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THE FUTURE OF THE AUTOMOTIVE INDUSTRY – REVOLUTIONIZING THE INTERIOR OF FUTURE CARS

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Abstract

This master thesis explores the future of the automotive industry, focusing on revolutionizing car interiors amidst evolving megatrends. It examines strategic shifts required for German premium car manufacturers to remain competitive, emphasizing connected services, particularly Over-The-Air updates, and the potential of bio-based materials in vehicle interiors. Using a modified Unified Theory of Acceptance and Use of Technology framework, it investigates German willingness to pay for these innovations. Findings suggest the importance of flexibility in payment models and sustainable materials as differentiation strategies. The thesis concludes with strategic recommendations for leveraging these insights to adapt to emerging consumer preferences.

Keywords

Automotive Industry, Car Interiors, Connected Services, OTA Updates, Bio-Based Materials, Consumer Perceptions, German Market, Sustainability, Technology Strategy

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I. LIST OF ABBREVIATIONS

ADAS	Advanced Driving Assistance System
AI	Artificial Intelligence
AV	Autonomous Vehicle
BEV	Internal combustion Engine
CASE	Connectivity, Autonomous Driving, Shared & Services, and Electric
CO_2	Carbondioxide
CTAM	Car Technology Acceptance Model
C-V2X	Cellular-vehicle-to-Everything
DSCR	Dedicated short-range communications
EV	Electric Vehicle
FOTA	Firmware-Over-the-Air
ICE	Internal Combustion Engine
IoC	Internet of Cars
IoT	Internet of Things
IoV	Internet of Vehicles
LCA	Life Cycle Assessment
LiDAR	Light Detection and Ranging
OEM	Original Equipment Manufacturer
OTA	Over-the-Air
PESTEL	Political, Economic, Social, Technological, Environmental, Legal
PU	Polyurethane
PVC	Polyvinyl chloride
SOTA	Software-Over-the-Air
TAM	Technology Acceptance Model
UTAUT	Unified Theory of Acceptance and Use of Technology
V2C	Vehicle-to-Cloud
V2D	Vehicle-to-Device
V2I	Vehicle-to-Infrastructure
V2P	Vehicle-to-Pedestrian
V2V	Vehicle-to-Vehicle
V2X	Vehicle-to-Everything
WTP	Willingness to pay

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1. INTRODUCTION (55661)

The automotive industry has become one of the most important and influential industries on earth over the last century. In 2022, it generated a global turnover of 2.52 trillion USD (Carlier 2023a) and provided jobs for more than 13.58 million people (Castillo 2023), with a much higher number of indirectly contributing workers at suppliers and third parties. Its significance is deeply rooted in transformative milestones, from Karl Benz and Gottlieb Daimler's pioneering inventions in the late 19th century to Henry Ford's revolutionary assembly line in the 20th century (Johae 2013). Ongoing regulatory changes in safety, fuel efficiency, and environmental concerns have challenged the industry, prompting continuous innovation and advancements (Library of Congress 2023). The COVID-19 pandemic catalyzed a profound reassessment of societal priorities, intensifying efforts in sustainability and digitalization across industries (LaBerge, et al. 2023). Although significant investments in sustainable powertrains, digitalization and alternative business models had already been made before the pandemic (Hensley, Maurer and Padhi 2021), the automotive sector faced vulnerabilities exposed by the state of emergency. Delays in alternative powertrains and an inflexible supply chain had the most far-reaching impact (Deloitte 2023).

For major German car manufacturers, renowned for robust engines and quality, staying competitive requires navigating transformative megatrends (CASE: Connectivity, Autonomous Driving, Shared Mobility, Electric) (Infopulse 2020) and evolving consumer preferences, especially in the post-pandemic era (Campbell, White, et al. 2023). Asian automakers, exemplified by NIO, are narrowing down the gap in brand image and gaining popularity by offering competitive prices and prioritizing an innovative customer experience. Consumers nowadays prioritize a good product experience over brand image and that is where Chinese manufacturers currently have an advantage. This study aims to present unique opportunities for differentiation for German Premium OEMs which leads to the following research question of the master thesis:

How can German premium OEMs differentiate themselves and create new revenue streams to effectively respond to the rising competition from foreign automakers?

The study narrows down its scope to connected services via Over-The-Air (OTA) updates, and sustainable bio-based leather as an alternative for seat covers. The scope of this study is to ascertain the customer acceptance of OTA updates and bio-based leather seats in the German market, as well as to identify the factors contributing to willingness to pay (WTP). To achieve this objective, the UTAUT/UTAUT2 model has been modified and adapted through the inclusion of pertinent variables, a proven concept known by Salahshour Rad et al. (2018) based on the work of Venkatesh et al. (2003). The empirical analysis is underpinned by primary data collected via an online survey, employing a structured questionnaire. Findings through the empirical research will provide recommendations on how German premium car manufacturers can tailor their offerings to align with the expectations and preferences of customers in the German market.

The subsequent segments of this study are systematically structured to offer a thorough investigation of the subject. The initial part initiates with a strategic analysis utilizing the PESTEL framework, dissecting prevailing megatrends and exploring the macroeconomic factors pivotal to their evolution. Transitioning to the "Methodology" section, the study delineates the approach employed for the subsequent statistical analysis of survey results. The first individual part of the master thesis deals with connected services via software and firmware over-the-air updates. This involves assessing the state-of-the-art and potential of the technology, as well as conducting a competitive analysis of the pioneers for OTA updates. The second individual part shifts the focus to the analysis of bio-based leather alternatives. This involves an exploration of the current developmental status and addresses fundamental questions essential for the sustainability of this upcoming industry. Both sections meticulously integrate the evaluation of survey results and the assessment of factors influencing willingness to pay. In the final section, strategic recommendations are presented, rooted in the insights derived from the preceding chapters. This approach aims to provide a coherent and insightful exploration, unveiling the intricate interplay between macroeconomic trends, technological advancements, and consumer preferences within the automotive industry.

2. STRATEGIC ANALYSIS (54361, 55661)

2.1 PESTEL analysis of the automotive landscape

In light of the significant impact of CASE trends on the automotive industry, a comprehensive understanding of the forces driving these changes is crucial. To achieve this, the study begins with a PESTEL analysis, which dissects the political, economic, social, technological, environmental, and legal factors influencing the industry (Aguilar 1967). This methodical exploration provides insights into the foundational and macroeconomic contexts that have given rise to these megatrends. For a detailed graphical representation of how these factors intertwine with individual megatrends, refer to Appendix A1.

Political (55661). Car manufacturers worldwide are challenged with regulatory changes, especially in the past years with higher regulations on emissions and the focus on electric vehicles (EV).

1) Focus on CO2 emissions and neutrality. A key priority for leading nations in the EU is attaining CO2 targets and steering the economy towards climate neutrality. As a result, car manufacturers and suppliers must adapt to the changing regulations. The European Union has decided that newly sold vehicles must have zero CO2 emissions from 2025, which poses a substantial challenge for automotive manufacturers (Reuters 2023). To address this issue, car companies are employing various strategies, including the utilization and incorporation of sustainable and recycled materials, a heightened emphasis on electric mobility and connected cars, the adoption of eFuels, and an increased commitment to recycling. When these strategies are collectively applied across various facets of production, manufacturers can achieve a noteworthy reduction in their overall CO2 emissions (see expert interview A20)

2) Government incentives to increase the adoption of new technologies. A movement toward sustainable and technologically advanced products can be identified in Germany, as McKinsey has examined (McKinsey 2021). Discussions surrounding the automotive industry are particularly strong. Numerous initiatives and subsidies, such as electric vehicles with standard modern technology, are intended to encourage consumers to opt for more sustainable products. For example, action was already taken at the beginning of the pandemic, with premiums offered by the German government of up to €9,000 for electric vehicles for a certain period (VDA 2023). As a result, over 255,000 applications were filed in 2020, more than triple the previous year. Even in the following year, the number of applications increased again to 625,000 (BAFA 2023).

3) Intensified regulations. Significant regulations, especially in Germany since the beginning of 2023, impose additional obligations on companies, with an impending EU-wide directive. This pertains to the Supply Chain Due Diligence Act (German: Lieferkettensorgfaltsvorschriftengesetz), which mandates that companies adhere to due diligence responsibilities for preservation of environmental integrity and the safeguarding of human rights within global supply chains (BMAS 2023). This has notable implications for the development and procurement practices of internationally operating businesses, as they must ensure that their suppliers meet the stipulated conditions. Similarly, manufacturers of products composed of sustainable materials are held to these standards. However, the latter may find it somewhat more manageable, as their processes are often less complex, thus making it easier to comply with environmental and human rights requirements.

Environmental (55661). As highlighted in the "Political" section, the prevailing landscape is characterized by the evolution of regulatory frameworks and the adoption of climate and emissions targets. Naturally, these factors push the manufacturers' inherent self-interest, compelling them to adapt and innovate to remain competitive in the industry.

1) Impact through waste management. A novel dimension that has yet to be addressed is waste management, a pivotal facet in the context of government-led initiatives aimed at propelling businesses toward carbon neutrality. Within the automotive industry, an essential distinction arises concerning the origins of carbon dioxide (CO_2) emissions. One source is the emissions generated during the production phase of vehicles, an aspect that is expected to continue with the advent of electric vehicles. However, post-production emissions are expected to decrease significantly in the future, particularly as electric vehicles will dominate the market and are predominantly powered by renewable energy sources (see expert interview A20). In the future, automotive manufacturers will try to compensate for this with an intelligent waste management system by increasingly using secondary or bio-based materials.

2) Resource scarcity as important pillar to consider. Another consideration involves resource scarcity, particularly concerning its impact on vital resources such as water and biodiversity, as well as the extraction of rare earth elements. These considerations become paramount in the development and utilization of alternative materials for various applications. Therefore, when adopting alternative materials, it becomes imperative to ensure that an eco-friendlier production process is implemented. The same principle extends to the preservation of biodiversity. (see expert interview A20). It is essential to avoid scenarios where forests are cleared to cultivate materials needed for producing automotive parts, or monoculture practices leading to soil degradation.

3) Focus on establishing a circular economy. Achieving climate-neutral mobility involves an intensified focus on Circular Economy. This involves minimizing CO_2 emissions by utilizing eco-friendly primary raw materials and repurposing recycled secondary materials. This process has been defined and documented by the European Commission, notably within the "Strategic

Research and Innovation Plan for Safe and Sustainable Chemicals and Materials" report (European Commission 2023).

Social (55661). Changing consumer preferences are challenging car manufacturers worldwide to meet the growing demands and standards. Continuous market research and adoption to trends are necessary.

1) Increasing urbanization as part of the change in future mobility. The contemporary demographic landscape is characterized by an unprecedented urbanization trend, with over 1 billion more individuals dwelling in urban centers than in rural areas (Ritchi and Roser 2019). This trajectory is anticipated to persist, posing formidable challenges to governments and urban entities. This transformation also affects the automotive industry, as an increased concentration of people in limited areas will lead to mobility challenges. Therefore, automotive manufacturers are striving to broaden their positions through the exploration of various new business fields and the adoption of new technologies to offer tailored solutions to their customers (Statista Research Department 2023). In this regard, the heightened connectivity alternatives within advanced smart cities are poised to play a pivotal role in mitigating mobility challenges.

2) Technological acceptance and digital trends. The world today is characterized by technological advancements, and these trends also influence the automotive industry, driven by the demand from technology-savvy customers (Automotive World 2019). Automotive manufacturers must engage with such innovations to remain competitive. Particularly, manufacturers from Asia have recognized these trends on time and invested significant resources accordingly. German premium car manufacturers, in particular, are feeling the impact, as customers nowadays not only focus on the brand but primarily expect a technologically advanced vehicle, especially in terms of interconnected mobility at more competitive prices (Seige 2023).

3) Increasing expectations by customers. A changing customer segment also comes changing consumer awareness and expectations. Consumers place significant importance on connectivity, while for 73% a good digital customer experience plays a decisive role (Hattrup-Silberberg 2019). 37% of respondents would change car brands to experience enhancements in this regard (Bertoncello, Martens, et al. 2021). Furthermore, the targeted customer segment with a very high level of education and income can be shown to have increased environmental behavior, coupled with an increased environmental impact (BMUV 2023). Therefore, it is incumbent upon automakers to align with customer preferences and invest in pertinent technologies to distinguish themselves from the more affordable competition.

Technological (54361). The automotive industry is experiencing a substantial shift in its technological landscape, with EVs becoming primary platforms for integrating cutting-edge technologies due to their modern electrical architectures (Hrvoje, Babic and Podobnik 2019)

1) Integration of cutting-edge technologies and digital transformation: The integration of artificial intelligence (AI) and big data management in the automotive sector is revolutionizing vehicle functionality and customer interaction (Javaid, et al. 2022). The move towards more intelligent and responsive automotive solutions is exemplified by the use of AI in tracking vehicular data to predict maintenance or enhancing customer safety and service through chatbots and automatic braking and lane-keeping (Bertoncello, et al. 2021). Germany and China's considerable investment in research and development, amounting to 75 billion euros and 2 trillion yuan (256 billion euros) annually, demonstrates the commitment but also aggressive pursuit of technological improvements (UNDP 2021).

2) Emergence of autonomous and connected vehicle technologies: Advanced sensor technologies like LiDAR (Light Detection and Ranging), sophisticated camera systems, and improvements in external tech like 4G networks are driving the development of autonomous cars (Yeong, et al. 2021). As a result, the operation and interaction of cars with their surroundings is being revolutionized, making driving safer and more efficient (Kräuter 2023). The rise of connected car ecosystems is reshaping the whole driver experience by going beyond traditional functionalities, offering real-time interconnectivity and a seamless integration with users' digital lives (Miller 2022).

3) Digital sales and innovative revenue models: Many Original Equipment Manufacturer (OEM) are no longer focusing solely on the technological development of hardware, but are delving into the potential of software developments, including Software-as-a-Service (SaaS), and connected services (Simon Kucher 2023). The primary driver behind the strategy shift is the growing recognition of the value of vehicle data and the many opportunities it offers. McKinsey's research underscores the importance of data monetization in the automotive industry, highlighting that connected cars not only enhance the customer experience but also provide new opportunities for generating income (Bertoncello, et al. 2021).

