaning in the literature without evolving a concept that would have prepared me for the empirical research. Indeed, exchanges in the ALS, soliciting supervisors' opinions, and by reflecting on the topic's main streams, the

approach to use existing knowledge against the variety of conflicting views in order to produce new knowledge, has been the most suitable concept for my research topic. Other approaches would not have combined the theoretical streams of the various authors.

Methodology and Findings

This chapter has been one of the most difficult tasks. Apart from the need to be aware of my own philosophy in order to develop a defensible research strategy, collecting important information from the most relevant sources in a given time has been very exhausting. Not just as a result of conducting interviews with people whose participation was hard to achieve, but instead the post-processing phase in terms of transcribing, coding, and making sense of the data brought me almost to the limits. However, I have learnt a lot about the method and underlying principles to make reliable and valid conclusions from the collected information.

Even though this challenge demanded the highest efforts, it contributed the most knowledge to my development as a reflective researcher. In particular, the findings and results chapter in which the natural voices of the participants were reflected, the synthesising process of the various meanings supported the critical thinking remarkably.

Discussion and Conclusion

Based on the taught elements and the characteristics of a doctorate, which demands that the researcher be unbiased every time, the emerging conclusion about a flexible and dynamic business model has been the most valuable development. In the discussion part that synthesised the implications from the theory and practical works, the emerging picture in my mind developed this conceptual model. That said, I have been aware about the strong implications of such a theory to the economic world, several reflective investigations in the current automotive sector confirmed this theory indeed.

I asked myself many times whether I could really provide such a contribution to knowledge, but the theoretical findings and advanced knowledge from the primary research evidenced such a model and the related consequences for tier-1 suppliers.

Conclusively, the journey over the whole thesis has developed my skills in such a way that I have constructed the findings based on evidence and not intrinsic feelings or anchorless meanings.

Based on my personal development and enhanced expertise as a reflective practitioner, the recommendations for my further development could be seen in the domain of consultancy. This, of course, would not be my main professional remit but instead to act as a supporter for concerned tier-1 suppliers in Germany.

7.5 Recommendations for further research

As the research has identified a project-oriented evaluation process in which a unique value proposition ought to be aimed in an unknown business area to create hidden customer demands, potential business opportunities arose in the e-mobility era. Although e-mobility has not yet experienced its breakthrough, current tendencies and developments seem to be a signpost for upcoming opportunities.

Whether or not a V2G model or other emerging business model type could be the recipe for tier-1 suppliers remains to be clarified. Nevertheless and as previously mentioned in the conclusion chapter, a business branch that provides the infrastructure for e-vehicles could be the focus for further research. Besides this, other elements that support further penetration of e-mobility in the German automotive industry could also be interesting for upcoming researchers. Consequently, the recommendation for further research could be formulated, as following:

E-mobility in Germany: An advanced value proposition for automotive companies in the domain of the charging infrastructure of e-vehicles.

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Appendix 1: Interview guide for the case study

Interview guide for semi-structured interviews

(Based on Saunders et al, 2016)

Interviewee:

Name	Title	Profession	Inquiry source
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I. Preparation Phase: (5P's > prior planning prevents poor performance, Saunders et al., 2016)

- Initial personal call/meeting with the interviewee
 - Brief Introduction about the researcher, research topic, and intended interview
 - Exchanging findings and the level of knowledge about participant's organisation
 - Agreement on the face-to-face interview, appropriate location, and time
- Send basic documents and research questions to the informant
 - Business model canvas
 - Study's conceptual framework
 - How important is a value proposition that creates value to sustain and potentially build upon competitive advantages?
 - How significant is a business case in a revised business model?
 - How essential is an organisational infrastructure to produce a value proposition?
 - How relevant is the customer expectation for a value proposition?
- Checklist prior the interview
 - Is your dress code appropriate for the interview?
 - Is your note pad and pen for the individual remarks ready and in order?
 - Is your smart phone to record the interview fully loaded and in function?
 - Do you have your note pad and interview guide ready and available?
 - Are the documents DBAIP (Interview protocol) and DBANDA (non-disclosure agreement) ready and prepared?

