Ownership versus Shared Economy: Implications on German car manufacturers

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Abstract

Title: Ownership versus Shared Economy: Implications on German car manufacturers

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In times of financial uncertainty, sustainable demands, and resource scarcity, consumers tend to share rather than own items. Digitalization has played its part, start-ups have evolved, and consumers become suppliers. In 2008, the first app entered a mobile device, and a company called Uber was founded only one year later. It has ever since transformed business, markets, and processes in one of the largest industries in the world – the automotive sector.

Despite the rapid development of digitalization and tech giants dominating markets, there isn't an ideal solution for traditional German carmakers to defend their turf. Those implications create uncertainties for incumbents of the automotive industry. Therefore, two research questions animate this thesis:

What is the impact of the shared economy on the automotive industry?
What is the impact of digitalization on the automotive industry?

This requires a precise understanding of the reason behind changing consumer preferences and the actual development and impact of digitalization in the automotive industry. In today's business world, industries are emerging, and new competitors are joining the stage frequently.

The theoretical research exhausts vast literature and recent news to understand changing consumer preferences and the impact of digitalization on the automotive industry. Through qualitative data collection, the academic findings are supported by practical insights, gained through eight interviews.

That combined approach of literature and qualitative data concluded that the car has to become pre-dominantly a service rather than the actual hardware in the future. Carmakers have to move towards becoming software companies to stay competitive with tech giants entering the field.

Keywords: Shared economy, digitalization, technology, automotive, German car manufacturers

Sumario

Título: Propriedade versus Economia Compartilhada: Implicações para os fabricantes alemães de automóveis

Autor: Maximilian Alexander Schneider

Em tempos de incerteza financeira, demandas sustentáveis e escassez de recursos, os consumidores tendem a compartilhar em vez de possuir itens. A digitalização tem desempenhado o seu papel, as start-ups têm evoluído, e os consumidores se tornam fornecedores.

Apesar do rápido desenvolvimento da digitalização e dos gigantes tecnológicos dominando os mercados, não existe uma solução ideal para as montadoras alemãs tradicionais defenderem seu território. Essas implicações criam incertezas para os operadores históricos da indústria automotiva. Portanto, duas questões de pesquisa animam esta tese:

Qual é o impacto da economia compartilhada na indústria automotiva?
Qual o impacto da digitalização na indústria automobilística?

Isso requer um entendimento preciso da razão por trás da mudança das preferências dos consumidores e do desenvolvimento e impacto real da digitalização na indústria automotiva. No mundo dos negócios de hoje, as indústrias estão emergindo e novos concorrentes estão se juntando ao palco com freqüência.

As pesquisas teóricas esgotam literatura e notícias recentes para entender as mudanças nas preferências dos consumidores e o impacto da digitalização na indústria automotiva. Através da coleta de dados qualitativos, os resultados acadêmicos são apoiados por perspectivas práticos, obtidos através de oito entrevistas.

Essa abordagem combinada de literatura e dados qualitativos concluiu que o carro tem que se tornar um serviço pré-dominante e não o hardware real no futuro. Os fabricantes de automóveis têm que se tornar empresas de software para se manterem competitivos com os gigantes da tecnologia que entram no campo.

Palavras-chave: economia compartilhada, digitalização, tecnologia, automotivo, fabricantes alemães de automóveis

Acknowledgment

Completing this thesis is the last part of my academic education, and I am grateful for all the people I have met along the journey. It has been an adventurous trip through ups and downs.
I am happy that in 2018, I made the difficult decision to terminate my permanent contract in Dubai and pursue higher education with Católica Lisbon and FGV/EBAPE. Knowledge is everything, and I can proudly say that I have grown personally and professionally during the last months.

Throughout my time at Católica, I have learned what it takes to succeed in a group of students and to manage learning success while being challenged in multiple ways. Meanwhile, FGV/EBAPE allowed me to experience a life very different from what I'd ever seen before and equipped me with strengthened soft skills and a global business understanding.
Now that my dissertation is finished, I want to thank the people involved in helping me.

Firstly, I want to express gratitude to my supervisor, Professor José Maria Nunes, for his continuous support and his valuable feedback that guided me through this Master's thesis.
Secondly, a big "Danke" to my family who made that journey possible in the first place. I couldn't have done it without the patience and support I have consistently received over all these years.

Thirdly, it was a special appreciation to all my interviewees who, despite the current challenging times, allowed me to use their valuable time and input.

Lastly, thanks to all the people I have started and finished the Master together. Our adventure is not yet finished, and I am curious and excited about what awaits all of us.

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List of Abbreviations

App	Application
BCE	Best Customer Experience
GDP	Gross Domestic Product
I.T.	Information Technology
ODCF	On-Demand Car Functions
OEM	Original Equipment Manufacturer
Tech	Technology
VDA	Verband der Automobilindustrie e.V. (Association of the automotive industry)
Vs.	Versus

1. Introduction

1.1. Introduction to the context of implications on the automotive industry

"On average, you spend two and a half years of your life in a car." Dr. Dieter Zetsche (former CEO of Daimler AG) once said (Zetsche, 2017, p.5). It is indisputable that using a car is an essential aspect of our life. Therefore, the critical question is how we spend those two and a half years. The perspectives on how to ideally use that time differed and developed over the years. Initially, the car was about speed, the driving experience, and luxury. However, today, users do not care about moving as simple as possible from point A to point B. Further, they want to achieve that in the most convenient, comfortable, and cheap way.

But what triggered that change in consumer preferences? As of today, new competitors rise, and industries are evolving. In today's world, cities are growing and growing, and estimates expect us to hit the 8 billion world population by 2023 (Chamie, 2020). Therefore, efficient solutions will be necessary to sustain our ways of living. To begin with, digitalization had and has a significant impact on consumers. Supply and demand can now meet on platforms as merely as never before. In that way, it drives a shift in consumer preferences that impacts industries across the world. Consumers are inclined and, through technology, enabled to use resources more efficiently. That triggered an engagement in sharing clothes, bikes, cars, houses, and many more. But that's not all. Technology advancements even threaten long-existing incumbents of various industries. For example, Airbnb is disrupting the hotel industry by offering a new way of accommodation rental. Uber has now turned itself into a feature of daily life for tens of millions of people around the world putting cab companies out of business (Bradshaw & Bond, 2019). And Amazon & eBay are reshaping the retail market from face-to-face to an online model.

The associated challenges for the automotive industry are enormous. Mobility will play its part and is likely to be a further component in future strategies and scenarios of politics and businesses. Take Lime, a company that is mostly engaged in offering short-transportation solutions. In 2018, 26 million rides were conducted with Lime e-scooters, which is equal to 117 trips to the moon (Lime, 2018). OEMs (original equipment manufacturers) have to adapt to the new environment forming around them. Even competitors such as Daimler AG and BMW Group have started working together. They launched ShareNow, a car-ride sharing app,

resulting from the merger of car2go (Daimler AG) and DriveNow (BMW Group). In that way, existing incumbents are trying to cooperate and fight against the tech (technology) giants threatening their businesses (Hawkins, 2019a). As we can see, industries are merging, and suddenly carmakers see themselves competing with Google or even Amazon. The question at hand will be on how the automotive industry is going to face the new challenges and secure its long-term success. ShareNow is a start, but automakers will have to continuously make the right business decisions to meet the evolving competition field.

1.2. Problem statement

This dissertation will research how consumer preferences have changed to gain an understanding of the right product and the right solution for consumers. Therefore, a closer look at the sharing economy will be taken. As Eckhardt & Bardhi (2015) said, the sharing economy is growing, but precisely, it is not a sharing economy at all, but rather an access economy. The question at hand will be how the shared economy evolved and how it influences the automotive industry. As a result, the first research question that will be investigated is:

What is the impact of the shared economy on the automotive industry?

To further explain the changing environment of the automotive industry, digitalization across industries will be researched. As already mentioned, the impact on traditional sectors is tremendous, and new businesses are formed as rapidly as ever. Hence, the second research question that animates this dissertation is:

What is the impact of digitalization on the automotive industry?

The data collected to answer both questions will be combined to provide a solid foundation for a discussion on German car manufacturers' required steps to stay competitive. The then drawn conclusion will deliver valuable insights and strategies on how changing consumer preferences and digitalization can be incorporated and used to create a suitable and right solution.

1.3. Relevance

This thesis is relevant to business scholars as it introduces and, in detail, explains the development of the sharing economy, which already poses a significant impact across industries. More rapidly than ever, the world is shifting towards more efficiently using resources (Huckle et al., 2016; Tabcum Jr., 2019). Additionally, literature provides comprehensive data to prove that newly evolved businesses have disrupted long-existing

industries. Airbnb has entirely changed the hotel business. Uber is threatening taxi companies' existence, and Expedia is driving traditional travel agents out of the market. In June 2019, Amazon was listed as the most valuable brand, with $315.5 billion (Handley, 2019). They do not have any physical stores or retailers, but merely an online platform that enables their success.

Further, this thesis is relevant due to its combined perspective on the impact of digitalization on the automotive industry. The German automotive sector is a global leader and is regarded as the backbone industry in Germany. Germany is one of the most advanced when it comes to high-tech automotive products, such as autonomous driving. Further, German car manufacturers are worldwide known for their quality and possess a strong brand reputation (Automobilindustrie, 2018). German car manufacturers, such as Daimler AG, BMW Group, and Volkswagen AG, have dominated the industry for centuries.
Consequently, the German automotive industry is vast and has a significant impact on the world's imports and exports. In 2017, more than 5.5 million passenger vehicles were produced, making Germany Europe's leading production site (Invest, 2018/2019). From these cars, around 78% of vehicles manufactured in Germany are being exported. However, the automotive industry is facing a transformation. Due to digitalization, technologies are changing and companies themselves, but foremost, consumer preferences shifting.