Economical (54361). In the realm of the automotive industry, several economic factors play an important role in shaping market dynamics.

1) Decreased purchasing power: The pandemic brought significant disruptions to the automotive industry, including lockdowns, business shutdowns, and travel restrictions, resulting in a global economic recession (Brown, et al. 2021). In order to cope with these unpredictable and unstable market conditions, consumer behavior in the automotive market is adapting to the current economic climate. Many consumers anticipate a decline in their ability to afford vehicles, which has led to a greater focus on the purchase price and a stronger consideration of cost aspects than in the past (Simon Kucher 2023). At the same time, the pandemic also accelerated consumer demand, particularly for electric, connected, safer and more sustainable vehicles with advanced features (Brown, et al. 2021).

2) Government subsidies and incentives for EVs: As already mentioned in the political part, governments worldwide, particularly in Europe, have introduced financial incentives to promote electric vehicles. By offering subsidies, tax rebates, and other supportive measures, governments are actively lowering the cost barrier for consumers and businesses, encouraging the adoption of environmentally friendly and technologically advanced vehicles (Brown, et al. 2021). As a result, the automotive industry is witnessing a significant and accelerated shift towards electric and connected vehicles (International Energy Agency 2023).

3) Emerging economies in Asia and other developing regions: Developing countries like China, India, and nations in Southeast Asia have become crucial for automotive brands. Due to the cost-effective labor and lower production costs, they are an attractive location for multinational automotive companies to relocate production and manufacturing. These regions also represent vast consumer markets with significant growth potential (EU-ASEAN Business Council 2017). A growing number of emerging Asian car brands are conquering more than just their home market. So far, China has mainly tapped into Western markets by buying existing brands, but now they intend to bring their own brands to Europe (Campbell, White, et al. 2023).

Legal (54361). Ranging from regulations on automated driving to data protection norms, each legal aspect has a significant impact on how manufacturers design and implement new technologies and features within vehicles.

1) Automated driving regulations: The regulatory framework around automated vehicles, exemplified by Germany's Automated Driving Act, plays a crucial role in shaping the future of automotive interiors (Kriebitz, Max and Lütge 2022). The presence of the driver in automated vehicles required by this law has implications for the development and design of vehicle interiors, particularly the integration of autonomous technologies, control systems, seating arrangements and interactive interfaces. Compliance with these regulations becomes even more important the more autonomous components are integrated into the interior (European Commission 2022).

2) Data protection and privacy regulations: The evolving landscape of data protection and privacy laws in Germany strongly influences how automotive manufacturers approach the development of (in-car) connectivity and data systems. Car makers are required to negotiate difficult legal terrain due to strict rules, such as the General Data Protection Regulation (GDPR), which control the processing and storage of personal and vehicular data. This impacts the design and functionality of in-car infotainment systems, navigation aids, and other connected services (Kerber 2018).

3) Intellectual property rights and copyright issues: As automotive interiors become more advanced with unique designs, innovative technologies, and digital interfaces, the significance of intellectual property rights and copyright laws increases (Hahn, Preter and Wedgwood 2008). This is particularly relevant in the context of global operations where design and technology replication can lead to legal conflicts. Manufacturers must consider the possibility of copyright infringements while protecting the unique aspects of automotive interiors, from ergonomic designs to software interfaces, which affects design choices and partnerships (Davis 2020).

2.2 Megatrends and trends of the automotive industry (54361, 55661)

A megatrend can be defined as "an unavoidable progression that brings about shifts in society, business, economics, or the environment." (Eagar, Boulton and Demyttenaere 2014). Megatrends are characterized by their long-lasting impact and universal presence, transcending regional borders. They provide a solid basis for shaping business strategies that will remain relevant for decades (ZukunftsInstitut 2023). Within the dynamic landscape of global industries, the automotive sector is one of the most rapidly changing, driven by profound advancements that challenge the status quo (Simon Kucher 2023). The previous PESTEL analysis shows that macroeconomic forces are driving this evolution, leading to four key megatrends: Connectivity, Autonomous Driving, Shared & Services, and Electric – collectively known as CASE (Kuhnert, Stürmer and Koster 2018). Each component of CASE holds the potential to disrupt traditional industry paradigms. Furthermore, the growing commitment to environmental stewardship is embodied by the key trend of sustainability, which emerges as a non-technological yet influential megatrend (American-Chemistry-Council 2023).

Connectivity (54361). Within the CASE trends, connectivity is proving to be the dominant driver of change (Cäsar, et al. 2019). OEMs are aware of this fact and are actively striving to achieve cutting-edge status by allocating resources towards this technology, as our PESTEL analysis has shown. BMW defines a connected vehicle as a "car that can be linked to other services and devices via a network" (BMW 2018). A smart and connected vehicle can connect to the internet, share data, and communicate with its environment (EMQX 2023). This networking of cars can be divided into different categories (BMW 2018):

- **Vehicle-to-Infrastructure (V2I)** refers to the ability of vehicles to communicate with various infrastructural components, such as traffic lights, toll gates, and parking spaces.
- **Vehicle-to-Vehicle (V2V)** involves vehicles near each other in order to share data about their speed, direction, and position, helping prevent collisions and making driving safer.
- **Vehicle-to-Cloud (V2C)** means that cars send data to cloud-based systems for analysis. This can be used for traffic management, remote diagnostics, and over-the-air updates.
- **Vehicle-to-Pedestrian (V2P)** improves pedestrian safety by enabling vehicles to detect and communicate with pedestrians to prevent accidents.
- **Vehicle-to-Everything (V2X)** encompasses all forms of vehicular communication, whether it's with other vehicles, infrastructure, or any other entity.

The digital ecosystem that makes this connectivity possible falls largely within two domains: The Internet of Things (IoT) and Internet of Vehicles (IoV) (Kim, Jung and Kim 2021). IoT refers to the interconnectivity and data exchange between devices and systems. IoV, on the other hand, is an applied concept of the IoT. Here, the "things" are vehicles that build a network to provide applications like driver assistance, alerts, collision avoidance, and road navigation

(Borges, et al. 2020). Consequently, IoV is mainly concerned with V2V or V2I, whereas IoT is more general and relates to V2C and Vehicle-To-Device (V2D). To achieve this seamless connectivity, connected vehicles rely on a variety of wireless communication technologies, such as mobile phone networks (4G or 5G), which includes communication, internet, and/or cloud services or dedicated short-range communications (DSCR), Wi-Fi 6, and cellular-vehicle-to-everything (C-V2X) communication (Deng, et al. 2017).

Autonomous Driving (55661)**.** Autonomous driving is poised to revolutionize transportation in the future, but significant developmental strides are still essential. The prevailing consensus envisions fully developed autonomous vehicles navigating seamlessly without driver intervention. Recognizing intermediary stages is crucial for this progression.
To provide a structured framework, SAE International introduced a classification system in 2014, delineating six levels of automated driving from Level 0 to Level 5 (Shuttleworth 2019). This classification facilitates understanding and regulation of incremental advancements. German car manufacturers currently operate at Level 3, where the vehicle can temporarily assume the driver's functions, allowing engagement in other activities (Wienrich 2023). Legal considerations are crucial. Mercedes-Benz and BMW have obtained approval, surpassing Tesla's capabilities (Fasse and Hubik 2023). However, challenges arise from computing power, data transmission, and technical intricacies.
Despite a forecasted market volume of 300 - 400 billion dollars by 2035 (Deichmann, et al. 2023), the realization of fully autonomous driving faces delays due to the above-mentioned challenges. Consumers and manufacturers must endure a protracted period before the technology attains its full potential (Rudschies, Kroher and Wieler 2023).

Shared Mobility (55661)**.** Shared mobility encompasses both shared vehicles and shared rides (Statista 2023b). The former entails a communal transportation paradigm, wherein consumers relinquish ownership of vehicles and instead opt to rent them for typically brief durations. A prevalent form of this concept is "free-floating," wherein an extensive fleet of vehicles from a singular provider is dispersed throughout the city. It is imperative to note that shared mobility extends beyond vehicular contexts to include alternative modes such as bicycles or e-scooters, thereby falling under the umbrella term "micro mobility", specifically addressing the so-called last mile (Kaiser and Richter 2023).

The second form of shared mobility, commonly known as ride-sharing, entails the concurrent utilization of a vehicle by multiple passengers en route to a shared destination (Harbusch 2019). It is pertinent to acknowledge that while ride-sharing and alternative modes of transportation, such as bikes or scooters, represent noteworthy components of shared mobility, they lie beyond the purview of the present master's thesis and are consequently not elaborated upon in further detail. Empirical evidence underscores the validity of the identified megatrend: excluding pandemic-impacted years, the shared mobility market has consistently expanded, with China emerging as the principal sales market. Notably, in 2022, sales in China reached an impressive figure of nearly half a billion dollars, and further growth of approximately 13% is anticipated in the subsequent years (Statista 2023b). This trend poses a formidable challenge to traditional automotive manufacturers, given that China remains a paramount sales market where shared mobility exerts a discernible influence (Carlier 2023b). The advantages of shared mobility have now permeated consumer awareness. According to a conducted study, sustainability considerations constitute the foremost determinant for the adoption of shared mobility, closely followed by cost considerations (Köllner 2023).

Electric Vehicles (54361). At the IAA Mobility 2023, one of the most important automotive trade fairs in the world, electric mobility was undoubtedly the prominent focus topic. Electric vehicles were in the spotlight, underlining the industry's commitment to sustainability and the trend towards electric mobility (Philipp and Hohl 2023). The entire automotive industry is gradually transitioning from traditional internal combustion engine

(ICE) vehicles to fully battery electric vehicles (BEVs). According to Statista, sales of electric vehicles are expected to reach 17.07 million units by 2028 (Statista 2023a), capturing a 16% share of the global vehicle market in 2023 (Canalys 2023). As indicated by the PESTEL analysis, this rise in demand can be attributed to various factors. Firstly, the COVID-19 pandemic has put environmental concerns at the center of attention (Gersdorf, et al. 2020).

Secondly, the government has effectively implemented incentives by lowering the purchase cost and thus making them more accessible to the public (Rajaeifar, et al. 2022). Furthermore, this widespread adoption of electric cars is a necessary step towards achieving climate protection goals such as the new European Climate Law to make the European economy and society climate-neutral by 2050 (Woodward, et al. 2020). To meet the interim target of reducing net greenhouse gas emissions by 55% by 2030, the EU has even deemed a ban on the sale of new petrol and diesel vehicles necessary, which will come into force in 2035 (European Commission 2021). As emphasized in the social section of the PESTEL, the changing consumer perception and growing awareness of sustainability are also leading to the increasing popularity of electric cars (BMUV 2023). Two other notable benefits for EV drivers are lower maintenance costs and reduced need for spare parts. (Simon Kucher 2023). At the same time, however, these benefits mean a decline in aftersales revenue, forcing traditional OEMs to diversify their revenue streams (Alanazi, 2023). In the age of electromobility, new technologies are needed, which opens up opportunities for newcomers and threatens established companies whose core competencies are no longer needed (Altenburg, Schamp and Chaudhary 2016).

2.3 New revenue streams and differentiation factors (54361)

For all the megatrends and changes mentioned above, consumer sentiment and behavior have always proven to be crucial indicators in the automotive industry. Especially the loyal German customer is exceptionally demanding and has relied on German quality for decades. However, as the market becomes more fragmented, customer perceptions and prejudices towards foreign brands are also changing. For example, around 25% of premium customers are considering Chinese brands when buying a car (Mansouri and Torgull 2022). Especially in the era of electric mobility, German OEMs can no longer rely solely on their brand name. Technology and innovation are becoming an increasingly important factor (Svahn, Mathiassen and Lindgren 2017) and China's car manufacturers have become experts in electric driving technology over the last quarter of a century (Campbell, White, et al. 2023). All these factors - the changing consumer perception, new competitors, and current technological advancements - have forced the automotive industry to rethink their products and services and explore new revenue streams (Svahn, Mathiassen and Lindgren 2017).

While historically, vehicular innovation has primarily focused on technical engineering and exterior aesthetics, the details of the in-car driving experience are becoming increasingly important (Winkelhake 2019). Especially in the wake of electromobility, where cars are increasingly becoming alike, the driving experience inside the vehicle is not only becoming a new differentiating factor, but also a potential new source of revenue. McKinsey cites OTA Updates as the key influencer of the future interior experience resulting from the rapidly evolving CASE Trends. In addition, there is a growing need for alternative surface materials, as leather is becoming less popular, and customers are increasingly looking for environmentally friendly and ethically produced materials (Möller, et al. 2021). Figure A2 in the appendix summarizes all the forces that lead to the disruption of established business models and highlights the importance of new differentiating features.

While historically, vehicular innovation has primarily focused on technical engineering and exterior aesthetics, the details of the in-car driving experience are becoming increasingly important (Winkelhake 2019). Especially in the wake of electromobility, where cars are increasingly becoming alike, the driving experience inside the vehicle is not only becoming a new differentiating factor, but also a potential new source of revenue. McKinsey cites OTA

Updates as the key influencer of the future interior experience resulting from the rapidly evolving CASE Trends. In addition, there is a growing need for alternative surface materials, as leather is becoming less popular, and customers are increasingly looking for environmentally friendly and ethically produced materials (Möller, et al. 2021). Figure A2 in the appendix summarizes all the forces that lead to the disruption of established business models and highlights the importance of new differentiating features.Although the interior is one of the most important factors for the customer experience, German OEMs still have some catching up to do (Möller, et al. 2021). Therefore, the individual parts of this master thesis concentrate on the most important factors that can revolutionize the interior - connected services via OTA updates as well as eco-friendly leather alternatives. In doing so, the focus is specifically set on premium OEMs, as they are often pioneers in the automotive industry when it comes to the introduction of innovative technologies. In both individual parts, customer perception in the German market is discussed to provide strategic implications on how to revolutionize the interior of future vehicles. The scientific basis for this is an adapted technology acceptance model, which is explained in more detail below.