II. Aspects to be considered during conducting interviews

**A Business Model for the Automotive Tier-1 Supplier Industry:
New Propulsion Technologies in Germany**

- Nature of questions, method of questioning, English language, and German to specify
 - Conduct the interview majorily in English language
 - Use German language in order to prevent different meanings or misunderstandings
 - Use open questions: how, why, what do you think about? How have you experienced...? Please describe..., etc.
 - Use only one thought per question, be specific in questioning, less generic
 - Focus on analysability > can you use that from what is being answered?
 - Keep your focus on the research questions => they need to be answered afterwards.
 - Expect unclear responses and be prepared to clarify them and to questioning deeper
 - Behave neutral in gestures, posture, and tone of voice > preventing of any bias
 - Attentive listening for building understanding > do not interrupt
 - Summarise responses/ test understanding > avoid a biased/incomplete interpretation
 - remain polite and not irritated > in case of participant behaves with: yes/no answers, with repeatedly and non-focused responses, reversing the interview, criticising continuously, and is becoming upset and incorrect
 - Use the note pad for immediate and arising thoughts and connections of variables that the audio-recorder would not record
 - Ensure that the location of the interview, the date and time, conditions of interview, informant background, and the individual impression of the interview are recorded directly at the interview or afterwards

III. The interview

- (1) Mutual introduction, name, small talk, etc.
- (2) Points and ethical issues to be clarified prior the interviews with the interviewee:
 - Voluntariness of the participation
 - Rights to refuse answers and to withdraw from statements
 - Research problem and current status of the research
 - Explain the research aim in context to provided research questions
 - Explain interview procedure and the subsequent analysis process
 - Issues of anonymity and confidentiality

(if requested, change organisation's name, location, and name of interviewee)

- Confirmation about voice recording of the interview by the smart phone
- Briefing about the possibility to decline or leave the session
- Offer further questions and remarks

(3) General questions to assess the knowledge of the interviewee's

- What is your job title?
- Can you please explain your profession in detail?
- Can you please describe your gained expertise in the automotive industry?
- How have you experienced change towards electric propulsion systems?
- How would you define a business model?
- What kind of expertise about business models did you acquire in your career?
- Could you please explain the main principle of the business model canvas?
- How do you think about interconnections between the nine business blocks?
- Can you please describe your understanding of a value creation process?
- How might value be created in the e-mobility for Tier-1 suppliers?

Description: In the light of alternative technologies, the next sections are structured in a way to inquire data from the broad to the detailed view. Due to its semi-structured nature that demands to open a conversation that shall guide the inquiry to the depth, each category is therefore only equipped with key questions.

(4) Involved semi-structured questions dedicated to each canvas block

Importance level of a value proposition

- How do you describe the term value proposition?
- What should a value proposition deliver to sustaining competitive advantages?
- How do think about the importance level of a value proposition?
- What kind of value propositions might be perceived as of key importance for customer demands?

The impact of a business case

- How do you distinguish between cost structure and revenue streams?
- How relevant should be the cost structure of a business model?
- How focused should be the revenue stream of a business model?
- Could you please describe the differences and dependencies among them?

Contribution of organisational competencies

- How would you describe the term ‘key activities’ within an organisation?
- How would you characterise the term ‘key resources’ of an organisation?
- How would you define the expression ‘key partnerships’ of an organisation?
- How important do you see the key activities, the key resources, and the key partnerships within a business model?
- Could you please explain the differences and why do you see them differently?

Relevance of customer expectations

- What would be your explanation about the term ‘customer segments’?
- What do you think about the word ‘channel’ that is linked to the customer segments?
- How do you interpret the term ‘customer relationships’ to the customer segments?
- What do you think about the importance level of ‘channels’ that delivers value to the customer segments?
- How significant is the customer relationship to a customer segment?

(5) Influences of strategy, change, and innovation to the importance level of each block

- How would you describe the word ‘strategy’?
- How would you define the term ‘change’?
- What means the phrase ‘business model innovation’ for you?
- In context to your definition of strategy, how would you evaluate the influences of strategy to each single business block?
- Based on change what would be your assessment in regards to the significance of the individual business blocks?
- Concerning business model innovation, how would you appraise the importance level of each business block?
- How do you appraise the dependencies of these influence factors to the importance levels?
- In context to these influence factors, please evaluate each single business block with, high = very important, medium = relevant but not decisive, low = could even be neglected?
- Why are you evaluating the importance level differently?

- How should a Tier-1 supplier use this knowledge?
 - Do you have further comments, proposals, or remarks to the importance levels of each business block?
- (6) Closing questions about interviewee's individual opinion
- What would be your general recommendations for a Tier-1 supplier?
 - How might a Tier-1 business model be designed to sustain its competitiveness?
 - How do you think about the most important business model elements for tier-1 suppliers?
- (7) Any other topics, remarks, or comments
- Do you have any other topics, remarks, or comments that were not covered but you think it is of importance for the research?
 - What would you recommend me for my next interview?
 - Any further remarks or comments for the study?
 - Do you have any questions you would like to ask me?
- (8) Thank you for your time and answers.