Lastly, the theme of this dissertation is also of personal interest. Before starting the Double Degree Master Program, I had worked for two years for the Daimler AG Regional Headquarter in Dubai. As a Regional Market Manager for FUSO, I was assigned the country Lebanon. FUSO is one of the largest commercial vehicle manufacturers globally, and Daimler AG is the major shareholder with an 89.3% stake (FUSO, 2020). My role – in short - was to function as an intermediary between the headquarter of FUSO in Japan and the General Distributor in the respective market Lebanon. Sales targets, marketing campaigns, product launches, and pricing belonged to my main activities.

1.4. Research strategy

The dissertation aims to answer the research questions by exhausting available literature on past events and recent news. In a further step, eight interviews with experts in the automotive industry will be conducted to support the qualitative data collection approach. Through combining theory and practical insights, an analysis can be made, and a conclusion drawn.

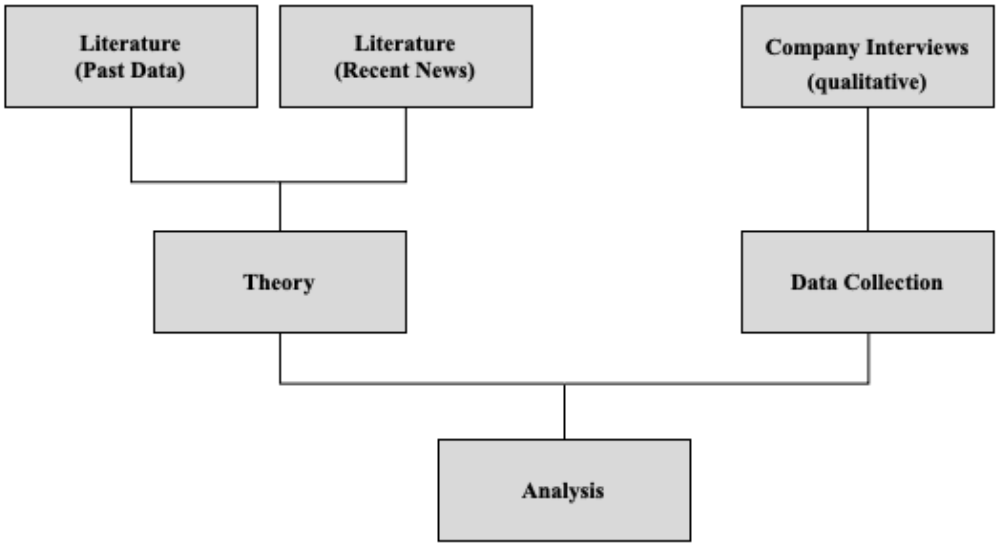

Figure 1: Conceptual model of this dissertation

1.5. Dissertation outline

To provide the reader with a well-organized and structured experience, the background and context of the research questions will be introduced. In the next step, the problems to be examined are presented and explained. The theoretical framework follows the introduction. Here, the aim is to inform the reader of the conducted research to gain an understanding of the shared economy and digitalization. Subsequently, the next part presents the development, status quo ad future outlook of the automotive industry. To proceed, the process of how the qualitative data collection was conducted will be demonstrated and explained.
Further, the limitations that this dissertation faces are going to be described. In a following step, the conducted interviews will be summarized, analyzed, and an overview created. In the last part of the thesis, the researched theory, and the practical insights the expert interviews have given will be discussed. Those results will be combined, and a conclusion drawn.

2. Theoretical Framework

This introductory chapter examines literature relevant to the research question and provides an overview of pertinent background theory. This part will cover an understanding of the change in consumer preferences from ownership to a shared/access economy and introduce the success and rise of digitalization. To partially justify the shift in consumer preferences, the financial crisis of 2008 delivers some of the answers.

2.1. Financial Crisis 2008

The financial crisis of 2008 was an avoidable disaster caused by failures in government regulations in the United States, corporate mismanagement, and reckless risk-taking by Wall Street (Chan, 2011). At the beginning of 2008, almost 9 million U.S. homeowners had higher debts than the actual value of their property, which in turn led to borrower defaults, resulting in bank defaults and a crash in the housing and stock markets (Karanikolos et al., 2013).

Therefore, it comes to no surprise that the financial crisis of 2008 had a strong impact worldwide. According to the International Labour Organization (ILO), the number of jobless people increased from 2007 to 2009 by 34 million – varying from 3% in Portugal up until as high as 12% in Spain, 13% in Estonia and even 14% in Lithuania (Karanikolos et al., 2013) Additionally, a massive drop in new company registrations was registered worldwide (Klapper & Love, 2011).

To some extent, the financial recession triggered an uprising trend for consumers to share rather than own objects. Scholars argue that the crisis changed consumers' behaviour and preferences; people started utilizing unused resources in creative and new ways. Of course, there was a variety of factors influencing the same, such as demand for sustainability, environmental awareness, and globalization. From that point on, resources should be used in a smarter, more efficient way than ever before. Hence, it is not a coincidence that today's successful players such as Airbnb and Uber were founded in precisely those years of recession, in August 2008 and March 2009, respectively. However, people that lost their jobs and struggled to pay their rents were saved through opportunities offered by technology. People could rent out part or all of their homes for short stays, thanks to Airbnb and Uber allowed for real-time, location-based ridesharing (Cohen & Kietzmann, 2014; Dawson, 2018). The sharing economy was born (Hern, 2015).

2.2. Owning vs. Sharing vs. Access

2.2.1 Ownership

Owning can be seen as the general idea of possessing an item by all means. Hence, a consumer buys or acquires an object to use for his purpose. A clear advantage of this ownership experience is the freedom to which a person can use the said item (Carmon & Ariely, 2000; Ferraro et al., 2011).

Despite this, nowadays, services that let customers access goods, such as car-sharing, are gaining increasing relevance as an alternative to ownership (Schaefers et al., 2016). Through those services, the "burdens of ownership," such as responsibilities and risks that come with possessing a good can be avoided (Moeller & Wittkowski, 2010). Consequently, 'rent' is becoming the new 'own': people stop owning products since they can rent it cheaper from someone else (Chase, 2015; Horton & Zeckhauser, 2016; Parker et al., 2016). That can be seen by the rise of Netflix, the T.V. channel with an enormous potential while being cable-free; Alibaba, the largest global retailer, with no actual stock; Instagram, home to the most extensive collection of photos, but does not own a single camera; and Uber, which has the world's most extensive taxi fleet, but does not own a single vehicle (Manuel Angel Alonso & Adrian Miranda, 2017; Moratis et al., 2018).

While for centuries owning an expensive car or a big house was a set-in-stone status symbol, especially in Germany, people are driven by making the best use of their resources (Rifkin, 2001). A tremendous shift from owning an item towards "temporary access to goods" is still witnessed today (Osztovits et al., 2015; Schaefers et al., 2016).

2.2.2 Shared Economy

In 2015 the term "sharing economy" was introduced into the Oxford English Dictionary. Proof that the sharing economy is not only a trend but rather an idea that will stay (Botsman, 2015). Generally, sharing takes place among people known to each other and is a form of exchange, without any profit (Eckhardt & Bardhi, 2015). It can be telling someone the time of day, the directions to nearby sightseeing, or even lighting someone a cigarette (Belk, 2014; Sundararajan, 2016). We can further define sharing as "the act and process of distributing what is ours to others for their use and/or the act and process of receiving or taking something from others for our use" (Belk, 2014, p. 126).

A critical criterion that moved consumers' preferences from ownership to sharing is the reduced interest in possession. Consumers don't want to own the DVD anymore; they just want to watch the movie; they don't need to hold the music CD, they only want to listen to the song; they don't want to own the car, they simply want to get from point A to point B (Botsman & Rogers, 2010; Gansky, 2010). Hence, the differences between what is mine, what is yours, and ours are diminishing and seem irrelevant. It is rather about usage than possession (Botsman & Rogers, 2010). That shift was identified, opportunities seized, and some extra cash was made by renting

out parts of apartments that people don't need, or through selling items that lie around unused for months (Chase, 2015; Parker et al., 2016). The trend started around the time of the financial crisis and was further intensified throughout and after it.

Nowadays, the sharing economy has been acknowledged as one of the major growth sectors of the future. Some experts even estimate the shared economy to rise from a mere $15 billion market volume in 2015 to nearly $335 billion by 2025 (Osztovits et al., 2015; Rifkin, 2015). Rifkin (2015) even states that the "sharing economy will overthrow well-established businesses, such as Macy's[1] and Nordstrom[2]. But as Eckhardt & Bardhi (2015) argue, the sharing economy isn't a sharing economy; instead, it is an access economy.

2.2.3 Access Economy

In the access economy, sharing is not the central part. Its primary purpose is to make money. Consequently, Eckhardt & Bardhi (2015) have a point, when arguing that when "sharing" is market-mediated — meaning a company is acting as an intermediary between consumers who don't know each other — it is no longer sharing at all. The access economy is determined by the fact that consumers are paying someone else to access his/her goods or services for a specific period. It is more about an economic exchange, which is rather useful than social. It is also critically described as "crowd-based capitalism" (Sundararajan, 2016).

Through the rise of the internet, both demand and supply are brought together in a new way (Gansky, 2010). Marketplaces and platforms such as eBay, Etsy, and Amazon that are easily and quickly accessible online, are dominating and disrupting industries. Here, consumers can engage in a mediated exchange organized by a third-party intermediary, a so-called "broker," through which transaction costs are significantly reduced, and consumers' goal to use resources are more efficiently met (Felländer et al., 2015). That mediated exchange became a significant opportunity to make money. Offering a platform for both sellers and buyers to meet and easily exchange goods enabled the conception of an entirely new business industry earning on either licensing, commissions, or advertisement.
Here, we speak of a new technological revolution, namely "Industry 4.0", that enables digital and physical marketplaces to converge to the factories of the future (Cisneros-Cabrera et al.,

[1] Revenue in 2019: 24.97 billion USD
[2] Revenue in 2019: 15.86 billion USD

2017; Pascual, 2020). One of the first companies to identify the growth potential was Airbnb, soon followed by today's major players such as Uber, Spotify, Groupon, etc.