3. METHODOLOGY (54361)

Since its introduction by Fred Davis (1989), the Technology Acceptance Model (TAM) has been a foundational and widely used framework for understanding the acceptance, adoption, and utilization of new technologies in the business environment (Adams, Nelson and Todd 1992). Despite its popularity, TAM has been criticized for its simplicity and inability to capture certain elements of behavior (Cronbach 1951) (Burton-Jones and Hubona 2006) (Subramanian 1994). Many modifications such as TAM2 (Venkatesh and Davis 2000) and TAM3 (Venkatesh and Hillol 2008) have been proposed to address these issues. Nonetheless, the highest level of explanation was attained by the Unified Theory of Technology Acceptance Models (UTAUT and UTAUT2), two other extended TAM models. In the updated models, performance expectancy, effort expectancy, and social influence are the three main determinants that directly affect behavioral intention. To account for individual differences, the model further includes moderating variables such as gender, age, experience, and the degree of voluntariness in technology usage (Venkatesh, Morris, et al. 2003).

Salahshour Rad et al. (2018) have shown that the UTAUT theory has been widely used in many studies, with researchers often modifying the model by introducing new variables or substituting existing ones. The adaptation by Arogundade et al. (2016) also serves as proof of the model’s versatility, in which the TAM was redesigned to assess customers' willingness to pay for the development of secure software. While TAM models have shown to be very effective for studies on digital technologies, their application in the field of automotive functions has not been as comprehensive. One of the few applications of UTAUT in the automotive context is illuminated by the research of Osswald et al. (2012). They developed a Car Technology Acceptance Model (CTAM) that extends the UTAUT framework by including additional variables such as perceived safety and driver attitude. Considering the distinct challenges, opportunities, and evolving needs within the automotive sector, there's a clear and growing importance of adapted technology acceptance models. Moreover, as the PESTEL and trend analysis has shown, it is not only important to understand the acceptance for technologies, but also the willingness to pay for them.

In this study, we evaluate the willingness to pay for in-vehicle technologies using the UTAUT model as starting point. The decision is based on our intention to avoid discussing specific prices, and instead focus on the broader acceptance and willingness of consumers to invest in these technologies. We chose to streamline the model by removing cross-effect factors like gender, age, experience, and voluntariness of use (Figure A3) to achieve simplicity and focus. Our approach consists of developing two distinct CTAM models, each tailored to address specific aspects of the automotive sector. CTAM1 addresses connected services and OTA updates, while CTAM2 emphasizes the study and development of biomaterials based on the UTAUT2 extension, each explained in the individual parts. Both models incorporate new variables from competitor analysis and literature review.

4. BIO-BASED MATERIALS (55661)

4.1 Overview

The automotive industry employs a wide variety of materials, reflecting decades of research and development. The materials have evolved in terms of both quantity and quality since the early days of mass production, to meet customer demands and gain a competitive edge. A car can be divided into four components: exterior, interior, mechanical, and electrical parts. According to a report by the Center for Automotive Research, today's cars are mainly composed of steel (65%), aluminum (13%), plastic and other polymer composites (6%) and magnesium (4%). The remaining percentages encompass materials such as glass and adhesives (Modi and Vadhavkar 2019). These statistics may vary by some degree depending on the specific model, manufacturer, and target customer segment for which a given car is designed. The interior of an automobile can be subdivided into distinct segments: the dashboard, seats, flooring, and headliner, each composed of varying materials. To align with the focus of this master's thesis, subsequent chapters will be dedicated to the examination of automotive seats with a particular emphasis on bio-based leather substitutes.

As discussed at the beginning of this paper, the automotive industry has evolved significantly over the past century due to increased research and development efforts. As the industry is constantly changing and influenced by consumer preferences, automotive manufacturers are driven to explore sustainable alternatives to replace non-vegan materials (Taylor-Smith 2021). This is precisely where sustainable materials assume a pivotal role within the automotive sector. Due to the limited number of pages and the large variety of different materials, only bio-based leather substitutes are examined in this paper, which will be explained in more detail.

4.2 Comparison of leather with bio-based leather alternatives

In the context of this master's thesis, the primary focus is on two materials commonly employed in the manufacturing of automotive seats: traditional leather and synthetic leather. Traditional leather primarily consists of processed cowhide, while synthetic leather encompasses distinct subcategories, notably synthetic leather, made from fossil-fuel-derived components like Polyurethane (PU) or Polyvinylchloride (PVC), recycled plastics, and leather imitations, exclusively derived from 100% bio-based resources (Motavalli 2022). This master's thesis is specifically centered on investigating and analyzing bio-based materials within the automotive seating context.

4.2.1 The manufacturing process of conventional leather

Before leather reaches the familiar state that the end customer recognizes, it passes an extensive manufacturing process. Since the focus lies on bio-based materials, this section roughly describes the various process steps in leather production. The first step is the procurement of raw materials, with the majority coming from cattle. Once obtained, the hides are preserved to prevent decay of the raw hides. The leather is then tanned to ensure resistance to moisture and wear. Subsequently, the intermediate product undergoes a splitting process in which different types and levels of quality are achieved within the leather. Afterward, the leather is dyed to achieve the desired color, and in the final step, it undergoes additional treatments to acquire the desired properties (LEATHERNATURALLY 2023). It should be noted that the manufacturing process may vary slightly from manufacturer to manufacturer.

4.2.2 The manufacturing process of bio-based substitutes

The manufacturing process for bio-based alternatives cannot be standardized, as different manufacturers employ diverse methods to produce imitation leather. Additionally, the array of used raw materials results in significant product variation, with each bearing its unique characteristics. Thanks to dedicated research and development endeavors, imitation leather can now be derived from an extensive range of sources. These encompass raw materials such as oranges, coconuts, cacti, and apples, reflecting the remarkable diversity in contemporary production possibilities (Motavalli 2022).

The companies where the manufacturing process is described in more detail were selected on a few criteria. It should be noted that many more companies produce imitation leather from bio-based raw materials. Natural Fiber Welding with its product "MIRUM" as well as the company Desserto with its product "Dessertex" and “MYLO” by Bold Threads are relevant for this master thesis because, on the one hand, they rely on 100% bio-based materials in the manufacturing process and do not use or add any plasticizers, whether recycled or not. On the other hand, these companies already have successful partnerships with BMW (Diianni and DeGirolamo 2021) and Mercedes-Benz, two of the largest German car manufacturers in the premium segment as well as proven concepts, that their technology and product is suitable for the automotive industry (DESERTTEX 2023a).

4.2.3 MIRUM® by Natural Fiber Welding

MIRUM represents a distinctive imitation leather product, setting itself apart through its exclusive reliance on 100% natural raw materials, thus avoiding the necessity for plasticizer additives or other synthetic inputs, a distinguishing feature among peers in the industry. The primary constituents of this product encompass fibers and fillers derived from agricultural waste, specifically coconut and rice hulls, complemented by naturally occurring rubber, and a structural colorant responsible for its pigment without recourse to poorly compatible or ecologically detrimental chemicals and microplastics. During production, these raw materials are blended without the need for additional water supply, a stark contrast to traditional leather-making. To confer the desired texture and form to the semi-finished product, a natural fabric backing is applied, firmly bonded together with the aid of natural rubber. Importantly, MIRUM is 100% recyclable, reflecting their commitment to sustainability (MIRUM 2023). When considering CO_2 emissions, it is noteworthy that the final product of NFW performs exceptionally well compared to other synthetic leathers. According to their measurements, depending on the variant, one square meter generates 0.8 – 2.1 kg of CO_2 emissions. In contrast, petroleum-based synthetic leather registers CO_2 emissions ranging from 7 – 15.8 kg per square meter (NFW 2022).

4.2.4 DESERTTEX® by DESSERTO

DESERTTEX represents an innovative development by the company DESSERTO, whereby synthetic leather is derived from the processing of nopal, a cactus species indigenous to Mexico. In the process, the company has managed to achieve a remarkable semblance between the texture of DESERTTEX and that of genuine leather. In the production process, mature cactus leaves are harvested and cleaned. Subsequently, these leaves are subjected to a proprietary blending process, following which the intermediate material is dried for three days. Post-drying, the material is molded, imparted with the desired texture, and colored utilizing environmentally friendly chemicals. The ultimate product is both biodegradable and characterized by a longevity of up to a decade, thereby underpinning the company's commitment to delivering a sustainable product (DESERTTEX 2023b). Another advantage arising from the use of synthetic leather made from cacti is the minimal water requirement during plant growth, coupled with the plant's ability to absorb CO_2 from the environment. Furthermore, cacti thrive in regions that provide limited nutrients for other species, thus avoiding disruption to the ecosystem during cultivation. Additionally, no pesticides or other chemicals are employed in the cultivation process (Charter, Pan, Black 2023). Similar to NFW, DESSERTO has conducted an early Life Cycle Assessment. Three noteworthy points include: (1) in comparison to traditional leather production, which generates approximately 27.3kg of CO_2 per square meter, synthetic leather only produces 1.39kg of CO_2, (2) it requires only 0.03 m^3 of water per square meter produced synthetic leather (leather production: 32.95 m^3), and (3) the company operates as a carbon-negative farming entity. The current 14 acres of cultivation absorb 8,100 tons of CO_2 annually, while DESSERTO emits only 15.3 tons of CO_2 annually (DESSERTO 2023).

4.2.5 MYLO™ by Bold Threads

The third manufacturer of significance in this study is the company Bold Threads with their product MYLO, which is already partnering with Mercedes-Benz (Bold Threads, Inc. 2022). The synthetic leather is produced from mycelium cells, which form the foundation of fungi. The manufacturing process for this product is relatively straightforward. The mycelium cells are cultivated in vertical farming houses, and after about two weeks, they are harvested as a foamy intermediate product. This intermediate product is then processed and dried to prepare for the final step which is identical to that of other products or real leather, where the product acquires the texture and color of genuine leather (Bold Threads, Inc. 2023a).

Currently, the product is made of 80% bio-based content but still contains added plastic, preventing MYLO from being fully biodegradable, while adhering to the Green Chemistry Principles. However, efforts are currently underway in the manufacturing process, with ongoing research aimed at offering a 100% environmentally friendly product in the future.

The Green Chemistry Principles observed by the company include, "using renewable feedstocks," which is ensured by the use of mycelium cells, "preventing waste," where the remnants of the feedstocks are composted, and "increasing energy efficiency," with Bold Threads relying on 100% renewable energy (Bold Threads, Inc. 2023a). For interested readers, all Green Chemical Principles can be found on the website of the United States Environmental Protection Agency (2023). Throughout the entire manufacturing process, care is taken to ensure that both the supply chain and the process itself, as well as external factors, are made as environmentally friendly as possible. These ethical fundamental issues will be further explored later in the thesis. Note: As of now, no reliable figures regarding specific CO_2 emissions have been released by Bold Threads.

4.3 Status quo of bio-based leather applications

To formulate strategic recommendations at the end of the master's thesis, it is imperative to assess the current situation. The focus will be on the three German premium manufacturers, namely Audi, BMW, and Mercedes-Benz, as well as the foreign and emerging brands Tesla, NIO, and BYD. Particularly, the three foreign brands are acknowledged as technological pioneers and trendsetters. However, other automotive manufacturers are emphasizing sustainable materials. These manufacturers either do not pose competition in the targeted segment or lack significance in terms of market presence or strategic orientation, given the primary focus on the German market of the thesis. The following representation provides an overview of current standards and future visions. It is important to note that the focus continues to be on synthetic leather, which largely avoids various polymers and predominantly relies on natural resources such as coconut fibers, cacti, or mushrooms.

BMW can be considered as pioneer among German automakers in terms of bio-based leather. As of now, BMW has positioned itself for a leather-free future with investments in companies such as NFW and DESSERTO (BMW GROUP 2022). The new BMW 5 Series, introduced to the market in 2023, also impresses with an interior and seats based on 100% vegan materials (Benny 2022). Mercedes-Benz is also committed to a leather-free future. Consequently, they have introduced an interior with sustainable materials in their Vision car EQXX. In the future, the brand will collaborate with DESSERTO and Bold Threads to offer bio-based leather seats (Markus 2022).

Audi, on the other hand, is currently pursuing a somewhat divergent approach. The automobile manufacturer from Ingolstadt is placing increased emphasis on seat covers manufactured through the recycling of PET bottles and is providing additional leather alternatives. It is noteworthy, however, that these alternatives fall outside the scope and criteria of this study (Prengel 2021).

In the analysis of foreign companies, a different perspective emerges in comparison to the German counterpart. For instance, in the case of NIO, it is currently undisclosed whether the brand utilizes or has future plans for bio-based leather. BYD states its intention to offer sustainable vegan leather in models like the "Atto3"; however, specific details regarding the materials employed by the manufacturer remain elusive (BYD Europe B.V. 2023). Upon closer examination of Tesla, it becomes apparent that the American automaker indeed opts for vegan leather, albeit composed of various polymers, thereby raising questions about the sustainable aspect (Muaddi 2022). Furthermore, an inspection of the manufacturer suggests that these are likely seats constructed from polymers (Ultrafabrics 2023). Additionally, recent reports in various forums have surfaced regarding subpar quality and issues with blistering (Tannins 2021).

At present, it is assertible that German automotive manufacturers dedicate a more substantial allocation of time and financial resources to the exploration of authentic bio-based leather alternatives compared to their international counterparts. The feasibility of bio-based leather alternatives as a distinctive element relies on confirming the hypothesis in the subsequent survey of this study.

4.4 Fundamental considerations regarding the application of bio-based leather

In principle, the pursuit of alternatives to traditional leather is deemed meaningful due to its considerable environmental impact. This impact is not only related to the use of environmentally harmful chemicals in the leather tanning process but, more significantly, to the adverse effects associated with animal farming. Several critical aspects need to be emphasized. Even before leather processing begins, a substantial amount of CO_2 emissions is released into the environment through animal breeding. While these animals are primarily bred for consumption, this factor must be taken into consideration. Another contributing factor to a heightened carbon footprint is associated with the transportation of animals or their by-products. In addition to the already unfavorable climate impact, there are further considerations such as wastewater treatment, energy consumption, and end-of-life utilization (United Nations Industrial Development Organization 2017). Furthermore, it is noteworthy to consider the commercial deforestation of forests, particularly prevalent in South America, where more than 70% of deforestation is ascribed to the establishment of pastures for livestock cultivation (De Sy, et al. 2015).