IV. Closing steps

- Transcription process is following the interview
- Complete the document DBAIP (Interview protocol)
- Sign document DBANDA (non-disclosure agreement)

Appendix 2: Cover Letter

Cover Letter

Dear [name of the participant],

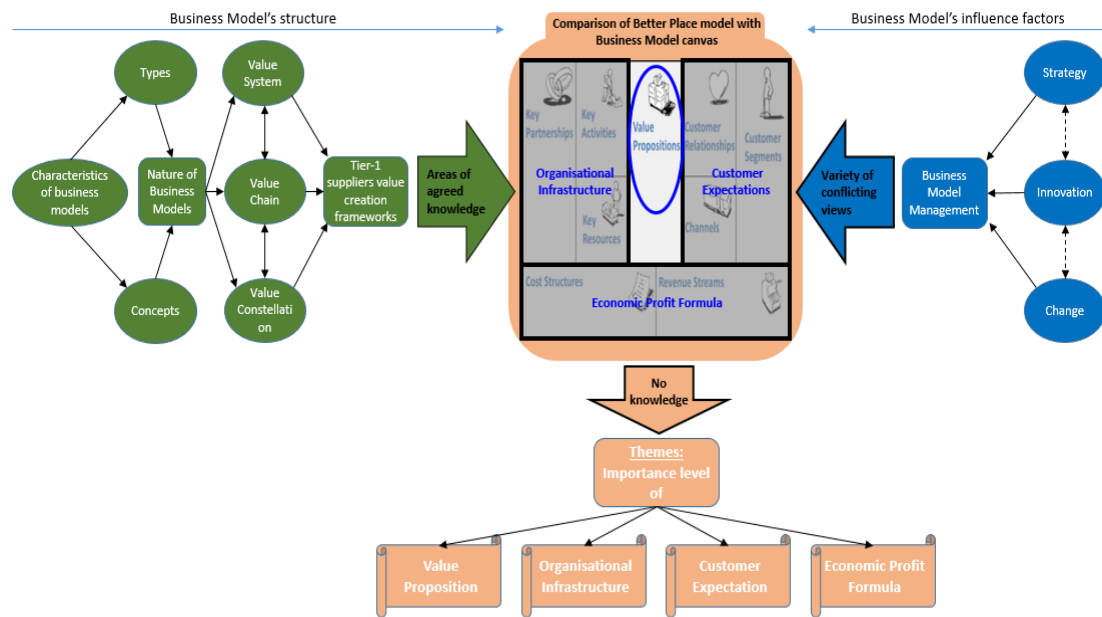
I highly appreciate that you have decided to participate in my research: “A Business Model for the Automotive Tier-1 Supplier Industry: New Propulsion Technologies in Germany”. Your participation is completely voluntarily. You can stop the process at any time.

The German automotive industry is facing big challenges in the upcoming decades and has already entered a new era. The industry is now undergoing a similar change as it has experienced by the transformation from the carriage to the car around 1910. External PEST forces (political, economic/environment, socio-cultural, technological) are challenging the current business models in the German automotive industry, especially those of tier-1 suppliers. This research focuses on business models in the automotive sector and is delimited in its scope to the automotive supplier industry in Germany. The study is not about to develop new business model elements, it rather considers a change in the evaluation method by identifying a value proposition that sets the organisational infrastructure, economic profit formula, and the customer expectations of the business model canvas as its focus. From such a perspective, the blocks of the business model canvas provided by Osterwalder and Pigneur, (2010) attains a different importance level.

This research aims to identify a framework of the most important business model blocks for tier-1 suppliers against which a business model could be evaluated in the new business environment.

The upcoming expert interview with you is going to test the findings from the literature. In the light of alternative technologies, your knowledge and experiences concerning business models and value creation in the automotive supplier industry are the initial start of the interview. Within the process of the interview, another focus is going to be on your individual evaluation on the importance levels of each business block within the canvas. External influence factors, like, strategy, change, and innovation will then provide a different perspective on the same evaluation procedure as before. In this context, your final importance level statement of the canvas blocks would be the main contribution to the aim of my research as summarised in the conceptual framework.

Conceptual Framework



Please be assured that all collected data are treated in a highly classified way. All following steps are using your information in a confidential and anonymised form only. Please also note that this study is completely funded by myself. This means that there is no conflict of interest of any kind. In general, this research is being conducted under the guidelines of the University of Gloucestershire's Handbook of Research Ethics.

As summarised beforehand, the brief overview aims to informing you about what to expect in the interview. This gives you the chance to prepare at least a little bit for the interview.

I would like to express again my gratitude that you are willing to participate in this research. I am looking forward to meeting you for an interesting interview.