The following will show how the digital transformation of businesses has changed and completely disrupted whole industries (Manuel Angel Alonso & Adrian Miranda, 2017; Miller, 2019).

2.3. Digital Transformation

"Software is eating the world." The slogan was used initially by Netscape (one of the first web browsers) 1994 to demonstrate how the internet transformed the world of business (Parker et al., 2016). Since then, the success story of internet-enabled disruption has occurred on a global scale. As Figure 2 illustrates, it took approximately 64 years for the airline industry to reach 50 million users, while Pokémon Go only needed 19 days to achieve the same (P. Wagner, 2018).

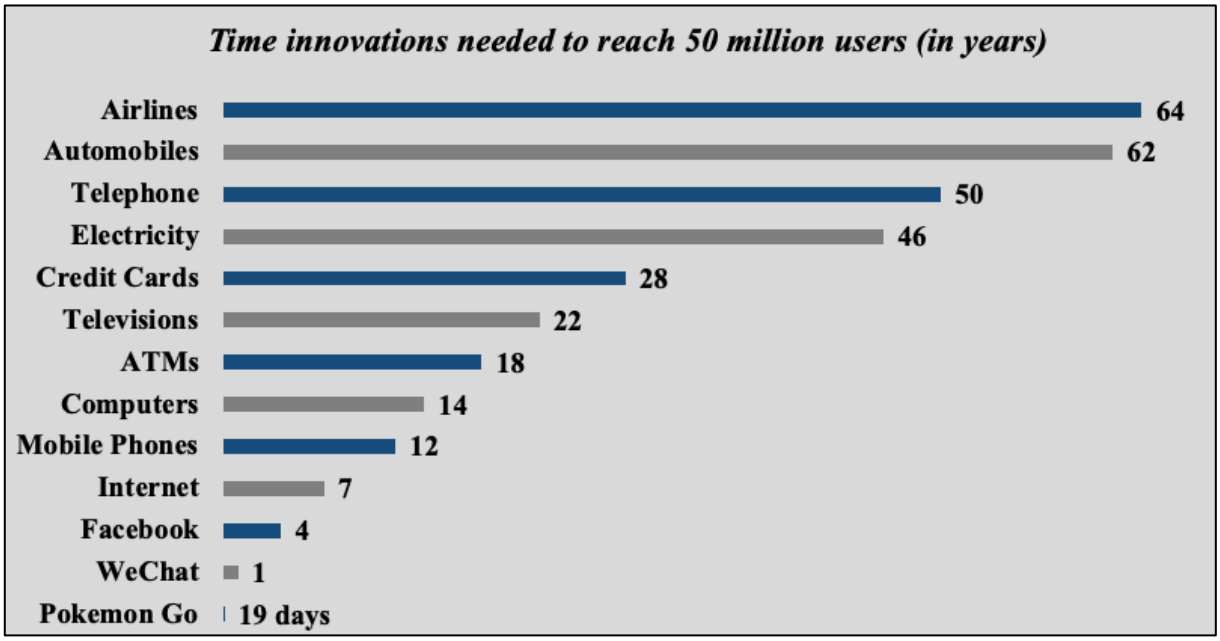

Figure 2: The Road to Ubiquity is Getting shorter (P. Wagner, 2018)

Further, automobiles required sixty-two years and the telephone fifty years to achieve the same. If we compare it with the period of the internet (seven years) and Facebook (four years), the disruptive speed of the web becomes vivid.

Hence, digital transformation is speeding up processes, building new business models, methods, and creating higher efficiency (Westerman et al., 2014). Technology is dominating markets, businesses, politics, and people. We speak about Web 2.0, Big Data, and Industry 4.0. One of the world's most prominent societies and economic powers in the world - China - has even introduced a social credit system that might deter you from buying airplane tickets if you have previously littered in the streets (Campbell & Chengdu, 2019).

Oskam & Boswijk (2016) speak of a “networked economy” that is replacing the traditional hierarchical structures. If you do not participate in those digitalized networks, you will be left out. For similar reasons, consumers join social networks such as Facebook or Instagram; it is also described as the “Fear of Missing Out” (Blackwell et al., 2017). On the other hand, in terms of companies, being part of the “networked economy” is rather critical for their survival and success. Nowadays, consumers can become a part of and manage their value chain, which leads to great competition and a high need for resource efficiency to stay competitive (Oskam & Boswijk, 2016; Prahalad & Ramaswamy, 2004). The co-creation concept and the co-created value were first mentioned by Allee (2003), and we can see it successfully put in place by companies such as Uber and Airbnb.

The internet created a necessity for products to become a service. A marketplace is instigated through platforms where sellers and buyers can meet and conduct business without having to leave the house (Gao et al., 2014; Teixeira & Piechota, 2019). That is the solution for today's consumers who want instant answers and for whom the delivery speed is often more important than the product or service itself (Kotler et al., 2017). If we look at the world’s five most valued companies in 2006, it included two oil companies, an industrial group, a bank, and a technology firm. Today, the top companies are all in tech. Further, the timespan it takes a company to grow large has entirely changed. While in 1951, it had taken the world’s 500 largest companies an average of 75 years to get where they were, in 2003, this was reduced to just 25 years, and by 2015 it took only 10 (Manuel Angel Alonso & Adrian Miranda, 2017).

One cannot deny that the business world is changing and further evolving. A study conducted by a team at MIT aimed to elaborate on the success of tech companies. They concluded that, in terms of transformation management and digital intensity, mature companies outperform their competitors by far; they generate 9% more revenue and 12% higher market valuation ratios (Westerman et al., 2014). It is difficult to overlook such flagrant success. The examples of successful technology companies that emerged using industry 4.0 and disrupted entire industries are numerous (Pascual, 2020).
Following some examples to briefly demonstrate the disruptive power digitalization has already had:

2.3.1 Airbnb (Hotel Industry)

By the first quarter of 2019, Airbnb projections estimated over 500 million guest arrivals since their founding in 2008. Perhaps even more impressive, they had already exceeded $1 billion in revenue by the third quarter of 2018. A cumulative $2 billion in tourist and occupancy taxes have been collected and forwarded to local governments worldwide (Lee, 2019), further strengthening their significant role in the new world economy. Airbnb's hosts offer more than 7 million listings in over 100,000 cities around the globe (Lee, 2019). That is equivalent to two times the size of Berlin's population.

2.3.2 Amazon (Retail industry)

Looking at Amazon leaves us with further astounding facts on the accomplishments of companies who successfully fostered the digital transformation. More than 206 million people visit amazon.com every month, and in 2018 Amazon even made $230 billion in revenue, joining Apple as the second company ever to be valued at $1tn on Wall Street (Franklin & Canter, 2019; Kotler et al., 2017). Early sector incumbents, like eBay, were already trading goods worth $52 billion on the platform a whole decade ago – more than the gross domestic product (GDP) of the world's 125 countries combined (Botsman & Rogers, 2010).

2.3.3 Uber (car-sharing industry)

Upon closer examination of another major player in the technology sphere, Uber is an unavoidable contender. The mobility app is dominating nearly 70% of the ride-hailing market, operates in 65 countries, and its drivers have completed more than 10 billion trips. All of which was achieved in a few short years. The first-ever mobile application (app) was introduced in mid of 2008. Ten years later, in 2018, Uber was downloaded more than 155 million times, equivalent to the entire population of Russia (Georgiev, 2019).

3. Automotive Industry

As part of the research question and the main focus of the thesis, the business model, and facts of the automotive industry are introduced in the following. Additionally, insights on the real challenges German car manufacturers are facing, and a future outlook that literature and experts foresee will be presented.

The speed in which digital transformation is disrupting industries and changing businesses dares a significant challenge and threat to established sectors, and the automotive industry is no exception.

3.1. Overview

In 1896 Henry Ford built his first car, the so-called "Quadricycle," which set to change our way of commuting entirely. By the time he conceptualized the Model T in 1908, the first car was thus available to the masses (Lacey, 1986; Wik, 1990). Through Ford's first car assembly line, more than 15 million units were produced until 1927 (Maxton & Wormald, 2004). Nowadays, there are roughly 90 million automobiles produced worldwide each year (I. Wagner, 2019) by several nameplates across nearly every continent. That said, the automotive industry has become one of the largest and oldest industries globally but is also significant for other sectors. As Maxton & Wormald noted, without the automotive industry, there would be no efficient steel business, plastics, or glass sector (Ford, 2020; Maxton & Wormald, 2004).

3.2. Automotive sector in Germany

The focus of this dissertation lies in Germany, widely known as 'the country of cars'. A study published by the Friedrich-Ebert-Stiftung in 2018 deduced that a German design produced more than half of the passenger vehicles destined for Europe and almost two-thirds of all luxury cars sold worldwide in 2016. German car manufacturers are worldwide known for their positive quality; from the moment Karl-Benz was awarded a patent for his first production automobile in 1888 till today, where Mercedes-Benz, Volkswagen, BMW and Porsche are clear industry leaders to name but a few (Dichter, 1962).

In Germany, the automotive sector is regarded as the backbone industry of the country, employing nearly 870,000 individuals. As a comparison, that is as many as France (223.000), Poland (203.00), The United Kingdom (186.000), and Spain (158.000) combined. In 2018, Volkswagen produced over 10.8 million units, followed by Daimler AG with 3.36 million and BMW Group rolling 2.54 million cars off the production lines (Daimler, 2020b; Koptyug, 2019a; Volkswagen, 2020). The fact that nearly 80% of these domestically produced vehicles are being exported places Germany as one of the world's most influential exporter in terms of cars, where 78% of the locally assembled vehicles are being shipped (Di Bitonto & Hempel, 2018). The total car sales in Germany (domestic and abroad combined) have been on steady growth in the last years, developing from 307.7 billion (2006) to 426.2 billion Euros in 2018 (Koptyug, 2019a). However, since 2018 the industry is struggling. Global factors such as the economic slowdown, the advancements towards Brexit terms, and the US-China trade war are profoundly affecting the sector.