Understanding the procedure underlying the genuine product is crucial before the sustainable impact of substitutes and imitations can be truly comprehended. Consequently, bio-based leather can only serve as an alternative if attention is given to the carbon footprint associated with the end product. Therefore, reliance has been placed on the three aforementioned companies, as they largely or entirely rely on natural raw materials. Conventional synthetic leather is mostly produced from PU or PVC, with recycling being scarcely feasible, if at all. Additionally, the included plasticizers can be classified as potentially hazardous to health (Graven 2020). Neither the environment, the company, nor the consumer benefits if vegan imitations have a worse carbon footprint than natural leather or synthetic leather-based on plastics. This includes the necessity for manufacturers to pay attention to aspects such as wastewater treatment, energy consumption, and end-of-life utilization. Ideally, no forests should be cleared for cultivation, nor should monocultures be established for it to be truly considered sustainable.

To avoid greenwashing, suppliers of vegan leather must be held accountable for investing resources in the development specifically aimed at addressing the aforementioned issues. It is essential for automotive manufacturers, as purchasers of bio-based leathers, to work with the following models and tools to ensure a sustainable outcome:

1) Circular Economy. The Circular Economy paradigm involves a concerted effort to diminish CO2 emissions through the utilization of sustainable primary raw materials and the recycling of secondary raw materials. This model fundamentally seeks to eradicate waste and amplify the recycling quotient, thereby enabling the repeated reuse of products and their constituent materials (Foundation 2023). A comprehensive examination of the entire process, spanning raw material selection, design, and manufacturing, extends to encompass maintenance and post-lifecycle reuse (Verband der Automobilindustrie 2023). Crucially, collaborative endeavors between automotive manufacturers as principal consumers and bio-based leather manufacturers are imperative. The objective is to devise methodologies and solutions conducive to material reuse, particularly post-lifecycle. Presently, the automotive industry exhibits a modest degree of Circular Economy; however, the aspiration is to evolve into a state of full circularity by the year 2035 (Lacy, Reers and Holst 2021). Notably, manufacturers such as those aforementioned (NFW, DESSERTO, and Bold Threads) can significantly contribute to advancing this paradigm.

2) Life Cycle Assessment. Within the Circular Economy framework, only the origin and processing of materials can be delineated. Additional assessment methods are required to measure the actual impacts and emission reductions. In this context, the Life Cycle Assessment (LCA) plays a crucial role, in quantifying energy consumption, selected materials, and, to some extent, waste disposal. Key components of an LCA include defined objectives and a life cycle inventory, collecting data such as energy usage and resource consumption during the manufacturing process, and material utilization. Moreover, potential impacts must be defined, and assessed, and the results benchmarked. (Jensen, et al. 1998) The Life Cycle Assessment is detailed in ISO 14040:2006 (International Organization for Standardization 1997).

3) Standardized processes and regulations. While the Life Cycle Assessment is standardized by ISO 14040:2006, it is not precisely defined which data should be included in the analysis. Even official indices such as the Higg MSI are frequently criticized for their lack of transparency (Hudson 2023). Therefore, independent organizations are required to establish and publish standardized, cross-sector, and transparent reporting to enable genuine comparisons. This is particularly crucial for consumer protection.

4.5 Data analysis on consumer perception of bio-based materials and results

To determine how automotive manufacturers in Germany can position themselves against increasing competition from abroad, it is important to understand how domestic customers feel about the automotive industry in general and how they welcome changes and new trends in the automotive industry. As mentioned at the beginning of this paper, consumer behavior has changed significantly since the pandemic, with sustainability playing a more important role in everyday life and in the products they buy (Kraljic 2021). A movement toward sustainable products and behavior could also be identified in Germany, as McKinsey has examined (McKinsey 2021). Discussions surrounding the automotive industry are particularly strong. This chapter attempts to find out whether these changes in consumer perception can also be observed in the automotive industry, in particular concerning sustainable materials in the interior, and whether German car manufacturers in the premium segment should increasingly rely on sustainable materials in the future to distance themselves from the growing influence of foreign competitors.

4.6 The CTAM2 Model

The CTAM2 model used in this thesis is a derivation of the UTAUT2 model, which is an advancement of the UTAUT model. In this context, the variables *hedonic motivation, price value, and habit* have been added to the existing variables (Venkatesh et al. 2012).

Bio-based leather alternatives, while not a pure technology in the traditional sense, have been made production-ready through recent technological advancements. Other studies have already demonstrated that the UTAUT or UTAUT2 model must also be applied to related domains that do not solely represent pure technology (Chuang, Chen and Chen 2018) (Kauschke 2020).

Since the CTAM2 model, like its predecessor CTAM, underwent some adjustments in the preceding section, only the variables *Expectation of Performance* and *Hedonic Motivation* are retained from both models UTAUT and UTAUT2. Additionally, *Effort Expectancy* is replaced with *Luxury Perception*. Subsequently, the defined variables are examined to determine the extent to which they influence willingness to pay (WTP).

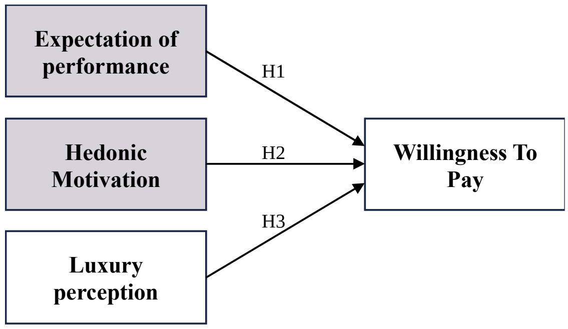


Figure 1 CTAM2 Model: Integration of New Variables from Competitive and Literature Insights (The grey determinants are inherited from the UTAUT/UTAUT2)

4.7 General conclusions about the perception among participants

The survey was completed by 104 individuals within two weeks. In part of the survey, the aim was to determine the extent to which potential buyers were familiar with bio-based leather and the direction of their purchasing behavior. Based on the responses from 104 participants, noteworthy conclusions can be drawn:

1) General preferences. The introduction explores the fundamental preferences individuals consider when buying a car, including features and powertrain. The results indicate that price (89.7%), comfort (72.9%), and advanced technology (64.5%) are crucial factors influencing customers' purchasing decisions. Furthermore, the majority of participants expressed the possibility of considering an electric car for their next purchase (58.9%), followed by a hybrid (50.5%), and a gasoline engine (49.5%).

2) Sustainability and awareness in daily life. The second set of questions focuses on participants' environmental consciousness. Only 33.6% of respondents indicated that they actively consider sustainability in their daily lives, with a significant portion (54.2%) expressing partial awareness. For 57% of participants, it is at least somewhat likely that they would choose a car based on sustainability and environmental friendliness. A conducted regression analysis reveals that the attitude toward sustainability in daily life has a positive influence ($\beta = .592$, $p < .001$) on choosing a more sustainable car and holds sufficient significance. Two-thirds (60.8%) of respondents express a desire for the use of sustainable and environmentally friendly materials in the automotive industry, with transparency regarding the origin of materials considered desirable by just under half (49.5%). The enacted Supply Chain Due Diligence Act (german: Lieferkettensorgfaltsvorschriftengesetz), set to take effect on January 1, 2024, can contribute to further strengthening consumer awareness (BMAS 2023). This is particularly beneficial for automotive manufacturers in the long run, as they deal with a vast number of diverse suppliers and current control measures are challenging (see expert interview A20).

H1: Participants with a higher level of environmental consciousness are more likely to express a willingness to pay a premium for bio-based leather seats.

3) Concerns about the quality of bio-based leather in the automotive interior. In the third section, respondents were encouraged to articulate their impressions and perceptions regarding the quality and comfort of bio-based leather. In principle, 63.6% of respondents have heard of synthetic leather. Only 11.2% are of the opinion that synthetic leather cannot provide the same level of comfort as its genuine counterpart. A low p-value ($p = 0.526$) and a low R-value (0.004) suggest that the opinion about comfort cannot be solely attributed to individuals having heard about synthetic leather or perhaps having personally tested it. External factors such as hearsay or strategic marketing placements could be investigated in a subsequent survey to explore a potential correlation, which could also explain the high percentage of respondents expressing a preference for the same comfort as genuine leather. For 57% of respondents, a similar appearance of artificial leather is deemed important. These expectations seem to align with the efforts of the aforementioned companies, evident in their substantial research endeavors aimed at achieving a similar aesthetic. In contrast to the hitherto positive feedback, respondents are divided on the aspects of durability and high quality: only 45.8% have expressed a preference in favor of these attributes.

H2: Positive perceptions of bio-based leather quality are associated with a higher willingness to pay among respondents.

4) Perception of bio-based leather seats as a luxury item. The final segment seeks to elucidate how synthetic leather is perceived as a luxury product.

Given the focus of this master's thesis on strategies for differentiation among German premium manufacturers, it becomes crucial to delve into the perception of synthetic leather. A substantial 62.6% of respondents believe that vehicles can retain their luxurious status. Furthermore, a significant 66.4% express the view that German automakers should fundamentally consider replacing genuine leather with bio-based alternatives. Through a thorough analysis, a clear correlation surfaces, supported by a low p-value (<0.001) and an R-squared value of 0.175. These statistical indicators underscore the model's significance, establishing a meaningful association between luxury status and the exclusive adoption of synthetic leather.

H3: Participants who associate bio-based leather with luxury are more willing to pay a higher price for it.

4.8 Data analysis and results

The data analysis in this chapter was performed using the IBM SPSS Statistics 29.0 software package.

Construction of the variables. In the survey, questions were posed concerning the three domains described in the CTAM2 model. Furthermore, various ranges were defined for Willingness to Pay, inquiring whether and to what extent participants would be willing to pay a premium for bio-based leather seats. Incorporating individual variables with the inquiry into willingness to pay, an attempt was made to ascertain whether this could be a viable strategy for German premium OEMs.

Reliability & Consistency. To test and ensure reliability, an analysis based on consistency was conducted. Two Pearson correlations were performed for *Expectation of Performance (EP)* and *Luxury Perception (LP)* and the *Hedonic Motivation (HM)* underwent a Cronbach's Alpha test. A detailed overview is found in A22. The variables for EP (Expectation of Performance) exhibit a positive correlation (0.338; $p < 0.001$) and are significant. Similarly, the relationship of individual items in LP (Luxury Perception) proved to be significant with a positive correlation (0.418; $p < 0.001$). The Cronbach's alpha test for HM (Hedonic Motivation) revealed strong support for the reliability of the employed scale for evaluating sustainable lifestyles and material choices. The calculation of Cronbach's Alpha yielded a satisfactory value of 0.858, indicating a solid to good internal consistency of the four items.

Descriptive statistics. In the next step, individual items are combined to form statistical constructs, using means derived from the items. A23 detailed summary statistics for these variables, including means, standard deviations, and observations. These statistics provide insights into variable distribution and central tendencies. *EP_Sum*, *LP_Sum*, and *HM_Sum* have relatively narrow ranges, indicating constrained participant responses. Conversely, the WTP variable shows a wider range, suggesting more variability.

Subsequently, the newly formed variables will be subjected to a correlation analysis to elucidate their interrelationships. Following this, a linear regression analysis, coupled with an examination of Willingness-to-Pay, will be conducted to ascertain the influence of the parameters on WTP and to prognosticate potential variations.

Correlation. The correlation analysis revealed interesting insights into the relationships between each variable and WTP. For *EP*, there was a significant positive correlation of 0.282 ($p = 0.004$) with WTP. *LP* also exhibited a positive correlation of 0.221 ($p = 0.024$). *HM*, on the other hand, displayed a stronger positive correlation of 0.403 ($p < 0.001$), also found in A24. These results imply that as the scores for Expectation of Performance, Luxury Perception, and

Hedonic Motivation increase, there is a corresponding tendency for participants' pricing perceptions to increase.

Regression. The multiple linear regression analysis aimed to explore the combined impact of the variables *HM*, *EP*, and *LP* on participants' pricing perceptions (WTP). The overall model was statistically significant ($F = 7.059$, $p < 0.001$), indicating that the predictors collectively explained a significant proportion of the variance in WTP (A25).

The standardized coefficients (Beta) provided insights into the relative contribution of each variable. *HM* (*Hypothesis 1*) exhibited the strongest positive impact (Beta = 0.383, p = 0.001), suggesting that participants' perceptions of sustainable automotive features significantly influenced their pricing perceptions. *EP* (*Hypothesis 2*) demonstrated a positive but less influential effect (Beta = 0.138, p = 0.230), while *LP* (*Hypothesis 3*) had a negligible negative impact (Beta = -0.084, p = 0.495). Therefore *H3* cannot be confirmed.

In summary, the regression analysis suggests that participants' perceptions of sustainable automotive features, particularly *HM*, are crucial in influencing their pricing perceptions. While EP also contributes positively, *LP* appears to have a limited impact on pricing perceptions. A detailed overview can be found in A26.

Research limitations and suggestions for further research. For future research, it would be beneficial to inquire more precisely about participants' demographics and further align the questionnaire with the UTAUT2 model to create an even more comprehensive understanding. Additionally, in other areas, investigations into pricing strategies and maturity planning toward the production readiness of bio-based materials could be conducted.

5. DISCUSSION AND CONCLUSION (54361, 55661)

At the outset of the thesis, the question arose concerning how German premium automakers could strategically position themselves amid intensifying competition. Our thesis journey navigates through a complex landscape of innovation, customer expectations, and market dynamics, culminating in a coherent strategy tree that encapsulates our findings and recommendations for German OEMs which can be found in appendix A27. Branching out, it identifies vehicle and business model differentiation as key hypothesis. Following extensive literature research, the strategic focus areas of software integration, hardware innovation and service subscription were selected in order to identify practicable differentiation strategies based on the megatrends of connectivity and sustainability. To assess the various approaches, a survey was conducted to determine the extent of customer approval for these innovations and to predict the willingness to pay. Our results also confirm that the developed CTAM models provide representative results. Thus, the study contributes to academic knowledge by extending the UTAUT(2) model and tailoring it to the context of the automotive industry. Based on the findings of this work, the innovation initiatives SOTA and FOTA updates, advanced material usage and subscription models were selected. In the following discussion, strategic recommendations are given on how OEMs can differentiate themselves by creating a symbiosis between connected services and sustainability.