Kind regards,

Michael Aberham

Appendix 3: Interview protocol

DBAIP (DBA Interview Protocol)

Interview protocol

Interviewee: _____

1. Date of the interview: _____
2. Duration of the interview: _____
3. Technical incidents: _____

4. Interferences, if applicable (e.g. were there only interviewee and interviewer present during the interview or a third party as well? If so, which third parties? Were there another interferences? If so, which one? How was the atmosphere, e.g. quite and/or relaxed?)
5. Answering style (e.g. how was the willingness of the interviewee to answer the questions? Were emotions involved and visible? Were some extraordinary behaviours recognisable? How was the eye contact of the interviewee? Were long breaks before answering questions?)
6. Categorisation of answers (e.g. how can the answers of the interview be categorised: reliable throughout; were the answers to the questions flowing, was the conversation artificially or rather naturally, was the order of questions reasonable?)

Appendix 4: Non-disclosure agreement (NDA)

Non-disclosure agreement

1. Goal and purpose of the research

- The interviewee has been informed about the goal of the research. Questions, objectives and research problem have been explicitly communicated.
- Purpose of the research has been communicated sufficiently.

2. Voluntary participation

- The interviewee has been informed by the researcher that the participation in this research is voluntarily. It further has been explained that the interviewee can at every time request the termination of the interview.

3. Interview process and data analysis

The researcher is permitted to apply the following research steps:

- Interview: voice recording of the interview is permitted.
- Transcription: the researcher is permitted to transcribe collected data in respect to point 4 and 5 of this agreement.
- Transcription approval: the researcher is permitted to use the research transcript for the next process steps and for the data analysis to produce conclusions.

4. Confidentiality

- All data concerning the research, in any form, is stored on a dedicated, password secured external hard drive. Access is only possible for the researcher.
- After finishing the research, the data will be kept confidential on the same hard drive in a secure location.

5. Anonymity

- At no time, names or clues to participants are going to be stated in any official document (e.g. paper, doctoral thesis). The anonymity of the participants is of the utmost interest for the researcher.

Interviewee:

Date: _____ Name: _____ Signature: _____

Researcher:

Date: _____ Name: _____ Signature: _____

Appendix 5: University of Gloucestershire's ethical guidelines

University principles

1. Primary responsibility for the conduct of ethical research lies with the researcher.

Where applicable, professional codes of conduct of external organisations take precedence over the university's expectations and requirements for the conduct of research, although in most cases final approval of research projects remains with the RESC.

2. Researchers have responsibilities:

- towards research participants (including themselves): to ensure as far as possible that their physical, social, and psychological well-being is not detrimentally affected;
- towards other researchers: to avoid, wherever possible, actions which may have deleterious consequences for other researchers or which might undermine the reputation of their discipline

3. Research should be based, as far as possible and practicable, on the freely given informed consent of those under study.

The researcher should:

- explain to participants the aims, nature, conduct, funding, duration, purpose and consequences of research, and how results will be disseminated;
- give due consideration to the power imbalance between researcher and researched, and the right of participants to refuse participation at any time;
- explain to participants the extent to which they will be afforded anonymity and confidentiality, and their option to reject data-gathering devices such as audio recorders etc.;
- discuss potential uses of data with participants and obtain their agreement;
- give due consideration to the interests of any 'gatekeepers' where access is gained via a 'gatekeeper';
- where research participants are young children or other vulnerable groups, consult relevant professionals, parents/guardians and relatives, and attempt to obtain informed consent of participants, their parents and those who are *in loco parentis*;

- anticipate and guard against any possible harmful consequences of research for participants

4. Researchers should endeavour, wherever possible and practicable, to avoid the use of deception.

Any researcher considering deceptive methods must seek approval from the Research Ethics Sub-Committee. Covert research should be a last resort.

5. The anonymity and privacy of participants should be respected and personal information should be kept confidential and secure.

Researchers must comply with the provision of the Data Protection Act. While taking every practicable measure to ensure confidentiality and anonymity, they should also take care not to give unrealistic assurances or guarantees.