Additionally, on the consumer side, a change in consumer preferences, inclinations towards environmentally friendly solutions, and the continuing digitalization of mobility (with Tesla at the forefront) are posing a massive threat to carmakers. According to the Association of the Automotive Industry (VDA), by the end of last year, the global car industry will have sold four million vehicles fewer than in the previous year (VDA, 2018). Experts expect a job loss of 233,00 in the industry by the latest 2030 (Niethammer, 2019). The 4.7 million cars produced in Germany in 2019 even demonstrate a 22-year low for the sector (Barfield, 2020).

Nevertheless, it must be distinguished between current nowadays repercussions and events in the past, such as the economic recession in the 1970s and the 2008 financial crisis (Barsky & Kilian, 2004). In 2008, as already highlighted, the economic crisis left its mark worldwide, including adverse effects on German car manufacturers. After October 2008, production levels decreased by almost 30% compared to the previous year. By the end of that same year, car sales reached an all-time low, recording only 3.09 million cars sold (Graham et al., 2010). Here we speak of an economic crisis that leads to a critical decline in sales and ensuing job losses within the automotive sector.

3.3. Business Model

Yet, today's negative implications for the automotive industry are somewhat due to a business model crisis. To have a better understanding of how that can severely impact a trade, the business model that presided for decades in the industry will briefly be introduced.

Generally speaking, a business model can be defined as having three constituent elements: the value proposition, the value network, and the context of regulations:

3.3.1 Value proposition

The mass production business model, widely used in the automotive industry, is dominating the industry. This model can be traced to the introduction of the assembly line production by Henry Ford in the early twentieth century (Holweg, 2008). The majority of car manufacturers still fundamentally build on mass production lines to serve the entire market of potential car users (White, 1971). The benefit dimension characterizes the manufacturers' aspired price leadership (Ward et al., 1996). Price leadership is realized through standardized products, model variance, and variety, as well as the use of cross-product platform architecture and customized mass production. Additionally, products are being sold together with warranty and

service provisions. Consequently, the realization of learning and scale effects is a clear driver of the value-added dimension of the business model (Collins et al., 1997).

3.3.2 Value network

To this end, a large number of different market segments are defined within the framework of the customer dimension and supplied through normal distribution channels. These consist of direct sales via online channels as well as indirect distribution channels such as the dealer network of the respective brands (Helper, 1991; White, 1971). To capture the created value, a functioning global supply chain and local clusters are in place. Franchisees and dealers support in terms of sales and after-sales, mainly to seek out maximum benefits of economies of scale on a worldwide level.

3.3.3 Context of regulations

Automobile car manufacturers have to adhere to national and international standards and regulations in terms of emissions, safety for drivers and passengers, and the environmental impact of vehicles. Just recently, Daimler AG was fined €870 million for breaking emission rules (Welt.de, 2019). Since the automotive industry plays a significant part in balancing wealth and economic stability, governments typically refrain from imposing strict regulations and taxations on the industry.

3.4. Future Outlook

To specify how the automotive industry is going to be challenged in the future, the subsequent part will be discussing innovations such as autonomous driving, electrification, connectivity, and sharing.

The current business model in the automobile industry is mainly driven by standardized products to achieve economies of scale. However, that does not match the expectations of today's customers. The progress of the digitalization and changes in consumer preferences pose difficulties to the car as an endproduct. The vehicle of today needs to become a service, providing instant solutions to the customer. It is about solutions and tailored offerings to fulfill customer needs rather than the outdated concept of ownership and associated cost burdens (Teixeira & Piechota, 2019).

Technology giant Tesla is heading that way and threatens the current model in place. To put it in Herbert Diess (CEO of Volkswagen Group) words: "Tesla is valued like a tech company

while V.W. is valued like an automobile company, and the German automaker needs to shift toward the former as software expertise will determine V.W.'s future (Miller, 2020).” Tesla, a company that focusses on all-electric vehicles, has entered the market with a new approach by not only providing the product but rather the solution for customers (Tesla, 2020). Consequently, in mid of January 2020, Tesla even surpassed the valuation mark of $100 billion – as the first U.S. carmaker ever to do so (Lerma, 2020). Hence, the current business model of traditional car manufacturers must undergo a significant change to stay competitive in the future. The next few years will show which multimillion-dollar corporations will successfully alter their course and which won't.

In the following section, four significant subjects, whose development plays a vital role in the strategy of car manufacturers, will be briefly outlined.

3.4.1 Car-Sharing

As outlined in Chapter 3, the sharing/access economy is the main driver for the change in consumer preferences, while resource efficiency has become a dominant factor in consumer behavior. For instance, Botsman & Rogers (2015) already concluded, that the average car user spends around 18% of their earnings on driving a medium-sized car, even though that car will sit idle for twenty-three hours of the day. Further, they estimated savings of $600 per month when switching to a car-sharing alternative (page 186). Annually, this accumulates to $7,200, or nearly 15% of Germany's median household income (Koptyug, 2019b).
The environmental impact is significant: for every shared vehicle, between 9 and 13 private cars are removed from the roads, either by selling a personal vehicle or postponing a planned purchase. When moving from owning a car towards a car-sharing alternative, the average user saves 50% per user in CO2 emissions. Further, if Netflix members would go back to the old way of watching movies and hence drive back and forth to a rental store, they would release more than 2.2 million tons of CO2 emissions (Botsman & Rogers, 2010). Therefore, digitalization combined with the sharing economy does not only disrupt industries and fosters resource efficiency, but also has a proven positive impact on the environment.

According to the federal car-sharing association in Germany, there are currently 226 organizations offering car-sharing, with approximately 2,29 million members registered. The company with the most cars within their fleet is ShareNow, a provider created jointly by BMW Group and Daimler AG in 2019. Their model bases on a free-floating approach: customers can

access a car at any time of the day and will find the vehicle wherever the previous driver has left it. An alternative model is a station-based approach, with the current leader being stadtmobil (Bundesverband CarSharing, e.V., 2020). With this service, customers access a vehicle at a specific station but must return it to the same location upon completing their journey. As a further step to establish themselves in the shared-mobility sector, Daimler AG and BMW Group also have the majority of stakes in FreeNow (originally mytaxi). FreeNow, as of today, is the biggest app-based taxi network in Europe (FreeNow, 2020; Zetsche, 2017).

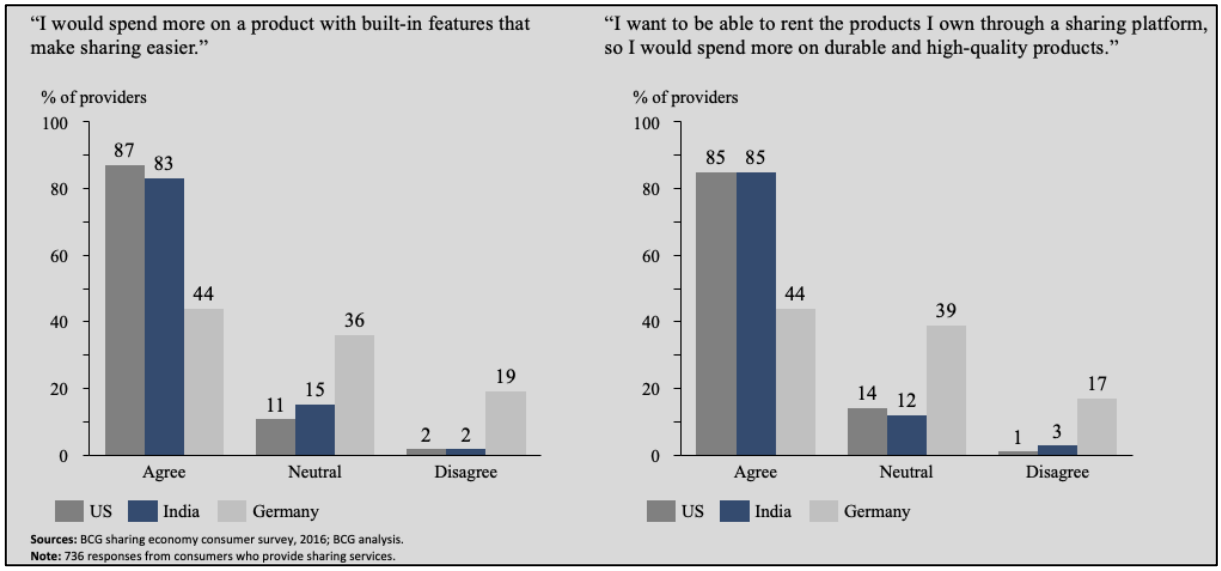

Figure 3: Consumer would spend more on products designed to be shared (Wallenstein & Shelat, 2017)

Concurrently, as Figure 3 points out, the sharing factor gained significant importance for consumers. A survey conducted by BCG in 2016, demonstrated how, on a global level, people are, to a great extent, willing to pay more for a product, that has built-in features that make sharing easier. While in Germany, almost fifty percent of respondents agreed with that statement, in the U.S. and India, about eighty-five percent approved the report. Further, the survey showed that roughly the same amount of people agrees on spending more on durable and high-quality products to be able to rent the products on a sharing platform. Those insights are crucial to understanding today's consumer mind.