Connected Services via OTA-Updates (54361)**.** The main objective of the individual part was to identify the factors that influence consumers' willingness to pay for connected services via OTA updates. It was found that personalization, social influence in the community and incentives were not statistically significant. In the broader context of consumer preferences, they are nevertheless relevant and shouldn't be ignored in ongoing research. However, this discussion and its practical implications focus on the key insight *flexibility in payment models*.

Differentiation factor. Connected services via OTA updates represent a rapidly evolving landscape in the automotive industry. While these connected services are now already an expectation among consumers and no longer stand alone as differentiators, the way in which they are offered – particularly in terms of payment flexibility – can create a unique competitive advantage. By offering various payment options, such as one-time payments, subscriptions, or dynamic leasing, OEMs address a broader range of consumer preferences.

New revenue stream. This flexibility in payment models can transform connected services via OTA updates from a standard offering to a lucrative revenue stream. Our survey analysis indicates that consumers show greater readiness to invest in services that align with their individual preferences. As the expert interviews have confirmed, the dynamic leasing model, in which OTA functions are integrated into vehicle's leasing contracts, is proving to be an effective solution. Customers can activate or deactivate features as needed, with corresponding adjustments in the leasing rate. This model offers a double advantage: It serves as a unique market differentiator, given its novelty among OEM offerings, and it taps into new revenue streams by aligning with what consumers are willing to pay for. To meet consumers' desire for more financial flexibility and develop this dynamic model with innovative payment options, German OEMs need to reprioritize and place a stronger focus on digital products and services. This is the only way to overcome the emerging challenges and get ahead of the competition. The detailed strategic recommendations can be found in the appendix A28.

Bio-based leather alternatives (55661). The findings on bio-based leather can be divided into two main areas:

(1) The literature review and an expert interview revealed that current bio-based leather products are far from being ready for mass production. Secondly, external factors were identified that must be considered in the production of bio-based leather. It is crucial to ensure that the manufacturing process does not exacerbate other environmental factors. This includes considerations such as the use of water and energy resources, the addition of toxic materials, and the intelligent utilization of cultivation areas. For instance, a hypothetical scenario illustrates that cultivating raw materials may be counterproductive if it requires extensive land use, thereby negatively impacting biodiversity.

(2) German automotive manufacturers should expand their investments and collaborations to secure a competitive advantage over foreign competitors in the future. It is crucial to early on embrace the comprehensive use of sustainable materials such as bio-based leather and eliminate plastics and genuine leather from the interior. The top three reasons for this strategic recommendation are:

Differentiation factor. As the research has revealed, German automotive manufacturers are currently most actively involved in the research and development of sustainable materials. Foreign manufacturers, especially those with a focus on the German market, currently show minimal efforts in dealing with sustainable materials. One reason for this is undoubtedly the competition's emphasis on convincing through price, which is not feasible when opting for the usage of more expensive bio-based materials.

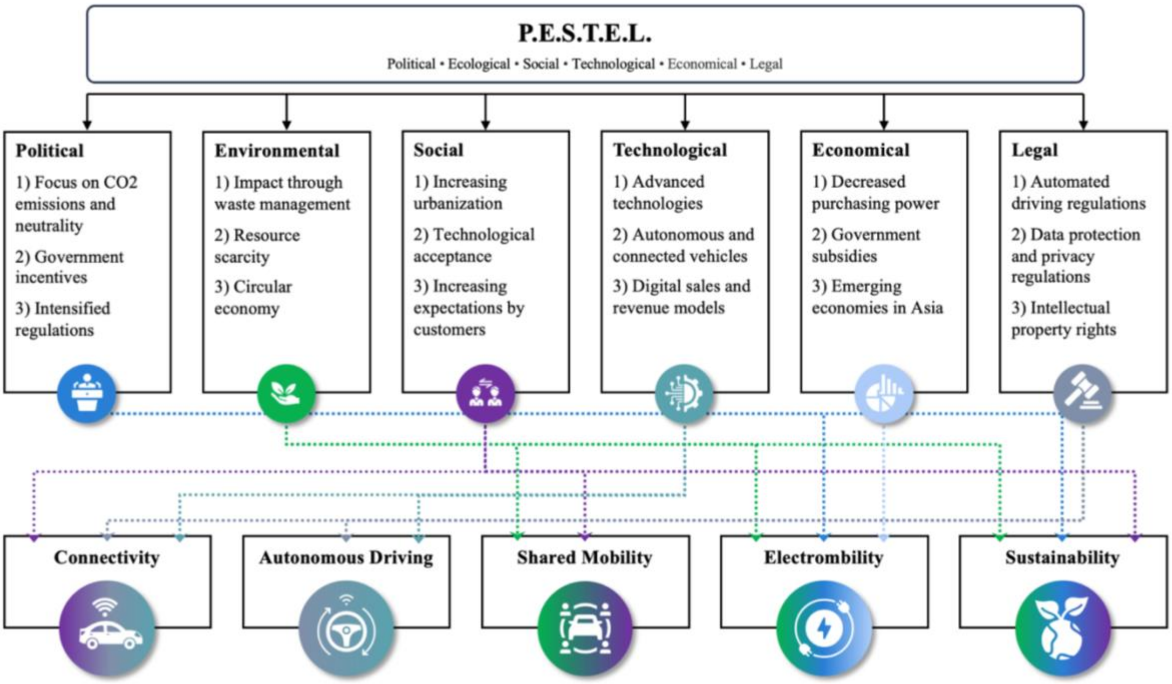
Consumer acceptance. Based on the survey evaluations, it has been found that 63.6% of respondents have already heard of bio-based leather or other synthetic materials and largely associate positive attributes such as the same comfort (88.8%) with them. Additionally, it is interesting for premium manufacturers that 62.6% believe that a car with integrated bio-based leather alternatives continues to be a luxury product.

Willingness to pay. The analysis of the modified UTAUT2 model with Expectation of Performance and Hedonic Motivation has revealed that they increase the willingness to pay (WTP), primarily driven by Hedonic Motivation. This implies that, especially influenced by personal inclination and attitude toward a sustainable lifestyle, there is a greater readiness to pay a premium for bio-based leather in the interior. It is also assumed that this trend will persist, as sustainability continues to play an increasingly significant role in daily life.

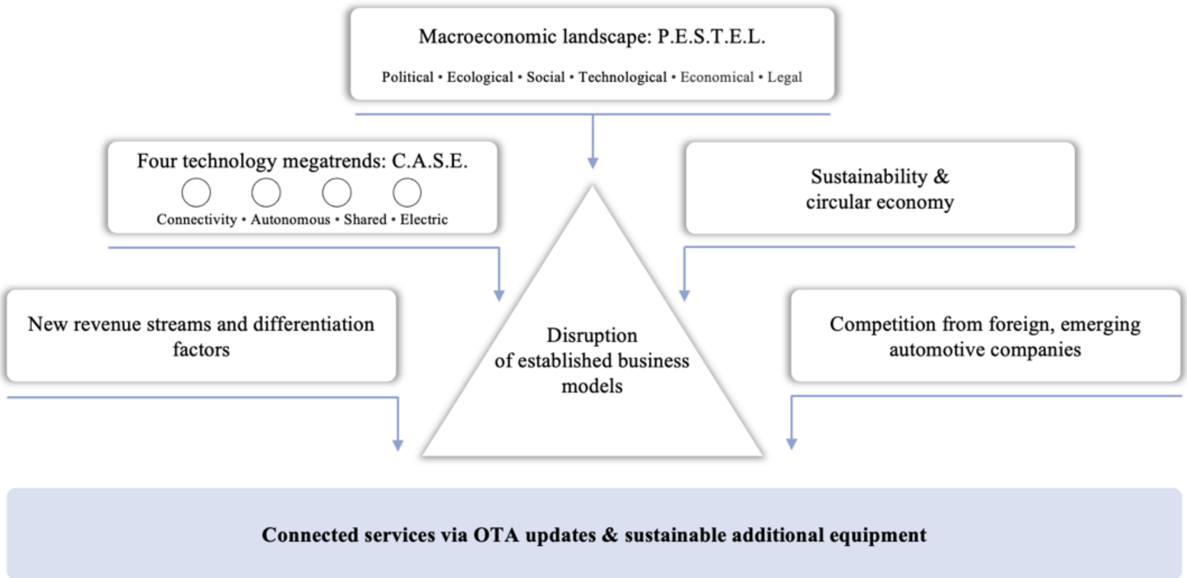
Conclusion (54361)**.** The journey of this study culminates in a clear message: For German OEMs to maintain their esteemed position in the global automotive arena, embracing innovation is not just an option, but a necessity. The agility of Chinese OEMs in adopting customer-centric and sustainable business models starkly contrasts the more cautious approach of their German counterparts. This disparity is not a question of capability but of organizational adaptiveness and the willingness to break from tradition. In the face of rapid technological evolution and shifting consumer preferences, German OEMs must pivot from their tried-and-tested paths. It's time to dismantle internal barriers, rethink contractual frameworks, and foster a culture that prioritizes innovation as much as engineering excellence. This strategic metamorphosis is not merely about staying relevant; it's about leading the charge in a dynamic, ever-evolving industry. As this thesis concludes, it leaves behind a pivotal thought for German automakers: The race in the automotive sector is accelerating, and winning it demands more than just speed – it requires the courage to innovate and adapt swiftly.

APPENDIX

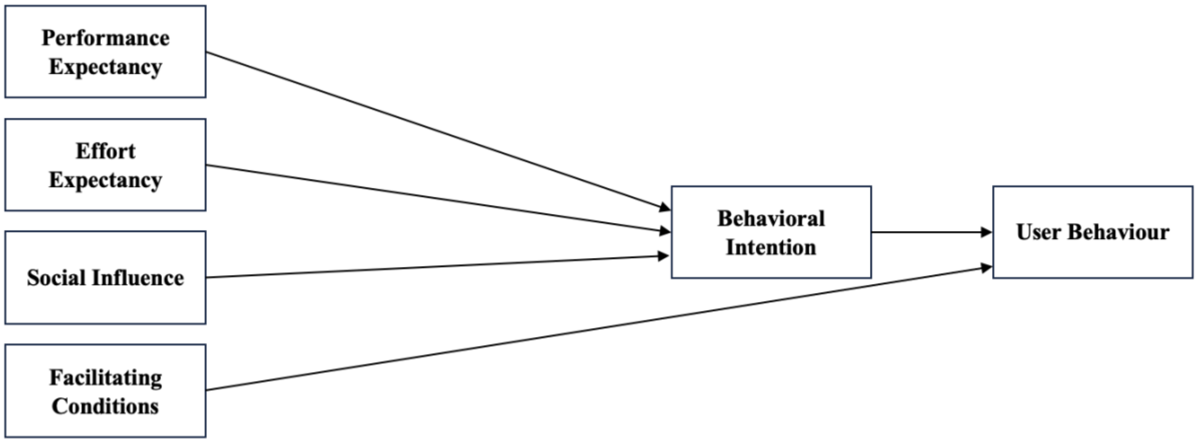
A1. Emergence of the most important megatrends in the automotive sector from macroeconomic events.



A2. Dynamics challenging established automotive business models and emerging revenue streams in connectivity and sustainability.



A3. A unified framework of acceptance and use of technology – UTAUT without the moderators of gender, age, experience, and voluntariness of use (Source: Venkatesh et al. 2003)



A4. Excerpt of Tesla's FOTA and SOTA services and costs (Source: Zhao and Jiang 2021)

	Services	**Content**	**Charges**
FOTA (Firmware Over-The-Air)	Full Self-Driving (FSD)	Auto range changing, auto-parking, smart summoning, etc.	Buyout: $15000 Subscription: $99/$199 per month
	Media Control Unit	Games, theater mode, cellular network, etc.	$1500
	Home Charging	J1772 wall connector	$550
	Acceleration	0.5 seconds reduction in 100 km	$20000
SOTA (Software-Over-The-Air)	Standard Connectivity	Navigation	Free for eight years
	Premium Connectivity	Navigation, traffic visualization, sentry mode, video streaming, music streaming, internet browser etc.	$9.99 per month

A5. Tesla's connectivity packages with its available features (Source: Zhao and Jiang 2021)

Connectivity Packages	**Standard**	**Premium**
Navigation	X	X
Live Traffic Visualization		X
Sentry Mode – View Live Camera		X
Satellite-View Maps		X
Video Streaming**		X
Caraoke*		X
Music Streaming**		X
Internet Browser*		X
Features subject to change and may vary based on hardware configuration *Currently available over Wi-Fi for Standard Connectivity **A paid subscription to streaming services is required to access music and media streaming		

A6. NIO's connectivity product portfolio with its available features (Yahoo Finance 2022).

NIO Connected Services
NIO Autonomous Driving (NAD)
NIO Pilot
Emergency Active Parking Assist (EAS)
Emergency Lane Keeping (ELK)
Advanced Driver Monitoring System (ADMS)
Power Station Parking Assist (PSAP)
Autonomous Driving Functions
NIO's smart cockpit is equipped with the NOMI in-vehicle artificial intelligence system. With this, NIO car owners can communicate with other people and vehicles through NOMI.

A7. Constructs used in the proposed model, their correspondence with the questionnaire items, and their reference source.