6. Specific approval from the Research Ethics Sub-Committee is required for:

- research which involves biomedical or clinical intervention;
- deceptive research where the investigator actively sets out to misrepresent themselves;
- certain classes of covert research;
- all research where participants are under 18;
- research into sensitive topics;
- research involving vulnerable groups

7. University of Gloucestershire ‘Clinical Trials’ Insurance

The following research conducted within the United Kingdom is automatically covered:

- questionnaires;
- venepuncture;
- measurements of physiological processes;
- collections of body secretions by non-invasive methods;
- intake of foods or nutrients or variation of diet (other than administration of drugs);
- psychological activity

Appendix 6: Example of a finalised interview protocol

Interview protocol

Interviewee: SH

1. Date of the interview: 15.09.2017
2. Duration of the interview: 97 min
3. Technical incidents: no

4. Interferences, if applicable (e.g. were there only interviewee and interviewer present during the interview or a third party as well? If so, which third parties? Were there another interferences? If so, which one? How was the atmosphere, e.g. quite and/or relaxed?
> Initially, the interview was planned with Mr. ~~SH~~ Head of Corporate Strategy & Development - but due to his sudden sickness, the interview was held with Mr. SH – Senior Manager Corporate Strategy & Development . There was only Mr. H present and the interview was conducted in an office in a quiet and relaxed atmosphere. No other interferences occurred during the whole interview!

5. Answering style (e.g. how was the willingness of the interviewee to answer the questions? Were emotions involved and visible? Were some extraordinary behaviours recognisable? How was the eye contact of the interviewee? Were long breaks before answering questions?)
> the answers were precise and without special emotions. Some questions caused a longer break due to some clarifications of the meanings. The eye contact was continuously given and upon some specific questions, the interviewee closed his eyes in order to think about his responses deeply. In general, the conversation flow was precise and similar as in a sophisticated discussion.

6. Categorisation of answers (e.g. how can the answers of the interview be categorised: reliable throughout; were the answers to the questions flowing, was the conversation artificially or rather naturally, was the order of questions reasonable?)

> the answers were clear and sometimes wider than expected. Upon some questions, the interviewee responded to other questions already even though it has not been addressed by the interviewer before. Based on the request to evaluate the importance levels of the canvas blocks, the interviewee started himself to create a percentage ranking from 0-100%. By this, he charged the value proposition with 100%, while the organisational infrastructure and the customer expectations were ranked with 100% each. The economic profit formula, however, achieved a score of 20% in total.

Interestingly, the informant even advised that the interviewer shall upfront provide a scale to the interviewee in order to simplify the evaluation process.

Overall, this interview has proven that without special expertise about the business models and the canvas, the responses may not be reliable and valid finally. The interviewee has confirmed his deep involvement in this topic!

Appendix 7: Extraction of a semi-structured interview transcript – Step 1

Interview with Dr. T. Z. 26.08.2017

R: Welcome Mr. Dr. Z. to my interview. First of all, thank you very much that you found the time to join this interview. It's really a pleasure for me to make an interview with you. Before we start with the normal questions and regarding my topic, my research, I'd like to inform you that this interview what we are doing is voluntary. It's of course between anonymity and you have the right in case you would like to step back at any time.

I: I understood.

R: First of all, also in case some questions would be not appropriate and so on [...] so it's not needed that you answer directly for that.

I: I do my very best.

R: First of all, I would like to explain you about the research problem and the current status of the research. The research problem is to identify, how to revise an existing business model in terms of the new alternative technologies in the German automotive industry were that the Tier-1 suppliers face, I would say, a big change in the upcoming future. Nobody knows when this change will come, however, the Tier-1 suppliers, they have or they would like to adjust in these regards as I would like to inform you my main research questions. First of all, what I would like to answer with this study regards to how important is a value proposition that creates value to sustain and potentially build upon competitive advantages? How significant is an economic profit formula in a revised business model? How essential is an organisational infrastructure to produce a value proposition? And the last question: How relevant is the customer expectation for a value proposition? So these two [...] four questions I'd like to answer by my study and therefore I would like to go more in detail. One question or one topic I have to clarify first of all: Are you ok that I record everything with the mobile phone? So this is something also for the ethical issues to clarify.

I: I am fine with the recording.

Appendix 8: Extraction of the colour marking procedure – Step 2

R: Yes. In case, maybe to describe it, in case your company is focused on the change itself which is for many companies now the case, how would then, in such a case based on change, the importance level of each category what we beforehand discussed or each element more or less be influenced? How would it be the same if I am more or less strategy oriented that I say ok, I know that something is on-going in the new upcoming market, but my strategy, as you said, would be still to be in the B2B business and I am focused on that [...] what would be then the evaluation of your importance level and the third one would be I am more or less a very innovative company, I don't need to care about strategy and change, I always try to develop new products and I always go into new technologies in order to survive for that. Under such influence factors, let's call them influence factors, how would you describe of each influence factor that the importance level would change or do you think they would still remain as the most important one or as the very important one as you described that beforehand?