3.4.2 Electrification

Climate protection, dwindling fossil fuels, and an increased need for mobility due to rising population figures also fuel the need for new and alternate solutions. Developers have concentrated on exploiting the real advantages of electric motors over combustion engines. One example is the high efficiency of an electric motor. While combustion engines can utilize up to 50% of the energy in the fuel, electric motors use between 80 and almost 100% of the energy

provided. Due to the need for alternative solutions, according to the VDA, the German automotive industry is pressing towards developments in the field of electromobility (VDA, 2020). Hence, on January 01, 2020, the cumulated new registrations in Germany amount to 308,000 electric cars. That implies that approximately 75% of all registered e-vehicles are on German roads (VDA, 2020).

Further, according to estimations, by 2030, more than 55% of all new registrations will already be electrified (Kuhnert et al., 2018). However, German carmakers are facing intense competition. Rivian, an American automaker founded in 2009, develops emissions-free Electric Adventure Vehicles and, in November 2019, received a $700 million investment from Amazon. Further, Amazon CEO Jeff Bezos placed an order for 100,000 electric delivery vans from Rivian (Boudette, 2019; Hawkins, 2019b; Rivian, 2020). Another tech giant – Google - already invested in a battery maker named ActaCell, an electric vehicle maker Aptera, and an efficient car maker Next Autoworks (Mirchandani, 2012).

3.4.3 Autonomous driving

Rapid progress in areas such as artificial intelligence, machine learning, and deep neural networks fundamentally changes the future's mobility. Namely, the development of autonomous vehicles that no longer require human intervention, even in complex traffic situations (Wittmann, 2017). The use of individual mobility is thus, fundamentally redefined. New application scenarios are emerging that were unthinkable just a few years ago. Even experts estimate that around 40% of the passenger driven kilometers in Europe will be covered autonomously in 2030. Many modern cars have more lines of software codes than a Boeing 787 (Knop, 2018). It is, therefore, no surprise that crucial technology mammoths like Google and Amazon, as highlighted previously with examples, are investing in start-ups that foster electric vehicles and even autonomous driving, adding even more pressure to the industry incumbents.

3.4.4 Connectivity

On March 31, in 2018, The European Commission has introduced a regulation, that made e-call (emergency call) a mandatory functionality in every new car. This e-Call requires a SIM card to send data to the emergency services. The same SIM card can be used for other applications exhausting the opportunities of a connected car and support On-Demand Car Functions (ODCF) (Kromhout et al., 2017; Wucher, 2020; Wucher et al., 2019). ODCF generally are services that customers can book in their cars according to their needs and volume. Experts believe them to play a significant role in shaping the future automotive industry

(Wucher et al., 2019, 2019). Those ODCF are enabled through an onboard wired and local wireless network that allows connectivity between sensors and users. A connected car typically inherits these sensors, and additionally, has access to the internet and can send and receive signals.

Further, it also includes other vehicles in its environment via local range networks. Through the created connectivity, a lot of data is created. That data can be used in many ways, such as generating additional revenues (selling products or features), reducing costs (analyzing user data), and by improving safety and security (Bertoncello & Husain, 2018; Sabella, 2018). According to Thomas Wheeler (2019), each autonomous vehicle is expected to generate 25 gigabytes of data per hour, which is by far more than H.D. video streaming, music streaming, web browsing, and turn-by-turn navigation combined (McKinsey, 2014; Richter, 2017). McKinsey even estimates the revenue pool from connected car derived data to hit the mark of up to $75 billion by 2030 on a global scale (Bertoncello et al., 2016; Sabella, 2018) An ecosystem is about to evolve in which houses, laptops, phones, grocery stores, and so on connect. While nowadays, a Tesla owner is greeted by opened car doors and can close them with merely putting the foot on the brake, we will also see entertainment and gamification become a standard tool of cars. However, according to KPMG, the connected car ecosystems and related platforms are still at an early stage, and its benefits will follow in the coming years (Kromhout et al., 2017).

4. Research Design

There are many different methods to collect data and assess the research question in terms of research design (Bryman et al., 2019). As the transformation and future success of the automotive industry mainly relies on the measures those manufacturers will take, that perspective is examined using a quantitative approach.
The following chapter will outline the method of data collection and data analysis.

4.1. Qualitative Approach of Data Collection

The theoretical framework examined the developments of the shared economy and its connectedness with the digitalization. Through journals, articles, books, and online papers, a basis was exhausted and put together. In the next step, an introduction of the automotive industry followed, current challenges and threats were stressed out, and supporting facts and

arguments were provided. The existing business model briefly explained, and a theoretical future outlook is given.

This thesis focuses on analyzing qualitative interviews to validate and question the theoretical findings and gain as much up-to-date and reliable data as possible (Bansal, 2012).
The Interview objectives were to conduct a 180-degree approach. Thus, the goal is to examine the automotive industry from different perspectives. Therefore, the largest car manufacturers in Germany, a significant player in the car rental market, and a market leader in the shared mobility sector were selected and contacted. Consumers are neglected since this dissertation does not research consumer touchpoints involved in the buying process. The 180-degree approach will provide an understanding and a more precise and valid position on how the automotive industry will evolve. Further, this quantitative analysis of the dissertation leads to eight interviews conducted with employees in the automotive industry. Through those eight interviews, sufficient data was collected to compare responses to gain a deeper understanding of the potential developments and challenges the automotive industry will be facing.

In the first step, the interviewees needed to be selected. The goal was to include opinions from different companies to gain as many diverse perspectives as possible. Large companies, such as Daimler AG and BMW Group, who have already successfully dominated the industry for decades, have been incorporated. Another representative of another major OEM was interviewed, but it was agreed not to disclose name nor company.
Four employees from Daimler AG have been interviewed, as it is the most well-known manufacturer and the epitome of German luxury in automotive. The first interview was conducted with Interviewee 1, who is responsible for Sales & Marketing in the Region Europe for more than eight years, based in the headquarter in Stuttgart. The goal of the interview was to receive insights into the perspective of an expert in Sales & Marketing. The second interview conducted with Interviewee 2, who has been working for more than 20 years in the industry and is currently in charge of Market Management & Business Intelligence in Dubai. Since part of his job is to gather data to improve decision-making, his perspective on the shared economy and digitalization deemed interesting. The findings were then deepened with the third and fourth interviews. Here, interviews with experts in the Customer Journey and I.T. segment were conducted. Interviewee 3 has previously worked for Mercedes-Benz Consulting, and since his move to Daimler AG, he was in charge as a Manager for Best Customer Experience (BCE) and Customer Service. Also, Interviewee 4 is responsible for Mercedes me Connect, an app that

connects the vehicle owner directly with the vehicle (Mercedes-Benz, 2020). Additionally, Interviewee 4 is responsible for BCE and Project Management in Dubai.

Next to employees from Daimler AG, one representative of BMW Group – Interviewee 5 was interviewed. He is working in the industry since 2006 and has very diverse expertise. His work fields range from crucial account management over retail, marketing, communication, and production. Hence, his view is valuable from the BMW Group's perspective on the developments of the industry and the steps they take to remain competitive.

Further, a Project Manager with a strong I.T. background, that works for another large OEM was interviewed. It was agreed not to disclose his details. His name further due to this document will be regarded as 'Interviewee 6'. Incorporating three major car manufacturers makes this dissertation a high level of credibility in the discussions and conclusions made based on the interviews.

To be as up to date as possible, the analysis incorporated one of the most well-known car retailers – sixt. The Executive Director, Interviewee 7, works for the intermediary sixt acting between the producer and the end-customer. The perspective of a car-rental company that is directly in touch with car manufacturers, but also the consumer provides additional insight that deems valuable for the discussion.
Lastly, Interviewee 8, an expert in the field of shared mobility, was inquired on current challenges and future outlooks of the industry. He works for the German shared-mobility market leader ShareNow. The inputs he will provide hold interesting insights since ShareNow is directly linked to both Daimler AG and BMW Group. Further, as introduced in *3.4.1*, ShareNow possesses the most vehicles in their fleet, among shared-mobility providers, and inherits a strong position in the market.
All in all, the selection leaves confidence that the collected data establishes a well-analyzed picture of the automotive industry.

4.2. Data Analysis

To analyze the data correctly, the interviewees were asked five similar questions to receive potentially diverse responses from a different point of view. However, small adjustments were made, depending on whether the interview was conducted with the manufacturer, an

intermediary, or car-sharing company. Through asking similar questions, the answers can be compared, and a conclusion drawn in a detailed manner.

The interviews were conducted via Zoom, an online platform that enables video and audio conversations (zoom.us, 2020). Those interviews were recorded to be able to go through each reply at any available time. Further, at a later stage, the most critical parts of the meetings were summarized and transcribed. The transcribed interviews rest with the author.

5. Limitations

This dissertation delivers insights into thoughts, trends, and challenges for the automotive industry. However, these findings do face restrictions, which will be briefly presented in the following:

5.1. COVID-19

Despite not being an initial topic, this thesis took into consideration that it is difficult to overlook the common effects of COVID-19. The consequences are yet hard to forecast, both on a personal and a global level. Hence, the findings, statistics provided, and estimations for the future made in this dissertation will be challenged significantly in the next few months. Therefore, it is essential to acknowledge that limitations given by the effects of the Corona-virus will influence the conclusions here presented.

5.2. Project Scope

The dissertation additionally faces limitations in terms of it its time frame and scope. The amount of data that can be found and used is vast. Therefore, this dissertation focused on specific points and aspects that are deemed essential for answering the research questions. Hence, issues such as autonomous driving and electrification have been included and covered, but not analyzed in-depth. Both areas are reasons for a separate Master Thesis and detailed individual research.

5.3. Confidentiality and bias

The conducted interviews with experts of car manufacturers, retailers, and a shared-mobility start-up have the potential of being biased in their responses due to subjectivity. Further, for safety reasons, the sources were mostly willing but unable to disclose details regarding confidential data in terms of new and future strategies, innovations, and sales planning. Hence, the discussion and conclusion made face limitations regarding accuracy.