Construct	Variable ID	Description/Question wording	Theoretical background
Flexibility	FL1	How appealing is the flexibility to have the option to purchase car features with a one-time payment or subscription-based model? (1-5 scale)	Flexibility in payment options significantly influences consumer decisions (Al-Shihi, Sharma and Sarrab 2018).
	FL2	How appealing is the option to activate hardware features in a subscription model? (1-5 scale)	
	FL3	How appealing is the option to activate hardware features in a leasing model? (1-5 scale)	
Personalization	PE1	How important is the ability to personalize your car's features to you? (1-5 scale)	Personalization as a key driver for willingness to pay in-vehicle infotainment systems (Mihale-Wilson, Zibuschka and Hinz 2019; Jiang et. al 2021)
	PE2	How likely are you to pay for advanced features that enhance personalization? (1-5 scale)	
Social Influence in Community	CE1	How much does being part of a car brand community influence your purchasing decisions? (1-5 scale)	Social influence significantly impacts technology acceptance (Osswald et al. 2012; Walter and Abendroth 2020; You et al. 2021).
	CE2	How likely are you to pay for features recommended by the community? (1-5 scale)	
	CE3	Would proactive communication from the OEM in the community make you more likely to purchase OTA updates? (1-5 scale)	
Incentives	RE1	How appealing is a reward system that offers benefits for purchasing OTA updates? (1-5 scale)	Incentives and rewards influence consumer behavior and willingness to pay (Ma et al. 2019).
	RE2	How likely is it that you will pay for the functions if you receive a reward for them? (1-5 scale)	

A8. Survey items with multiple choice options for willingness to pay for certain SOTA and FOTA features

Survey Item	Multiple choice options
Which of the following Software-Over-The-Air (SOTA) features would you consider a 'nice-to-have' for which you would be willing to pay extra? Please check all that apply.	• Navigation system update • Live traffic visualization • Sentry Mode - live camera view • Map view from satellite perspective • Video streaming • Caraoke • Music streaming • Internet browser • Smartphone integration (e.g. Apple CarPlay, Android Auto)

	• Voice control • WLAN hotspot • None
Which of the following Firmware-Over-The-Air (FOTA) features would you consider a 'nice-to-have' for which you would be willing to pay extra? Please check all that apply.	• Autonomous driving/assistance systems • Improvements in battery performance and efficiency (for electric cars) • Improvements in vehicle dynamics (e.g. acceleration, braking behavior) • Updates to vehicle diagnostics and maintenance instructions • Improvements in energy consumption and emission control • Updates to improve vehicle safety systems (e.g. emergency brake assist) • Improvements to the vehicle's user interface and controls • Seat heating and steering wheel heating (can be activated via OTA updates) • None

A9. In-depth explanation of the binary approach used for representing WTP.

By selecting one or more features, respondents indicated that they were willing to pay extra for them, increasing the total amount for each category. By selecting the "nothing" option, respondents could also indicate their unwillingness to pay for additional features. If this option was selected, the total of WTP_FOTA or WTP_SOTA was set to zero, ensuring that the WTP variables accurately reflect the willingness to pay for improvements.

A10. Reliability analysis of the constructs.

Constructs	**Item ID**	**Reliability factor**
Personalization – PE	PE1 PE2	**0.653** (Pearson Correlation)
Community Engagement – CE	CE1 CE2 CE3	**0.687** (Cronbach's Alpha)
Incentives – IN	IN1 IN2	**0.891** (Pearson Correlation)
Flexibility – FL	FL1 FL2 FL3	**0.636** (Cronbach's Alpha)

The two constructs Community Engagement and Flexibility, both consisting of three items, underwent a Cronbach's alpha test. According to the guidelines suggested by Hair et al. (2006), the Cronbach's alpha value should ideally exceed 0.7 for a scale to be considered reliable. However, for scales comprising fewer than 10 items, this requirement can be less strict, allowing for a minimum Cronbach's alpha of 0.5. For the two other constructs measured by only two items, the Pearson correlation provides a direct measure of the linear relationship between two items and is sufficient to assess their internal consistency (Eisinga, Grotenhuis and Pelzer 2013).

The slight deviation from the ideal alpha value of 0.7 for CE can be attributed to the community and communication aspects within the community construct. This comprehensive, yet complex view of user engagement includes social influence, community interaction and communication with the OEM.
The SOTA and FOTA variables are not included as they are composite indices generated from binary dummy variables, which represent the presence or absence of willingness to pay rather than a scaled response (Hair, et al. 2006).

A11. Descriptive statistics of study constructs and Willingness to Pay indicators.

Construct	Mean	Std. Deviation	No. of observation
PE	3.0381	1.03472	105
CE	3.3079	.89119	105
FL	3.2063	.99505	105
IN	3.6190	1.11701	105
WTP_SOTA	3.5810	2.02285	105
WTP_FOTA	3.4762	2.09438	105

A12. Correlation coefficients and hypothesis testing status for Willingness to Pay constructs.

Construct	WTP_SOTA	WTP_FOTA	Hypothesis	Status
PE	.332**	.273**	H1	Mixed
CE	.218*	.273**	H2	No Support
IN	.333**	.226*	H3	Support for SOTA. Mixed for FOTA
FL	.389**	.465**	H4	Support

*Note: ** statistical significance at the 0.01 level (p<0.01); * statistical significance at the 0.05 level*

IN present a robust correlation with WTP_SOTA ($r = .333$, $p < .001$), but are not statistically significant for WTP_FOTA. PE varies, with a stronger correlation with WTP_SOTA, highlighting the need for further analysis. CE exhibits a positive but weak correlation, lacking statistical significance, and does not strongly support the hypothesis. Although PE and CE do not show significant correlations in this set, their inclusion in the regression model is crucial for a comprehensive evaluation of consumers' WTP preferences.

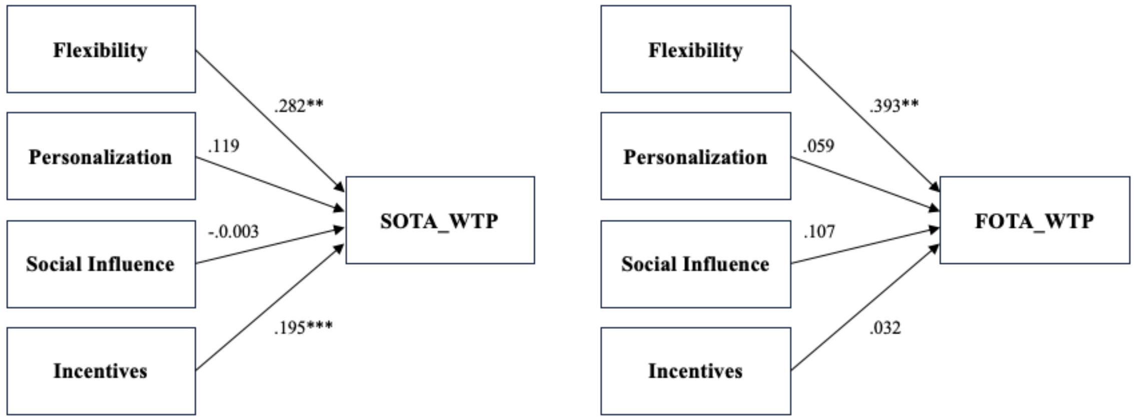
A13. Model summary statistics for Willingness to Pay for SOTA and FOTA Updates.

Summary Statistics	R^2	Adjusted R^2	Std. Error of the model	F test
Model SOTA	.213	.182	1.82962	6.782**
Model FOTA	.235	.205	1.86755	7.699**

*Note: ** statistical significance at the 0.01 level (p<0.01)*

For SOTA updates, the model summary shows that the independent variables explain 21.3% of the variance in SOTA, which is considered a moderate effect size. Regarding FOTA updates, the model accounts for a slightly higher proportion of 23.5% of the variance.

A14. Proposed CTAM1 model in two versions with the results of the empirical estimation



A15. Expert Interview guide to assess the viability of the dynamic leasing model based on SOTA & FOTA Updates in the German automotive market.

Background Summary	**Presenting Research Overview:** Our research focuses on differentiation strategies for German premium OEMs in the era of electromobility, specifically through new revenue streams in aftersales. This includes exploring the impact of connected services and OTA updates in the automotive sector.
	Brief on Key Findings: One of our main findings indicates that flexibility in payment models is a critical factor. Particularly, the concept of a dynamic leasing model based on SOTA & FOTA updates was well-received in our survey. It entails features being activated or deactivated based on customer needs, with a corresponding adjustment in leasing rates.
Expert Feedback on the Dynamic Leasing Model	**General Feedback:** We would appreciate your general feedback on the concept of a dynamic leasing model based on SOTA & FOTA updates. What are your initial thoughts on its potential in the German market?
	Feasibility and Customer Preference: How feasible do you find the integration of performance-based leasing models?
	Anticipated Challenges: What challenges might arise in introducing such a model, especially in terms of customer acceptance and technical feasibility?

A16. Transcription of the expert interview from 12/12/2023 with Capgemini Invent

00:00:01
Speaker 1: Erstmal nochmal vielen, vielen Dank, dass du dir die Zeit nochmal nimmst. Es geht mir tatsächlich im Call jetzt darum, das Geschäftsmodell, was wir jetzt entwickelt haben in der Masterarbeit so ein bisschen challengen zu lassen. Deshalb würde ich dir einmal nochmal Hintergrund geben, was wir jetzt genau gemacht haben. Es hat sich ein bisschen geändert, seitdem wir das letzte Mal telefoniert haben. Wir haben uns jetzt grundsätzlich mit den Veränderungen und neuen Wettbewerbern in der Automobilindustrie beschäftigt, vor allem im Hinblick auf die CASE-Trends. Im Zeitalter der Elektromobilität, wir wissen: Okay, es gibt viele neue chinesische Wettbewerber - NIO, BYD, Xpeng, kommen alle. Die Kundenwahrnehmung verändert sich auch, dass man nicht mehr sagt: Okay, chinesisch, billig, wollen wir nicht, sondern es ist eine gute Alternative mittlerweile. Und auch weniger Wartung, weniger Verschleißteile bei Elektroautos, deshalb Umsatzrückgang im Aftersales. Dann haben

wir geguckt: Okay, unsere Arbeit soll sich genauer damit beschäftigen: Wie können sich Deutsche Premium OEMs differenzieren, und welche Differenzierungsmöglichkeiten stellen vielleicht gleichzeitig auch noch ein Revenue Stream im Aftersales dar. Und da haben wir gesagt - nach viel Research - unser Fokus ist der Innenraum, also In-Car Experience, und dann eben Connected Services über die Firmware und Software Over-The-Air-Updates. Und da hatten wir, glaube ich, auch schon mal geredet bei unserem letzten Telefonat, dass BMW das auch schon mal probiert hatte, mit der Sitzheizung, das im Abo-Modell nachträglich freischalten zu lassen, was ja nicht wirklich gut funktioniert hat. Dann haben wir uns gedacht, okay, dann gucken wir uns doch mal an, was machen denn die Wettbewerber, die Vorreiter von Firmware-Over-The-Air-Updates, besser? Warum sind da die Kunden viel eher bereit, so was anzunehmen und vielleicht auch für solche Services sogar zu zahlen? Und dann haben wir eine Wettbewerbsanalyse gemacht. Auf die Ergebnisse können wir, wenn wir nachher noch mehr Zeit haben, gerne auch eingehen, sonst würde ich das jetzt so stehen lassen: Wir haben die Ergebnisse gehabt und haben dann eine Umfrage im deutschen Markt gemacht. Hier ist ein Hauptergebnis, dass die Flexibilität bei Zahlungsmodellen entscheidend ist für den Kunden. Also die Kunden möchten die Möglichkeit haben, aus einem einmaligen Kauf und Abo Modell wählen zu können für diese Connected Services. Ist jetzt erst mal nichts neues, weil BMW macht das ja auch schon, vor allem aber eben für Software-Over-The-Air-Updates. Und was wir uns jetzt überlegt hatten, weil wir auch auf einer Business School sind und so ein bisschen neue innovative Idee mit reinbringen wollen, ist ein dynamisches Leasing Modell basierend auf diesen Software- und Firmware-Over-The-Air-Updates, bei dem die Kunden dann diese Features je nach Bedarf aktivieren oder deaktivieren können. Und da wird dann aber auch die Leasingrate entsprechend angepasst, dass man beispielsweise dann im Winter, wenn man wieder auf die Sitzheizung eingeht, hat man beheizbare Sitze und vielleicht auch eine verbesserte Fahrdynamik, zahlt dann eine höhere Leasingrate, die im Sommer dann aber wieder günstiger wird. Das ist ein Differenzierungsmerkmal, weil kein anderer OEM macht das. Wir haben auf jeden Fall nichts anderes gefunden. Und es ist jetzt vielleicht für Software OTA Updates nicht sofort ein neuer Revenue Stream, weil es das schon gibt, aber es würde die Zahlungsbereitschaft erhöhen, was wir auch getestet haben, und wäre für FOTA-Updates vielleicht eine neue Option. Das ist jetzt mal so unsere Idee, und dazu gerne einfach mal deine Meinung, Feedback. Vielleicht gibt es erstmal einen trivialen Grund "Geht überhaupt nicht, weil ..." - was wir vielleicht übersehen haben. Ansonsten Challenges oder auch Möglichkeiten von so einem Modell, da jetzt mal das Wort an dich.

00:03:39
Speaker 2: Ja, ich habe tatsächlich auch einige Themen im Kopf. Vielleicht erst nochmal die Rückfrage, was versteht ihr denn unter Firmware Updates, habt ihr das irgendwie eingekreist, was das produktseitig sein könnte?

00:03:53
Speaker 1: Also, wir haben es ja erst mal eingekreist mit In-Car auf jeden Fall, also wir sagen, alles, was im Auto ist, was nicht Software ist, aber was man fest im Auto hat und trotzdem über Software freischalten kann. Also auch Lenkradheizung zum Beispiel oder auch, was jetzt nicht ganz Innenraum ist, aber auch der Motor beispielsweise, dass man da Verbesserungen hat. BMW, glaube ich, bietet auch die M Version im Motor an, also alles so in die Richtung, das nicht Software ist.