I: I think when I describe the situation in the first place, I was already looking [...] I had already in mind this change and how this change can then ultimately lead to a commercially interesting situation at a company, so I mean the customer and its feedback is important and the R&D factors are important to be able to manage the change and to actually tap these markets that are so interesting, but also the strategy needs to be coherent: Which area do we want to go in? What does the competition look like? I think you need to have a thorough strategic analysis which area you want to go into. For example the market needs to be evaluated and the own resources you could think about the best analysis to evaluate the context or you can think about a SWOT analysis when you assess the strengths and weaknesses of the company at the market and as opposed to threats and what's the last one [...] Opportunities. So, I think this strategic element needs to be there in the first place and ultimately all the other areas that be touched need to be there, too. And some might gain more importance than others when you think about new technologies it's probably the R&D department that is very important in the first stage but then you think about the life cycle of a product, then ultimately R&D becomes less important and then production and cost efficient management becomes more important in order to harvest the economic profits along the line of the life time of a product. I don't know if that answers your question a bit?

Appendix 9: Example of the labelling process to the categories – Step 3

<p>you look at how they build up their volumes: They say that their software is needed in the future in every single car. It starts as [...] and that's also unique to the automotive industry when you have a high technology to go into the upper-class the premium cars first and then down into the more value and volume segments, so that's something to look at. Where does all my product go into, what are the market expectations? Also for a business model, where do I want to start generating revenues? If you look at the European company, do you want to start at the whole market and the domestic market or do we want to go on a European level directly or do we want to expand even further and go to Asia or other [...] or US, some other attractive markets? So there you need to distinguish the parameter of where you want to be in. So that's the volumes and prices. It's affected by [...] what is the market demand? What is the outlook? How and what's the ultimate benefit and that's then [...] it gets back into the loop of the value proposition. What is the reservation price of the customer that he is willing to pay for your good or service, so that's something that you need to keep in mind and then, what I mentioned earlier, the price is also important to consider. How the price is going forward and needs to be reduced and then leads over to the cost side of things. You need to consider what cost do you have in the time prior to the SOP (Start of Production), so for example when you have a R&D intensive start-up or business that you want to evaluate, you need to look into [...] what needs to be funded up front and in order to get into a prototype stage and [...] which then ultimately leads to the start of production and the ramp of production. As soon as the products are already there then it's important to look at how</p>	<p>Mass market</p> <p>Michael Aberham Special know-how</p> <p>Michael Aberham Market analysis</p> <p>Michael Aberham Multi-sided markets</p> <p>Michael Aberham Revenue value</p> <p>Michael Aberham Fixed costs</p> <p>Michael Aberham Economics of scale</p>
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Appendix 10: Labelling codes to the canvas blocks in an excel sheet – Step 4