5.4. Derived results based on the opinion of a few

Due to time and resource limitations, only a specific number of interviewees could be selected. Consequently, the results based and derived from the outcome of the interviews will only partially reflect the majority opinion. Further, it is impossible to interview every company and manufacturer involved in the automotive business. Hence, the selected companies' will not entirely reflect the opinion of the industry as a whole.

6. Interviews

The different responses of the interviewees will be compared and presented in the following section.

At the beginning of the interviews, the experts were always asked for their consensus on displaying the name, position, and job experience in this thesis. As a next step, the interviewees were asked to give a short introduction. However, to protect the interviewees their responses and information will be treated anonymously.

The first question aimed to receive an overview of the real challenges the interviewees deems most severe for the automotive industry.

a) **What are, in your opinion, the major challenges the automotive industry is currently facing?**

All interviewees mentioned the change in consumer preferences from owning a car towards using shared-mobility services. Additionally, an increased focus on mobility and decreased importance for the individual car as a status symbol were mentioned. The experts pointed out that OEMs need to react to that trend in order to remain competitive. Further, all eight experts jointly stated that the combination of the right technology and product would be the challenge of today and tomorrow. What's more, the combined challenge of moving towards electric vehicles and transforming the product line will be a significant obstacle. Besides, some Daimler AG experts also stressed out that the new CO2 restrictions from the European Union pose a challenge for the future (EU, 2019; Interviewee 1, 2020; Interviewee 2, 2020). As Interviewee 1 stated (2020): "We, as a producer, have to adhere to them (CO2 restrictions) and these new standards will impact production processes and contest cost-efficiency."

In the second question, the companies Tesla, Uber, Lyft, and Lime were explicitly mentioned as current threats to car manufacturers' existing business models.

b) Tesla is entering the market with new all-electric products. Uber, Lyft, Lime, and other tech companies offer cheap instant solutions for consumers. How can your company (Daimler/ BMW/ OEM/ sixt/ ShareNow) compete against those competitors in the long run?

In the next step, it was asked how those threats could be answered from the interviewee's perspective. All parties pointed out that cooperation is critical to a successful future. The experts from Daimler AG and BMW Group mentioned the already existing joint venture ShareNow, collaboration on a horizontal basis. The representative of ShareNow is convinced that Daimler AG and BMW Group are currently role models for entering the shared-mobility market and shaping OEMs' business structure. He further, stressed the importance of engaging in vertical integration across industries with examples, such as Bosch and Siemens (Interviewee 8, 2020). For most of the interviewees, it will be interesting to see how the OEMs can streamline their products to be more agile in reacting to upcoming trends. Tesla inherits the advantage of a small product line and hence, a more flexible approach. Daimler AG, for example, has already streamlined the company by reducing staff costs by € 1.4 billion until the end of 2022 with the ambition of remaining more competitive within the industry (Daimler, 2020a). Lastly, the majority of interviewees agreed that to respond to changing consumer preferences, it will be crucial to invent sustainable and comfortable solutions for the customers. The focus will shift from the product towards the overall package of the offering. Hence, service and technology will increase in importance.

The third question aimed to understand how the sharing economy is impacting the automotive industry.

c) How is the sharing economy impacting the automotive industry*?*

The responses differed in terms of the interviewees' position in the value chain. While the shift towards using a car instead of owning a car was agreed upon and mentioned by all experts, the perception of OEMs current structure and future car sales was diversely discussed.

Firstly, the representatives from OEMs deemed the sharing economy necessary but not critical in their planning. However, representatives of sixt and ShareNow found the sharing economy as one of their major points for creating strategies and taking actions (Interviewee 7, 2020; Interviewee 8, 2020). Hence, they highlighted the importance of changing consumer preferences for their business strategies.

Secondly, although the interviewees all agreed on the shift of consumer preferences as demonstrated in the first and second questions, Daimler's representatives are firmly convinced of their companies' structure and strategy. One of them even said that "Daimler is a great

company and very structured, especially when it comes to product and quality. (Interviewee 2, 2020)" Some others further believe that hiring external software expertise will be necessary and support the business. Those statements are challenged by the expert of BMW Group, who instead believes, that OEMs, such as BMW Group & Daimler AG, need to change the company structure in their entirety, building upon a core foundation as a technology company (Interviewee 5, 2020). In his opinion, only hiring tech experts from major players, such as Google or Apple, won't help OEMs succeed in the long run.

Lastly, the subject of future car sales was mentioned by all interviewees and revealed different opinions. While the majority believes that future car sales will instead remain the same or even become less, representatives of Daimler AG and BMW Group share the believe that it will, in fact, increase. It is their shared belief that consumers will still own a car as well as use shared-mobility services, consequently, increase the number of vehicles on the road. Interviewee 4 follows the same logic. However, he stated that there would be differences between rural areas and big cities. The expert from ShareNow used the same argumentation. He added that to fight growing population and therefore, vehicles on the road, shared mobility will be a great tool to enhance sustainable solutions (Interviewee 4, 2020; Interviewee 8, 2020).

In the fourth question, Herbert Diess, the CEO of Volkswagen Group, was quoted in a statement made at the end of January 2020. Mr. Diess claimed that German car manufacturers have to move towards becoming tech companies with strong software expertise, or they will not stand a chance against Tesla. The interviewees were asked to provide their views on the same.

d) **What do you think about Herbert Diess, stating: "Tesla is valued like a tech company while V.W. is valued like an automobile company, and the German automaker needs to shift toward the former as software expertise will determine V.W.'s future."?**

Interestingly, all Daimler AG representatives out of the responders said that Tesla is a hype rather than an actual proven threat. They do acknowledge their software expertise and point out the lack of demonstrated quality and durability of products on the road. However, all agree that the OEMs must shift towards technology and software proficiency as it will be the basis for future cars (Interviewee 1, 2020; Interviewee 2, 2020; Interviewee 3, 2020; Interviewee 4, 2020). New insights were provided by Interviewee 4, who mentioned the internal company usage of the word "living room" as a description for the next vehicle (Interviewee 4, 2020). According to the majority of the experts, the car will instead serve the purpose of moving from point A to point B; therefore, the efficiency factor will increase its value. According to

Interviewee 5, consumers will use the time to complete tasks for private or business purposes (Interviewee 5, 2020). Therefore, technology is critical in providing the possibility of cars fulfilling the needs of a second office and living room (gamification/work desk). Also, Interviewee 8 and Interviewee 6 pointed out that the younger generation sees the car more as a mobile device, like a smartphone, that moves you (Interviewee 6, 2020; Interviewee 8, 2020). Consequently, connectedness of the car with the environment becomes crucial.

The last question for the round of expert interviews was targeted on finding out whether the group agrees with the findings in the earlier conducted literature review.

e) Nowadays, many experts claim that the car needs to become a service rather than a product. What is your opinion on the matter?

The undertaken research found out that the car needs to become a service rather than a product. As a fact, all interviewees agreed with that statement, despite to differing degrees. Whereas representatives from sixt and BMW Group strongly believe that even in the future, a Porsche 911 will remain a Porsche 911, regardless of the technology, experts from Daimler AG see the configurations as the differentiator in the buying process. Despite all experts highlighting that vehicles of the future will be more and more standardized, yet better equipped, to save costs and remain competitive, major players such as Daimler AG are already working on solutions to offer excellent services.

The model of the future, according to all respondents, will be to provide fully loaded cars, where configurations, such as higher horsepower can be individually booked for a specific amount of time. This means that a customer would be able to "unlock" certain features that are already built into the car's hardware with an over-the-air software upgrade (Interviewee 2, 2020; Interviewee 3, 2020; Interviewee 4, 2020; Interviewee 5, 2020). Car-owners would therefore possess a vehicle that has the ability to access virtually all available specifications and updates, at the touch of a few buttons. The inherited advantage is the flexibility for consumers to change the car according to their needs and purposes, showcasing the potential to fundamentally change the way customers purchase cars. For more details, see Table 1 in the following chapter.

7. Discussion

The above-outlined responses of the interview experts are now going to be put into relation and discussed with the earlier researched theoretical findings. To have a more innate understanding of the most critical inputs of the interview experts, a summary has been created. The following

graph shows the key messages of the interviewee's responses:

#	Questions	Key Mesages	Respondents
1	*What are the major challenges the automobile industry is currently facing?*	• Consumer preferences change from ownership to a shared-model approach • Digitalization of the car (find right techology & right product for consumer) • Electrification requires transformation of product line/ electrifying engines • Adhere to CO2 restrictions from European Union	• 1,2,3,4,5,6,7,8 • 1,2,3,4,5,6,7,8 • 1,2,3,4,5,6,7,8 • 1,2,3,5,6
2	*How can German car manufacturers compete against competitors such as Tesla, Uber and Lyft in the long run?*	• Engage in cooperations with players in different industries (software, shared-mobility) • Streamline products to become more flexible and agile • Base company foundation on software • Invent sustainable and comfortable solutions for customers	• 1,2,3,4,5,6,7,8 • 3,4,5 • 1,2,3,4,5 • 1,2,3,4,5,6,7,8
3	*How is the sharing economy impacting the automotive industry?*	• Shift towards using instead of owning a car is becoming huge • Manufacturers have to decide between producing hardware or becoming a mobility-service provider • Car sales will drop in the future	• 1,2,3,4,5,6,7,8 • 1,2,3,4,5,6,7,8 • 1,2,5
4	*What do you think about Herbert Diess statement?*	• Agree, car manufacturers have to shift towards technology & software expertise • Car to become a second living room and/or office • Tesla is more a speculation than an actual threat • Tesla lacks experience of products actually driven on the street (over 150.000 miles)	• 1,2,3,4,5,6,7,8 • 1,2,3,4,5,6,8 • 1,2,3,4 • 1,2,3,4
5	*Nowadays, there are a lot of experts claming, that the car needs to become a service rather than a product. What is yur opinion?*	• It will become a mixture of both with an increased focus on service • Cars will be more similar and standardized in the future, service to be the differentiator • Fully loaded cars will be sold, where configurations, such as higher horsepower and navigation system, are individually bookable for specific amount of time	• 1,2,3,4,5,6,7,8 • 1,2,3,4,5,6,7,8 • 1,2,3,4,5,6,7,8
(1) Interviewee 1 (2) Interviewee 2, (3) Interviewee 3, (4) Interviewee 4, DAIMLER AG		*(5) Interviewee 5, BMW GROUP*	*(6) Interviewee 6, LARGE OEM* *(7) Interviewee 7 SIXT* *(8) Interviewee 8 ShareNow*

Table 1: Overview of expert interviews

The table illustrates the questions that the interviewees have been asked. In the next column, key messages are listed and summarized based on the responses received throughout the data collection process. The last column displays the respective interviewee, which stated the corresponding keyword. On the bottom, the color-coding for the individual (or grouped) experts is explained. The first four interviews are combined representatives from Daimler AG, followed by a representative from BMW Group. Subsequently, Interviewee 6 from another large OEM, Interviewee 7 from sixt and Interviewee 8 as a representative from ShareNow.