00:04:26
Speaker 2: Ich würde dich gerade gerne für mein Projekt weg rekrutieren, weil wir uns genau das für XXX gerade anschauen. Mal vorne angefangen, deshalb habe ich auch gefragt. Das ist aus meiner Sicht zwar weniger relevant, aber nur, damit du das mal gehört hast, ähm, diese klassischen, ich nenne das mal Hardware Freischaltungen, wie... gut, Licht ist jetzt Außen am Fahrzeug, keine Ahnung, Sound Features oder Ambiente Beleuchtung oder Cruise Control oder vielleicht auch einfach nur das Navi, also alles, was so eine Hardware Komponente hat, das ist ganz spannend im Markt, weil zum Beispiel Polestar, die haben auch so einen Acceleration Boost, wie du gerade auch erwähnt hast. Die nennen das auch Over-The-Air-Updates. Technisch gesehen, das erwähne ich für dich aber nur so am Rande, weil ich glaube, man muss es nicht zu verakademisieren, gibt es entweder die Möglichkeit über ein OTA-Update wirklich eine Funktion und eine Software komplett neu aufzuspielen, so wie bei deinem Smartphone, einfach Software-Update. Was die meisten Hersteller in dem Kontext, was sie dann

wahlweise FOD, COD by BMW und so weiter nennen, ist, dass quasi die Hardware schon im Fahrzeug ist, die Software insofern auch schon da und, vereinfacht gesagt, das technisch so ein bisschen ein "An-Aus-Mechanismus" ist, das jetzt nicht eine komplett neue Feature Idee ist, was aber eigentlich auch spannende Berührungspunkte hat. Weil in dem Moment, wo du auch in der Lage bist über Over-The-Air-Updates komplett neue Features einzuspielen und vielleicht die bestehende Hardware zu nutzen, hast du nicht das große, ich will es nicht Problem nennen, aber durchaus Herausforderung, die es in dem Bereich gibt, und zwar, dass diese Themen ja an einem Fahrzeugprojekt hängen, und Fahrzeugprojekte... Wenn jetzt nächstes Jahr der XXX für XXX endlich mal auf den Markt kommt, dann ist das ein Fahrzeugprojekt, was schon zwei, drei Jahre vorher einen gewissen Stand hat. Das heißt, du muss quasi Jahre vorher schon wissen, was dein Fahrzeug irgendwann mal können soll, auch in dem Digitalbereich, und das bleibt ja auch deutlich länger bestehen, solange dieses Fahrzeug auf dem Markt ist. Das heißt, das Thema "Time to Market" ist dadurch, also schon ein bisschen schwierig, weil du gewissermaßen unflexibel bist und eben diese Themen vorab schon definieren musst. Das ist jetzt aber eher so die Produktseite "Was bietest du an?". Wenn ich das richtig verstehe, ist ja euer Key Finding auch Richtung "Wie biete ich das an?", also nicht per se das "Was?" und das ist ein Bereich, wo, glaube ich, gerade jeder OEM so ein bisschen auch am Experimentieren ist. Also, wie du gesagt hast, klassisch kommt man so von einmaligen Freischaltungen, gerade im Bereich Connected Services gibt es ja jetzt immer mehr auch den Trend Richtung Abo-Modell, wie das Tesla macht, wie das BMW mit Digital Premium jetzt neu macht, und in dem Kontext auch so ein bisschen die Frage, was ist denn da auch eine Kundenpräferenz? Du hast da gerade dieses Beispiel genannt, auch Flexibilisierung, was wir uns zum Beispiel gerade auch angeschaut haben als spannendes Cross-Industry Beispiel, ich weiß nicht, kennst du Peloton? Diese Spinning Räder, die man sich holt. Die haben auch ein ganz interessantes Modell, was sich ganz gut auf die Autobranche übertragen lässt, und zwar entweder du kaufst dir dein Rad, und dann hast du so ein Abo, das dazu läuft, oder eben du mietest dir dieses Fahrzeug und hast dann für den Mietzeitraum, ergo übersetzt in die Automobilwelt, für den Leasing Zeitraum, auch ein gewisses Angebot inkludiert. Und ähnlich macht es zum Beispiel NIO auch mit dem Battery Swap, dass du die Batterie mitmietest. Was wir feststellen, ist, dass per se die OEMs gerade zwei Herausforderungen haben. Das eine ist das Thema, sie wollen eigentlich immer mehr digitale Produkte anbieten. Du wirst aber einen Auto-Kunden, der noch nicht so wirklich in der Digitalwelt angekommen ist, wahrscheinlich nicht dazu bringen, dass er sich fünf 3,99€ Abos für sein Auto abschließt. Von dem her, glaube ich, zahlt ihr mit dem, was ihr da über die Studie ermittelt habt, genau in diesem Pain Point ein, und zwar, wie kann dieses Angebot so integriert werden, dass es attraktiv ist für den Kunden? Und der zweite Punkt ist, wie du auch richtig sagst, dass gerade nachbuchbare Features, die nutzt du als Kunde eigentlich nur, wenn du sie wirklich brauchst. Das heißt, gerade wenn das irgendwelche Themen sind, die wahlweise Richtung Winter oder Sommer, kann ja in beide Richtungen gehen, sieht man auch saisonale Buchungen. Und der Worst Case für so einen OEM ist ja tatsächlich, dass du es schaffst, für einen Winter deinen Kunden in der Subscription oder in dem Buchungsmodell zu halten, und dann muss er sich quasi jeden Winter nochmal neu entscheiden. Von dem her finde ich das ganz spannend, was ihr euch da ausgedacht habt. Zum einen eben, weil es in diesen Pain Point einzahlt. Zum anderen hast du glaube ich auch, du hast das eben so schön formuliert, ich kriege das gerade nicht mehr ganz zusammen. Aber auch diese Flexibilisierung über das, was man halt so kennt, hinaus. Das braucht es aus meiner Sicht auch, um dieses Angebot attraktiv zu halten, weil, was wir halt sehen im Markt oder in unseren Beratungsprojekten, was nicht funktioniert ist... ein BMW, Mercedes oder Audi werden kein Netflix und kein Spotify sein. Und dementsprechend ist es schon durchaus eine Herausforderung, wie kannst du auch entsprechend die Revenues nach oben bringen, gleichzeitig aber auch eben die Kundenzufriedenheit zu schaffen. Von dem her finde ich das einen spannenden Ansatz, den ihr gerade habt. Ich habe noch ein paar Gedanken im Kopf, aber du kannst gerne erst mal anmerken und fragen.

00:11:01
Speaker 1: Also das war schon mal sehr, sehr gut und auch eine tolle Bestätigung, für das, was wir bis jetzt gemacht haben. Also danke dafür auf jeden Fall und mit dem Leasing Modell an sich, das waren jetzt sehr viele Chancen, die du genannt hast, siehst du noch andere Herausforderungen, also außer jetzt die Produktseite, also die sehe ich auch auf jeden Fall, die haben wir jetzt in unserer Masterarbeit nicht ganz fokussiert, die natürlich aber da ist. Was man vielleicht mit einem Satz schon noch erwähnen sollte, weil das auf jeden Fall auch eine Challenge ist, aber sonst so im Business Model, strategischen

Gedanken oder vielleicht andere Kostenaspekte? Wo würde ein Leasing Modell, was diese hinzu buchbaren Features hat, keinen Sinn machen? Oder was wären noch weitere Herausforderungen, die dir einfallen würden?

00:11:45
Speaker 2: Ja, Leasing Modell wäre jetzt auch tatsächlich erst mal so für einen, also Zeitraum gebunden, oder auch, was du gemeint hattest mit quasi dynamisches Pricing im Sinne von "Im Sommer vielleicht andere Kosten als im Winter", sind beide Faktoren mit drin oder sind das einfach zwei separate Ideen? Nur damit ich es richtig kommentiere.

00:12:12
Speaker 1: Tatsächlich alles in einem, also die Idee ist, dass man das dynamische Pricing hat, aber auch dynamisch die Features dazu buchen kann. Also nach Bedarf, dass eben der Kunde genau sagen kann, ich brauch im Sommer das, ich brauche vielleicht hier, für meinen Urlaub brauche ich das und das. Es gibt ja wahrscheinlich total viele Use Cases. Und das Problem beim Autokauf, dass der Kunde denkt: "Ich habe doch ein Auto gekauft, und es ist alles Meins. Warum gehört nicht alles mir?" kann durch das Leasing Modell eben gelöst werden. Genau, das ist mal so der Approach, den wir ein bisschen weiterverfolgen wollen, wo ich aber mir denke, es haben doch sicher schon OEMs irgendwie mal im Kopf gehabt. Wo ist denn der Haken? Weil für mich das gerade so sinnvoll ist. Aber es muss ja irgendwie noch was geben, warum es noch nicht gemacht wird.

00:13:00
Speaker 2: Ja, also, ich glaube, da muss man auch reflektieren, wo OEMs geradestehen, und klassisch das Thema "Digitale Produkte" ist auch in der Organisation, und das dementsprechend sowohl von der Relevanz, von den Ressourcen, als auch von "Wer beschäftigt sich mit welcher Priorität damit?" Ähm, auch noch sehr in den Kinderschuhen. Also, das ist nicht zitierfähig, aber XXX hat XXX mit einer Restrukturierung erst eine eigene Abteilung für wirklich Business Development "Digitale Produkte" eingeführt, deswegen machen wir gerade die Projekte erst jetzt, die wir machen. XXX ist gerade auch dabei, ein Business Steering und eine eigene digitale Aftersales Einheit aufzubauen. Das hat unterschiedliche Gründe. Zum einen, weil natürlich die Volumentreiber im Automobilgeschäft immer noch Fahrzeuge und Zubehör sind. Also mit X Dachboxen verdienst du deutlich mehr als mit digitalen Produkten, weshalb auch so eine Kernfrage in dieser Welt auch immer ist: Ist es rein Revenue basiert, was du hier machst, oder sind Teile davon einfach Teil der Customer Experience und damit der Wettbewerbsfähigkeit, gewisse Angebote sicherzustellen? Das heißt, in dem Sinne, glaube ich, muss man auch ein bisschen einordnen, dass dieses ganze Digitalgeschäft schon noch so ein bisschen stiefmütterlich in den Organisationen enthalten ist, und ich glaube aber auch, ein Grund, weshalb es solche Ideen noch weniger gibt, ist, dass die meisten Produkte, die es Stand heute gibt, wenn du mal irgendwie bei Connected Drive in den BMW Store gehst oder Mercedes Me, oder AUDI Functions on Demand, die meisten der Dinge, die du hier nachträglich upgraden kannst, sind Ausstattungen, die du auch schon zu deiner Fahrzeugkonfiguration erwerben kannst. Also nehmen wir mal das Beispiel von, gut das ist jetzt außerhalb vom Fahrzeug, so ein Matrix-Beam oder auch innerhalb von Fahrzeugen: Navi oder gewisse Music Experience Themen, das sind in der Regel Konfigurationsausstattungen. Das heißt im Umkehrschluss für so einen OEM, es gibt auch gewisse Limitationen, weil du dein eigenes Geschäft und auch das Geschäft deiner Händler nicht kannibalisieren kannst. In dem Moment, um es mal an einem plakativen Beispiel festzumachen. Du sagst, du hast, keine Ahnung, im Fahrzeug, eine Ausstattung, eine unbeliebte Ausstattung. Da nehmen wir mal so ein Cruise Control, braucht kein Mensch, aber gibt es. Das kannst du dir ausstatten, kostet, keine Ahnung, 500 €. Dann ist es aus Sicht OEM auch einfach so ein bisschen die Benchmark "Was kannst du später anbieten?". Nehmen wir nämlich mal rein preislich gesehen dieses reguläre Lifetime-Freischaltungs-Modell. In dem Moment, wo der Kunde in der Konfiguration 500 € zahlen müsste und später 300€, dann kannibalisierst du dir dein Fahrzeug-Konfigurations-Geschäft und auch das, womit die Händler ihre Provision verdienen. Und das ist also, da gibt es in Teilen sogar auch Händlerverträge. Aber es ist auch per se einfach, alles, was der Kunde schon zur Konfiguration reinholt, ist für einen OEM in einem ersten Schritt einfach deutlich attraktiver, weil die Revenues sind in der Tasche. Ich muss mich nicht drum kümmern, ob der sein Abo verlängert oder sein Leasing, wie auch immer, und ich habe Implikationen, was kann ich später noch

anbieten. Das löst sich ein Schritt weit auf, indem jetzt auch Abo-Modelle und Co. kommen, wo man so ein bisschen weniger diesen 500 €, 300 € Vergleich hat, sondern auch einfach wirklich dieses, was es ja eigentlich mal war, diesen On-Demand-Gedanken aufgreift, und das sehe ich zum einen so ein bisschen als Herausforderung, gleichzeitig aber auch Chance von der Idee, die ihr habt, das nämlich in dem Moment, wo auch in einem Leasing das mit integriert ist, du beide Seiten... in der Ausgestaltung, muss man sich dann gleich im Detail anschauen, aber von der Idee her, kannst du das schon so machen, dass es gleichwertig ist zu dem regulären Fahrzeug-Konfigurations-Geschäft, aber gleichzeitig die Flexibilisierung bietet. Das Einzige, wo ich weiß, dass ein Hersteller tatsächlich an einem Abo arbeitet, um auch quasi, wenn du dein Auto kaufst und konfigurierst, auch schon hier dann ein digitales Abo abschließt, ist so ein bisschen der Touchpoint Bruch, weil... Ich weiß nicht, ob du mal ein Auto konfiguriert hast. Ich habe das, bevor ich Firmenwagen hatte, noch nie gemacht. Aber das ist eigentlich so, man geht in seinen Onlinekonfigurator, man sagt, ich hätte gerne ein schwarzes Auto und bitte matte Scheiben und alle Design Pakete und sonst was, ähm, und dann schickt man das zum Händler, oder man geht zum Händler, und dann läuft das halt entsprechend über ein, entweder einen Kaufvertrag oder einen Leasingvertrag. In dem Moment, wo du digital Produkte kaufst, läuft das in der Regel über einen E-Commerce Shop und deine eigene Kreditkarte. Oder Kreditkarte deiner Firma, wenn die es netterweise zahlt, heißt, man müsste auch in der Umsetzung einfach diese Welten zusammenbringen, dass du in einem Leasingvertrag... Und du kannst ja Stand heute schon diese Konfigurationen in deinem Leasing-Vertrag haben, dass das sowohl attraktiver ist als das, was du jetzt hast, das heißt, mehr Kunden sich gewisse Features reinholen würden und gleichzeitig aber eben sicherstellen kannst, dass du eben diese, diese Zahlungsweise auch mitintegrierst. Das sind jetzt alle schon Fragen, die gehen drei Schritte weiter in "Wie gestaltet man das aus?", sind aber so klassische Themen, die auch einfach auftauchen, wenn man sich überlegt, wie kann man Dinge flexibilisieren. Und ich glaube, das Eingangs genannte Thema mit, es sollte unter dem Strich für den OEM, nicht nur für den Kunden, auch für den OEM attraktiver sein als das bisherige klassische Leasing. Das ist auf jeden Fall ein großer Knackpunkt, was sich auflöst, wenn du sagst, du erweiterst dein Portfolio. Ich weiß, wir sprechen primär über das wie, aber es hängt ein bisschen zusammen, wenn du eben sagst, du machst nicht Konfigurationsgeschäft, was du später auch noch aktivieren kannst, sondern du hast rein digitale Produkte, die dann wirklich klassisch als Software-Update ins Fahrzeug gespielt werden. Dann wiederum hast du aber auch gerade noch mal präsenter dieses Thema Touchpoint-Bruch, weil dann hast du ja dein Fahrzeug schon, und dann könntest du sagen, hey, ich kann das noch irgendwie in mein Leasing integrieren, also wo kann man das sinnvollerweise dann anbringen?