Labelling codes to the canvas blocks in an excel sheet STEP 4				
Key Partnerships	Key Activities	Value Proposition	Customer Relationships	Customer Segments
	Key Resources		Channels	
Cost Structures		Revenue Streams		
Mr. M.H. - 104 Codes	Dr. T. Z. - 125 Codes	Mr. S.H. - 122 Codes	Mr. P. B. - 66 Codes	Prof. Dr. M.D. - 75 Codes
Mass market	New technology	Available competencies	Blue ocean	R&D
Customer perspective	R&D	Multi-sided platforms	Customer base	Customer demand
Contracted partners	Newness	Customer expectation	Customer expectation	Market demand
Solution provider	Customer perspective	Customer perspective	Value-driven	partnerships
Performance	Technical expertise	newness	Multi-sided platforms	R&D
Support customer's performance	Available means	solution provider	distribution	Customer perspective
Supplying values	Customer satisfaction	Customer perspective	Mass market	intellectual
Alliances with customers	Lean cost structure	Customer segment	newness	intellectual property
Human	Market needs	multi-sided markets	products	Blue ocean
Intellectual	Foreseen customer perspective	customer service	customer expectation	Blue ocean
Solution provider	Expected market view	customer perspective	customer oriented	Customer demand
Knowledge and experiences	Available means	solution provider	alliances with customers	Mass market
Tacit knowledge	competencies	market expectation	blue ocean	Unique performance
Without competition	managerial skills	Customer differentiation	solution provider	Blue ocean
Cost driven	customer expectations	Customer perspective	alliances with customers	Financial funds
Conquering 'blue ocean'	customer perspective	Solution provider	customer satisfaction	R&D
Conquering 'blue ocean'	company's abilities	Customer satisfaction	problem solving	Production technologies
Economics of scope	technical innovations	System provider	cost-driven	Unique selling point
Economics of scale	customer demands	Solution provider	production technologies	Solution provider
Conquering 'blue ocean'	competitive products	newness	solution provider	R&D
Strategic alliances	customer perspective	solution provider	customer expectations	blue ocean
Tacit knowledge	technical expertise	cost-driven	customer perspective	production technologies
Newness	market needs	system provider	market development	human resources
Cost-driven	blue ocean	newness	R&D	R&D
R&D	added value to customers	unique	Operational performance	Financial funds
Production technologies	cost-driven	blue ocean	Unique selling point	Market expectation
Variable costs	customer perspective	Customer satisfaction	R&D	Cost-driven
Customer perspective	blue ocean	Customer satisfaction	Mass market	Blue ocean
Continuously conquering 'blue o	customer expectations	Cost-driven	Blue ocean	Niche market
Make or buy	blue ocean	Customer perspective	R&D	Core competencies
Customer perspective	blue ocean	Blue ocean	Enter a blue ocean	New development
Problem solving	blue ocean	Blue ocean	Cost-driven	Humans knowledge
Personal assistance	R&D	Blue ocean	Value-driven	Tacit knowledge
Close communication	Customer expectations	Blue ocean	Customer expectation	R&D
Many 'blue oceans' available	Unique value proposition	Blue ocean	Economics of scale	Less competencies needed
Researching power	Solution provider	newness	innovative	Blue ocean
Blue ocean'	Flexible organisation	customer perception	variable cost	Economics of scale
Newness	Remain in red ocean	system provider	processes	Too high costs
Mass market	Blue ocean	solution provider	human	Cost-driven
Mass market	Blue ocean	customer satisfaction	tangible assets	Other core competencies
Special know-how	Customer expectations	competencies	in-sourcing	Production technologies
Market analysis	Customer perspective	know-how	intellectual	Core competencies
Multi-sided markets	Blue ocean	production processes	knowledge	processes
Revenue value	Conquer a blue ocean	core competencies	Personal assistance	solution provider
Fixed costs	Market development	networking	distribution	R&D
Economics of scale	Unique selling point	subscription fees	networking	Humans intellectual
Cost management	R&D	fixed costs	customer oriented	Production technologies
ROI 'Return of Capital employed'	Newness	subscription fees	Market driven	Value-driven
Blue ocean	Customer oriented	unique	Blue ocean	Production technologies
Unique selling point	Customer segment	newness	Production technologies	Niche markets
Value-driven	Solution provider	competitive behaviour	Multi-sided platforms	Blue ocean
Strategic alliances	Customised customer solution	cost-driven	Cost-driven	Solution provider
Company's management process	Blue ocean	usage fees	newness	New markets
Contracted partners	Lean organisation	usage fees	cost-driven	Alliances with customers
Market segment	Financial funds	cost-driven	production technologies	Value proposition
Interfaces to the customers	Financial funds	intellectual	economics of scale	Blue ocean
Intellectual	Financial result	unique	Blue ocean	differentiation
Tacit knowledge	Financial funds	intellectual	distribution	create the blue ocean
Core competencies	Technology influenced	contracted partners	Customer perspective	Blue ocean
Red ocean	R&D	diversified	Customer base	unique
Partnerships	Unique selling point	contracted partners	Co-creation	unique selling point
Intellectual	Actual organisational structure	Blue ocean	communication	R&D
Innovative constellation - service	Market development	Customer perspective	diversified	R&D
Partnerships	Financial result	segmented	customer expectation	R&D
Co-creation	Customer connection	differentiated	market view	Blue ocean
Know-how partners	Customer expectations	diversified	blue ocean	processes
'Blue Ocean'	Production processes	communication		cost-driven
Cost-driven	R&D	distribution		production technology
Tacit knowledge	Companies performance	personal assistance		unique selling point
Special customer contracts	Man-power	mass market		R&D
Unique selling point	Humans' knowledge	R&D		Value proposition > high
Innovative and one step ahead	Organisational structure	Customer target		Key activities > medium
'Blue ocean'	Financial funds	Production technology		Customer segments > low
Close customer exchange	Humans knowledge	Blue ocean		R&D
Sales interfaces to customer	Production processes	performing		Mass market