To answer the research question, vast literature on the development and impact of a shared economy had to be thoroughly explored. The differences in owning, sharing, and accessing items, goods, and services have been explained and can be looked up in detail in 2.2.2 Shared Economy.

7.1. Shared Economy

As the theoretical findings and the expert interviews confirmed, the sharing economy is impacting the automotive industry. The sharing economy is expected to grow to up to $335 billion by 2025, and the German car manufacturer has to prepare to get its portion.

That development has had many differing reasons. It was partially triggered by the financial crisis in 2008, which created a need for people to be more resource-efficient. Further, the rise of the internet provided alternative solutions for consumers. That trend has been acknowledged

by the interviewed experts as well as all experts unanimously agreed on the shift in consumer preferences to using, rather than owning a car.

Further, literature and experts believe that it will be crucial to invent sustainable and convenient solutions for new consumer demands. The consumer of today is different from the consumer of the past. It is connected to a rise of digitalization, globalization, and a call for resource-efficiency. In times where consumers can meet on online platforms and combine supply and demand, sustainable solutions are required. With only a few clicks online, consumers can compare prices and performance among hundreds of companies, brands, and products. Even more impressively, consumers can order virtually anything to their doorstep within a matter of hours – more and more automotive companies are eagerly following suit and bringing their product offering online. That requires German carmakers to work more efficiently, transparent, and useful. As of today, consumers have a vast information advantage on their buying decision. Further, they want to have continuous access to products, services, and solutions. That demand for having this access was stressed by the interviewed experts. Nowadays, people like to follow trends highlighted by Interviewee 4 and Interviewee 5. The current trend indicates an increased interest of consumers to be resource-efficient (Interviewee 4, 2020; Interviewee 5, 2020).

In short, the shared economy is a result of changing consumer preferences and these preferences will continue to deviate and shift.

7.2. Business orientation

To address these consumer preferences, OEMs will have to make an essential decision. They are to determine whether to become hardware-provider or a service-provider. Here, theory and experts are not entirely aligned. While some experts argue that it is compelling to move towards service, others believe it to be a mixture. As most experts mentioned, cars will remain cars, and the emotions are always connected to consumers' buying decisions. However, Interviewee 4 is correct in arguing that there will be a market for consumers who value the product, the brand, and the specifications (Interviewee 4, 2020). A comparison with the airline industry is suitable. Some consumers only want to travel in the most convenient and cost-effective way, while others value the provider, the type of aircraft, and the overall experience. However, as theory also stressed, we can witness a trend of the majority of consumers moving towards efficient solutions. Hence, there will be a fine line for OEMs of offering the right product. To achieve that goal, it will be ideal for incorporating ecosystems in OEMs product offerings. A connection between cars and their environment has to be created for long-term success. Therefore, OEMs flexibility and agility, as mentioned by Interviewee 3 (2020), will play a crucial role. Companies

that are slow in changing strategies will face troubles adapting, and many ultimately be put out of business. While the hardware was traditionally the predominant revenue stream for OEMs, the future will be about monetizing connected vehicle data, selling configurations, and leveraging shared mobility. The expert from BMW Group made a strong point arguing that OEMs have to analyze whether it is a more profitable business scenario to outsource parts of their value chain, rather than starting to produce technology in-house (Interviewee 5, 2020). Hence, cooperation between incumbent technology providers may gain significant importance for companies to remain successful. They do not necessarily have to be within the automotive industry - as Interviewee 8 mentioned, shared-mobility players are looking across industries for collaborations (Interviewee 8, 2020).

There is no definite correct answer as of today, but each OEM will have to find its suitable path for conducting business in the future.

7.3. Shared-Mobility

According to literature and experts, the importance of shared mobility will increase. In cities where population density keeps growing, efficient solutions are more necessary than before. To adhere to the new customer, carmakers must incorporate mobility solutions within their planning. The interviewee's responses underlined that same fact. Representatives from Daimler AG (Interviewee 3, 2020; Interviewee 4, 2020) continuously pointed out the existent joint venture ShareNow, so did Interviewee 5 (Interviewee 5, 2020). Experts from Daimler AG and BMW Group specifically mentioned the car to become a second living room and office. The latter gave the example of Apple CarPlay or Android Auto, which essentially integrates a driver's smartphone on the vehicle dashboard, providing a safer way to use the device's apps such as music streaming or navigation while driving (Interviewee 5, 2020). That is a direct reaction to the demand of consumers to be more time-efficient and turn their car into a safe mobile assistant.

As stated in the introduction, a person on average spends two and a half years of their lives in a car. The majority of consumers do not know that for a fact, but they do acknowledge the vast amount of time spent getting from point A to B on a daily basis. Here, shared-mobility has helped to provide a solution. When calling an Uber, consumers can spend the ride focussing on fulfilling other tasks – whether that be finishing an email, a conversation with a friend or a work-related issue. Additionally, they travel in a convenient and low-priced way. However, these shared-mobility services do not function at their full potential yet. This was an additional outcome of the expert interviews and had not yet been disclosed by the literature review. The

associated problems with using shared-mobility services are sometimes frustrating for the consumer (e.g., dirty car, long waiting time, cancellation of the driver). Hence, we have not yet reached the final stage and solution of providing mobility solutions to customers. Some experts mentioned exciting insights on new solutions in progress. In discussion is a model in which consumers can rent idle standing cars in their parking lot to others via an app. This could eliminate some of the aforementioned problems, such as dependency on drivers and bad car quality. A reliable tool and mechanism need to be in place to prohibit theft and misuse as well as cover insurance related elements of the car. Here, Airbnb could serve as a role model with their review and safety system.

7.4. Digitalization

To provide adequate working shared-mobility solutions and offer consumers the ideal offering – technology is of vital importance. Hence, one of the significant challenges for the German carmakers will be finding the right technology and the right product for the consumers. While related to shared-mobility concepts, it is instead focused on the actual design and functionality of the car of the future. Through technological advancements, the car will change, and it will change faster than the majority expects. While, as of today, car manufacturers generate their revenues by selling the hardware and offering after-sales services, the next decades will require different revenue streams. Electrification, servicing, and data will become essential buzzwords – and profit-drivers. The development does not stop here. The theory already touched upon autonomous driving, connectivity, and car-sharing. Interviewees agreed on the same, stating, that even in the short-term gamification, entertainment and additional services will become a necessity for consumers. That uncertainty leaves a challenge for carmakers, which can drive large OEMs out of business. The theoretical framework already researched how tech giants, such as Amazon and Google, are entering the industry.

Further, Tesla, with innovative designs, solutions, and entirely new product image, is creating a trend that engages customers on a new level. Technology connects people, and people engage in technology. The future, therefore, requires the OEMs to focus on hiring talent, expertise, and knowledge in order to maintain and develop a competitive edge. Further, it is essential to implement and base the company on software to keep up with technological progress. According to Interviewee 3 (2020) this will be the "strategic question a company has to answer." Further, Interviewee 5 shared, it will not be enough just to hire external talent, but rather to create the company built on a foundation of tech-related knowledge.

7.5. Tesla

Tesla has been covered in the theoretical research of this dissertation and was also specifically part of the interview questions. When exploring trends and developments in the automotive industry, it is inevitable to read about Tesla. While the theory pointed out success, innovation, and the disruptive power that comes with the company, experts had a diverse view. Yes, they agreed that Tesla is doing things differently with success. However, several OEM representatives were commonly convinced that Tesla instead created a hype than an actual sustainable solution. The truth will be somewhere in between. Interviewee 2 and Interviewee 3 are correct in doubting the quality and proven long-term durability of Tesla's vehicles. Tesla does lack the experience of thousands of cars running on the streets for many years.

However, as of today, we have to wait for the future to provide the answer. Despite potential quality issues, Tesla has provided innovations and an entirely new approach to building a successful carmaker company. The theory review and experts were also slightly misaligned regarding Tesla's impact on the industry. While the theoretical research stated that carmakers have to find solutions to compete against Tesla mainly, experts believe it to be more a competition of meeting consumers' demands. Here, it is crucial to understand that consumer demand is being shaped by new products and offerings, such as those provided by Tesla. It will be critical to meet these developing demands, and therefore important to have a close look at what competitors are doing. New entrants such as Rivian and other tech giants will have different approaches, and while they may not provide the ideal solution, incumbent manufacturers should leverage these as an opportunity to learn and adopt alternative, novel strategies.

7.6. Electrification and streamlining products

Further, the literature review indicated that German carmakers' current business model mainly focuses on producing highly standardized products to make use of learning and scale effects. Here, a bright point outlined by the interviewees was the need for streamlining products. This will further enhance the production of more standardized products and provide an opportunity to advance in terms of technology and service. A clear disadvantage of large corporations, such as Daimler AG and BMW Group, is the inability to make quick decisions. Carmakers must shift to change the majority of their combustion engines to electric engines. That will require adjustments in production processes, suppliers, supply chains and entire infrastructures, such as loading stations and servicing. The combined efforts are enormous, and manufacturers have

to act quickly. The European Union restricted certain emission levels, and these can only be reached by incorporating electric vehicles within OEMs' fleets.

In comparison to Tesla, carmakers automotive groups such as Daimler AG (Mercedes-Benz, Mercedes-AMG, Mercedes-Maybach, Freightliner, Western Star, FUSO, etc.) and Volkswagen Group (Audi, SEAT, SKODA, Bentley, Bugatti, Lamborghini, etc.) inherit an extensive range of vehicles, brands, and products. To make product decisions are therefore significantly more complex. This specifically impacts the companies' product line-ups. Adhering to the new CO2 emissions will be noticeably more straightforward for companies whose portfolios include a lower number of products or brands. Therefore, Daimler AG have already begun streamlining their workforce and a planned reduction in product models is expected - and suggested-industry-wide. In that way, consumers will be offered less variety, but budget will ideally be shifted to provide more optimized service. Naturally, the customer is at the core of such decisions, regardless of the speed they were taken at.

7.7. Fully loaded vehicles with up-to-date technology

Lastly, one of the most noteworthy findings was the much-discussed possibility of how the future car could look like. The majority of experts gave internal insights on a solution already in progress. The idea is to build vehicles that are continuously and daily updateable. In that way, consumers' demands can be met and cars ultimately serving various purposes beyond transportation from point A to B. The interviewees explained that consumers would be able to individually book configurations, such as higher horsepower or increase range on electric vehicles, for specific time frames to fit a consumer's purpose of more tailored usage.

Further, technology is a decisive factor for consumers buying decisions. As Figure 3 earlier addressed, consumers tend to spend more on products with built-in sharing functions. Through advanced technology and software solutions, those demands should be fulfilled. The theoretical research has not disclosed the solution of always-on-demand updates and individually bookable configurations. However, it deems to be a very potential possibility for the future, and the interviewed experts hence provided invaluable insights on current development within the industry.

8. Conclusion

This dissertation aimed to assess how the shared economy and digitalization both influence the automotive industry. Empirical research has shown that both topics have had significant impacts: an entire ecosystem is evolving and changing the car industry as we know it. Eight interviews with experts in the field were conducted. Representatives from Daimler AG, BMW Group, another large OEM, a retailer (sixt), and the car-sharing market leader in Germany (ShareNow) were questioned, and their responses analyzed. The conducted comparison between theory and practical insights have yielded results, which will now be displayed and summarized.

Despite new trends and developments, cars are – and will in the foreseeable future stay – cars. The emotions and thoughts put into purchasing a vehicle will remain connected with the product. Other parts of the vehicle, such as service and technology, gain significant importance, but car enthusiasts will continue to find unique models and products to their liking. That is indeed good news for German car manufacturers.

- To begin, the shared economy drives and changes consumer preferences to an extraordinary extent. Consumers want access to the newest innovations, products, and updates – and they want them *now*. The shared economy evolved into an access economy and has created a new type of demand. This ultimately results in a need for German car manufacturers to develop mobility solutions and more customer-oriented product offerings.

- Secondly, German carmakers must shift their focus away from merely providing the hardware, to instead offering a holistic solution that is not only convenient, but also makes consumers' lives more comfortable. Shared-mobility will be relevant in achieving the same goal. These services are yet far from perfect, but they show a clear trend in what consumers demand: quick and cheap solutions available at any time.

- Thirdly, digitalization has enabled consumers to think differently. They want to be more resource-efficient; they want convenient and cheap solutions; they always want to be up-to-date. What was unthinkable years ago is possible today. Through digitalization, industries have been shaped and disrupted. Large businesses, such as hotels, taxis, and

retail stores, are challenged and thus struggle within the new field of competition. Incumbents in the automotive industry are currently in the same critical position. Technological progress demands car manufacturers to shift their strategies, workforce, and even the foundations of long-existing business models to become software experts. The car of the future will be one of the most sophisticated products in terms of coding and software. We will see technology and electrification rise and become central components of vehicles. Big T.V. screens, state-of-the-art navigation systems, and configurable specifications will have to be standard gadgets of the future car. Also, services, such as shared-mobility, will require well-functioning and seamless apps in order to enable that exceptional consumer experience.

- To add, one of the significant results of this thesis is a derived perspective on how digitalization and the shared economy undeniably shape the car of the future. According to the interviewed experts, the automotive industry will shift towards providing cars that already possess a variety of specifications and configurations that can be retrofitted electronically. Consumers will no longer be forced to decide on the day of the purchase which gadgets and settings they want to include in their vehicles. This has become a necessity due to consumers' recently developed technological mindsets. The future car has to offer the consumer the opportunity to continuously remain up-to-date, or at the forefront of ongoing developments. In times of apps, smartphones, and news on-demand, the consumers mindsets have shifted to not only requesting, but expecting the same of their vehicles. Through software, the car would and should be a permanently updateable product that can react and be designed in the consumer's favor. Those vehicles, fully loaded with configurations, can be individually equipped with bookable add-ons at any time in the future - be it only for a weekend or a year. Thus, to provide these on-demand updates, and/or software codes in a car will become more complex, yet essential.

- Finally, as of today, the automotive industry is reacting, rather than acting. Flexibility and agility will determine whether large OEMs fulfil consumers' needs. However, providing the entirety of hardware, service, technology, and mobility solutions comes with great difficulty. Therefore, cooperation will become significantly more critical. Decisions must be made regarding which specific parts of the value chain are to be conducted in-house and which to outsource. This differentiation will define revenue

streams and kept knowledge for OEMs. As emphasized in the expert interviews, OEMs cannot only hire tech specialists from leading companies and hope in that way to be positioned well enough to compete with Silicon Valley. These findings suggest that we will see a change in product ranges, brands, and company structures within Daimler AG, BMW Group, Volkswagen AG, and other industry incumbents. The critical process will be to streamline products, efforts, and investments to draw a path and strategy for the future.

To summarize, the competition is not sleeping, and with tech giants like Google and Amazon entering the field, OEMs are now more than ever challenged to be quick and creative. However, the shared economy and digitalization offer both challenges and opportunities for the players in the market. The market volume of the shared prosperity is expected to rise to up to $335 billion by 2025, and data derived from connected cars to hit $75 billion by 2030. We will see a completely reshaped automotive industry, and consumers must be met in a new and exciting ways.

A world where autonomous driving and flying cabs are commonplace might seem distant now, but this future is already underway. The ones that accept the change now and rapidly shift their businesses to adopt to it will most likely be the ones to survive and prosper in the most appropriate fashion. Sustainability, alternative solutions, and efficient mobility are demanded and driven by us - the consumer. To put it in Dieter Zetsche's (2017) words: "The decisive point is not what we want. The decisive point is what the customers want."

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Interviewee 4, Senior Executive for Best Customer Experience & Digital Innovation, Mercedes-Benz, Daimler AG, 2020

Interviewee 5, Head of Marketing & Product, BMW Group, 2020

Interviewee 6, Project Manager & I.T. Expert, one of the major automotive OEMs in Germany, 2020

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Appendix

#	Questions	Key Mesages	Respondents
1	*What are the major challenges the automobile industry is currently facing?*	• Consumer preferences change from ownership to a shared-model approach • Digitalization of the car (find right techology & right product for consumer) • Electrification requires transformation of product line/ electrifying engines • Adhere to CO2 restrictions from European Union	• 1,2,3,4,5,6,7,8 • 1,2,3,4,5,6,7,8 • 1,2,3,4,5,6,7,8 • 1,2,3,5,6
2	*How can German car manufacturers compete against competitors such as Tesla, Uber and Lyft in the long run?*	• Engage in cooperations with players in different industries (software, shared-mobility) • Streamline products to become more flexible and agile • Base company foundation on software • Invent sustainable and comfortable solutions for customers	• 1,2,3,4,5,6,7,8 • 3,4,5 • 1,2,3,4,5 • 1,2,3,4,5,6,7,8
3	*How is the sharing economy impacting the automotive industry?*	• Shift towards using instead of owning a car is becoming huge • Manufacturers have to decide between producing hardware or becoming a mobility-service provider • Car sales will drop in the future	• 1,2,3,4,5,6,7,8 • 1,2,3,4,5,6,7,8 • 1,2,5
4	*What do you think about Herbert Diess statement?*	• Agree, car manufacturers have to shift towards technology & software expertise • Car to become a second living room and/or office • Tesla is more a speculation than an actual threat • Tesla lacks experience of products actually driven on the street (over 150.000 miles)	• 1,2,3,4,5,6,7,8 • 1,2,3,4,5,6,8 • 1,2,3,4 • 1,2,3,4
5	*Nowadays, there are a lot of experts claming, that the car needs to become a service rather than a product. What is yur opinion?*	• It will become a mixture of both with an increased focus on service • Cars will be more similar and standardized in the future, service to be the differentiator • Fully loaded cars will be sold, where configurations, such as higher horsepower and navigation system, are individually bookable for specific amount of time	• 1,2,3,4,5,6,7,8 • 1,2,3,4,5,6,7,8 • 1,2,3,4,5,6,7,8
(1) Interviewee 1 (2) Interviewee 2, (3) Interviewee 3, (4) Interviewee 4, (5) Interviewee 5, (6) Interviewee 6, (7) Interviewee 7 (8) Interviewee 8 *DAIMLER AG BMW GROUP LARGE OEM SIXT ShareNow*			

Table 1: Overview of expert interviews