Appendix 11: Interviewees' frequency of codes in percentage - Step 5.1

Labelling codes to the canvas blocks in an excel sheet STEP 4						STEP 5.1
Key Partnerships	Key Activities	Value Proposition	Customer Relationships	Customer Segments		Horizontal ranking of the individual codes in average across all interviewees
	Key Resources		Channels			
Cost Structures		Revenue Streams				Total: 492 codes
Mr. M.H. - 104 Codes	Dr. T. Z. - 125 Codes	Mr. S.H. - 122 Codes	Mr. P. B. - 66 Codes	Prof. Dr. M.D. - 75 Codes		
Value Proposition: 28,8%	Value Proposition: 33,6%	Value Proposition: 45,9%	Value Proposition: 33,3%	Value Proposition: 34,7%		Value Proposition: 35,3% Ø
Key Resources: 21,1%	Key Resources: 25,6%	Key Resources: 13,9%	Key Resources: 10,6%	Key Resources: 28,0%		Key Resources: 19,8% Ø
Cost Structures: 9,6%	Cost Structures: 1,6%	Cost Structures: 8,2%	Cost Structures: 13,6%	Cost Structures: 8,0%		Cost Structures: 8,2% Ø
Customer Segments: 10,6%	Customer Segments: 9,6%	Customer Segments: 9,8%	Customer Segments: 15,2%	Customer Segments: 9,3%		Customer Segments: 10,9% Ø
Customer Relationships: 9,6%	Customer Relationships: 1,6%	Customer Relationships: 1,6%	Customer Relationships: 6,1%	Customer Relationships: 1,3%		Customer Relationships: 4,0% Ø
Key Partnerships: 8,6%	Key Partnerships: 5,6%	Key Partnerships: 1,6%	Key Partnerships: 1,5%	Key Partnerships: 1,3%		Key Partnerships: 3,7% Ø
Channels: 5,8%	Channels: 0,8%	Channels: 4,1%	Channels: 6,1%	Channels: 0,0%		Channels: 3,4% Ø
Key Activities: 3,8%	Key Activities: 13,6%	Key Activities: 10,6%	Key Activities: 13,6%	Key Activities: 14,7%		Key Activities: 11,3% Ø
Revenue Streams: 1,9%	Revenue Streams: 8,0%	Revenue Streams: 4,1%	Revenue Streams: 0,0%	Revenue Streams: 2,7%		Revenue Streams: 3,3% Ø

Appendix 12: Horizontal weighting of codes in a ranking – Step 5.2

STEP 5.2		
Horizontal ranking of individual codes of the same context in order to identify the codes' weight		492 codes
Research & Development	Intellectual, Knowledge and experiences, Tacit knowledge, R&D, Knowledge networking, Key resources – very high, Intellectual as a basis, Humans' knowledge, know-how, intellectual property, human, special knowledge, researching power, New technology, new development	68
Innovation	Solution provider, Without competition, Unique selling point, Innovative constellation - service, Unique selling point, Innovative and one step ahead, Solution provider, Value proposition - high, technical innovations, added value to customers, Unique value proposition, Service provider, system provider, newness,	65
Entering a 'blue ocean'	Conquering 'blue ocean', Continuously conquering 'blue oceans', Many 'blue oceans' available, blue ocean strategy, Entered a blue ocean, create the blue ocean, Diversified, differentiated,	64
Customer perspective	Customer perspective, Support customer's performance, Foreseen customer perspective, customer service, Customer demand, customer oriented, customer expectations, customer focus, customer perception, customer expectations, Customer segments	61
OPEX-driven > red ocean	Supplying values, Economics of scope, Economics of scale, Production technologies, Red ocean, competitive products, Supplier base, Less manufacturing expertises, competitive behaviour, products, tangible assets,	35
Focused on costs	Cost driven, Variable costs, Fixed costs, Cost management, Lean cost structure, fixed and variable costs, too high costs	26
Organisational structure	Company's management processes, Flexible organisation, Lean organisation, Actual organisational structure, Production processes, Organisational structure, Flexible organisational structure, equipment, man-power, human resources, Initial knowledge, technical resources	24
Market behaviour	Market analysis, Market segment, Market needs, Market development, market segment, Market perspective, market expectation, market penetration, market observation, market development, Market driven, Market demand, New markets, Expected market view, external business environment, society	23
Core Competencies	Core competencies, Technical expertise, competencies, company's abilities, Available core competencies, Other core competencies, managerial skills	22
customer focus	Alliances with customers, Interfaces to the customers, Special customer contracts, Sales interfaces to customer, Alliances with customers, Relation with customer, Customer relationships, Interlink partnerships and customer, close customer exchange, distribution	22
Networking	Partnerships, Know-how partners, Key partnerships – very high, External partners, co-creation, contracted partners, strategic alliance	21
Market type	Mass market, Multi-sided markets, Multi-sided platforms, Niche market	16
Financial power	Revenue value, Financial funds, Revenue streams, available means	16
Organisational performance	Performance, Problem solving, Key activities - medium, Companies performance, problem solving, Unique performance, value-driven	14
Customer retention	Personal assistance, Contracted partners, subscription fees, usage fees, personal assistance, Sales interfaces, Channels - low	10
Communication	Close communication, Communication with customers, communication, online communication	5