00:20:49
Speaker 1: Verstehe!

00:20:50
Speaker 2: Das sind dann so ein bisschen, glaube ich, die Hintergründe, weshalb es durchaus in der Umsetzung dann oder im Gesamtkontext OEM vielleicht die ein oder andere Herausforderung gibt, auch wenn ich die Idee tatsächlich, das ist jetzt meine persönliche Sicht, durchaus attraktiv finde, da misst man das halt schon so ein bisschen an "Was bringt es mir im Business Impact“, insbesondere mit Blick auf Revenues.

00:21:19
Speaker 1: Das stimmt. Oder wie viel Aufwand ist es eigentlich, das zu realisieren, ob es Ende dann Sinn macht. Obwohl das auch wieder, finde ich, superspannende Projekte wären, sich genau das wieder anzugucken: Okay, wo sind dann die Touchpoints, wo man das dann wieder perfekt integrieren kann, oder wo sollte man gucken, wo man den Kunden noch mal erreichen kann, um dann die digitalen Produkte zu verkaufen. Aber okay, das waren schonmal super Insights. Ich bin richtig froh, dass ich das noch gemacht habe. Ich bin jetzt kurz vor Abgabe, aber dachte mir, ich möchte noch einmal fragen, und das war schon, war richtig gut. Also vielen Dank dafür schon mal.

00:21:53
Speaker 2: Sehr, sehr gerne. Also mit der Tatsache, dass ich gerade ein laufendes Projekt zu XXX hab. Also spiegelt das schon auch wider, dass du da einen relevanten Kern getroffen hast. Genau, aber die

Ausführung gerade sollten, glaube ich, so ein bisschen relativieren… Die Frage, die du so schön gestellt hast, warum macht das eigentlich keiner, ist, dass es tatsächlich verschiedene Faktoren gibt, die damit einspielen. Genau.

00:22:26
Speaker 1: Also, ich finde ich auch wieder richtig cool, dass ihr solche Projekte gerade habt. Da freue mich schon wieder zurückzukommen.

00:22:31
Speaker 2: Du kannst gleich mal mit auf das Projekt! Tatsächlich werden wir dann nämlich auch im nächsten Jahr noch eine Kundenstudie durchführen, auch mit Blick auf welche Features sind eigentlich quasi so Basisanforderungen? Wofür hat ein Kunde Zahlungsbereitschaft? Und dann aber auch so die Frage, wie hättest du es denn gerne? Weil du siehst gerade schon so in der Industrie diesen Trend 9,99 Abos. Ich weiß nicht, ob du BMW Digital Premium in deiner Recherche mal gesehen hast. Da geht ja viel in diese Richtung. Ist das das, was Kunden wollen? I don't know. Das müssen wir, glaube ich, noch mal rausfinden. Deswegen aber auch zum Beispiel dieses Peloton Beispiel, was ja sehr nah an eurer Idee ist.

00:23:19
Speaker 1: Ja, ja, genau das wollte ich eigentlich in meiner Masterarbeit machen, aber dafür haben jetzt irgendwie die Zeit und Ressourcen nicht gereicht, wirklich so spezifisch diese Willingness-To-Pay abzufragen. Aber da vielleicht noch ein spannender Insight, bevor die Zeit um ist, was ich eigentlich auch ganz cool fand, beziehungsweise vorher gar nicht draufgekommen bin. Ich habe in der Umfrage sehr viele Antworten bekommen von wegen, warum sind denn safety features freizuschalten? Ist mein Auto denn nicht sicher? Was ich auch wieder super interessant finde, wie man da als OEM auch aufpassen muss, vor allem als Deutscher OEM, der für Qualität und auch Sicherheit steht, dann auf einmal zu sagen, ah, übrigens, kannst du dir Safety nachher noch freischalten. Weil es gibt, das habe ich mal gecheckt, auf der BMW-Seite so viele safety features. Da macht es schon Sinn, dass der Kunden sich denkt, warte mal, ist mein Auto eigentlich gar nicht so sicher? Das fand ich auch superspannend!

00:24:08
Speaker 2: Ja, das ist auch total spannend. Also, ich habe quasi zwei Projekte. Das eine ist das, das andere ist auch quasi die Vermarktung von dem digitalen Produktportfolio, dass man da schon auch in der Kommunikation ein bisschen aufpassen muss, gerade wenn das so ein Premium Hersteller ist, dann kaufst du irgendwie dein Auto für 100000 €, und das sollte jetzt noch was dazu buchen, damit das sicherer ist. Das ist ja auch so ein Widerspruch Richtung Kunde in sich, und das ist auch ein großes Thema. In diesem gesamten Kontext gibt es auch etliche Medien-Artikel dazu, dieses muss ich jetzt nochmal on top was freischalten, was zahlen, was in meinem Auto eigentlich schon ist? Richtung Kundenkommunikation, ich glaube, da kannst du noch drei Masterarbeiten dazu schreiben. Ist es auch superspannend. Auch so, wie catche ich den Kunden eigentlich, um in diese digitale Welt zu kommen, weil du eigentlich immer nur noch in Anführungsstrichen ein Auto kaufst, um von A nach B zu kommen. Und wie, wie schaffst du da kommunikativ auch den Mehrwert? Also... aber spannend, dass das auch rauskam. Sonst noch irgendwas? Jetzt bin ich auch ganz neugierig. Wo sagst du, hey, da bist du wirklich drüber gestolpert!

00:25:24
Speaker 1: Ähm, was ich auch spannend fand, ein Faktor aus der Wettbewerbsanalyse, bei der ich mir auch NIO genau angeguckt habe, war Communication und Community. Wenn man sagt: Okay, wenn in der Community was empfohlen wird, da hält die ganze NIO-Community irgendwie zusammen. Einer teilt in der Community, dass er das Feature gut findet, der nächste lädt es sich auch runter. Und dass NIO auch in dieser Community als OEM selber mit den ganzen Kunden kommuniziert. Da haben wir wieder Kommunikation, weil die halt sagen, hier guckt mal, wir haben das neue Feature. Und das hast du mir auch das letztes Mal gesagt, am besten ist es auch von der Community gefordert worden. Die haben einfach da eine viel bessere Kommunikationsstruktur. Aber da habe ich gesehen, das war zum Beispiel in meiner Umfrage, weil das habe ich auch abgefragt, wie das deutsche Kunden sehen würden.

Da haben weniger Leute Lust, wie ich dachte, auf so eine Community, was ich auch superspannend fand. Also, wir haben jetzt auch keine Strichprobe von 1000 Leuten, sondern 110, glaube ich, was auch schon gut war.

00:26:22
Speaker 2: Ja, das ist ordentlich!

00:26:22
Speaker 1: Oder? Da war ich auch richtig proud. Genau, aber das fand ich auch sehr spannend, dass da irgendwie der Deutsche Kunde dann doch nicht so viel Lust hat, sich mit anderen auszutauschen, was dann eben doch kein Willingness-To-Pay Faktor sein sollte, jetzt in diesem Fall, bei meiner Umfrage.

00:26:42
Speaker 2: Aber finde ich superspannend, also in dem Sinne überrascht es mich nicht komplett. Vor allem im deutschen Markt hat man irgendwie doch so den grumpy Birkenstock-Kunden vor Augen. Nichtsdestotrotz ist das auch was, wo gerade jeder OEM so ein bisschen rumbastelt, dass du halt so "elitäre Loyalitätsprogramme" und Co. hast, weil ich glaube, das zumindest hat jetzt langsam auch jeder Automobilhersteller aus der traditionellen Welt verstanden, du musst irgendwie deine Kunden in diese digitale Welt bekommen, weil du sonst... sonst hast du einfach eine komplette Blackbox und hoffst einfach, der Kunde kauft dein Auto wieder. Das macht NIO schon richtig gut, auch wenn die noch überschaubar viele Markterfolg haben. Aber ich glaube, da gibt es viele Ansätze, wo ich auch so sage - finde ich cool.

00:27:32
Speaker 1: Ja, also jetzt auch durch meine Masterarbeit, NIO, die Brand an sich, begeistert mich schon, muss ich wirklich sagen. Was die da anders machen und so ein bisschen auch Out-of-the-Box denken, bei so vielen Sachen. Auch das ganze Anreizsystem, die Incentives, die die geben, dieses Punktesystem. Ob das dann wieder gut ankommt im deutschen Markt ist die andere Sache, aber ich finde es so interessant.

00:27:56
Speaker 2: Ja, ja, die waren ja auch die ersten, die so wirklich so Richtung, auch dieses Abo-Modell gegangen sind und auch einfach einen ganz anderen Ansatz haben. Auch wenn ich mir sagen habe lassen, unsere Kunden meinten, sie sind mal einen Probe gefahren, ihnen ist schlecht geworden, dass das Fahrzeug noch ein bisschen ausbaufähig ist. Nichtsdestotrotz, die machen viele Dinge richtig. Und ich weiß nicht, was ich gemacht habe, ich habe mir mal die NIO-App runtergeladen aus Interesse und irgendwie, egal, was ich teilen möchte, ich habe auch immer gleich das Feature, dass ich das Richtung, also das hat man nach unten, dann so hier "Send to teams" oder irgendwie in deine Fotos, ich kann das auch immer gleich irgendwie bei NIO teilen. Das ist so richtig integriert, also machen sie schon cool, muss man ihnen lassen!

00:28:40
Speaker 1: Ja, ich habe im Rahmen eines Beratungsprojekts mir die NIO-App auch schon runtergeladen, darin Autos konfiguriert und mir das alles angeguckt. Mega cool! Das ist einfach keine OEM-App, sondern viel mehr. Das ist schon bewundernswert.

00:29:09
Speaker 2: Ja, ja, das ist richtig cool. Ach schön, ich freue mich schon, wenn du hier bist. Ich glaube, da haben wir einigen Projektbedarf bei unseren lieben Kunden gerade. Kann ich dir sonst noch mit irgendwas weiterhelfen? Jetzt habe ich mal so ein bisschen random einfach meine Gedanken ausgespeichert.

00:29:28
Speaker 1: Das war genau perfekt, genau das wollte ich, einmal so Feedback, Herausforderung, Chancen

zu der Idee. Deshalb, ich will gar nicht mehr Zeit von dir klauen. Das war perfekt, und ich bin sehr froh, dass wir es nochmal gemacht haben.

00:29:40
Speaker 2: Sehr, sehr gerne! Falls noch was gibt: Melde dich einfach, und ich befrage dich, wenn du dann hier bist mal zu deiner NIO Experience. Dann können wir ein umgekehrtes Experteninterview machen. Cool, aber dennoch viel Erfolg für den Endspurt und eine wunderschöne Weihnachzeit! #00:30:04-9#

A17. Translation of the expert interview from 12/12/2023 with Capgemini Invent

00:00:01
Speaker 1: First of all, thank you very, very much for taking the time again. The point of my call is actually to have the business model that we have now developed challenged a little in the master's thesis. That's why I'd like to give you some more background on exactly what we've done. Things have changed a bit since we last spoke on the phone. We've now basically looked at the changes and new competitors in the automotive industry, especially with regard to CASE trends. In the age of electromobility, we know: Okay, there are many new Chinese competitors - NIO, BYD, Xpeng, are all coming. Customer perception is also changing so that people no longer say: Okay, Chinese, cheap, we don't want it, but it's a good alternative now. And also less maintenance, fewer wearing parts for electric cars, which is why sales in aftersales are falling. Then we looked: Okay, our work should take a closer look at this: How can German premium OEMs differentiate themselves, and what differentiation opportunities might also represent a revenue stream in aftersales at the same time. And then we said - after a lot of research - our focus is on the interior, i.e. the in-car experience, and then connected services via firmware and software over-the-air updates. And I think we had already talked about this during our last phone call, that BMW had already tried this with the seat heating, to have it activated retrospectively in the subscription model, which didn't really work very well. Then we thought, okay, let's take a look at what the competitors, the pioneers of firmware over-the-air updates, are doing better. Why are customers much more willing to accept and perhaps even pay for such services? And then we carried out a competitive analysis. If we have more time later, we can discuss the results, otherwise I would leave it at that: We had the results and then did a survey of the German market. One of the main findings is that flexibility in payment models is crucial for customers. In other words, customers want to be able to choose between a one-off purchase and a subscription model for these connected services. This is nothing new, because BMW is already doing this, especially for software over-the-air updates. And what we have now thought about, because we are also at a business school and want to bring in a bit of a new innovative idea, is a dynamic leasing model based on these software and firmware over-the-air updates, where customers can then activate or deactivate these features as required. And then the leasing rate is also adjusted accordingly so that, for example, in winter, if you go back to heated seats, you have heated seats and perhaps also improved driving dynamics, you then pay a higher leasing rate, which then becomes cheaper again in summer. This is a differentiating feature, because no other OEM does this. In any case, we haven't found anything else. And it may not immediately be a new revenue stream for software OTA updates, because that already exists, but it would increase the willingness to pay, which we have also tested, and would perhaps be a new option for FOTA updates. That's just our idea, and we'd love your opinion and feedback. Maybe there's a trivial reason first: "Doesn't work at all because ..." - which we may have overlooked. Otherwise, challenges or possibilities of such a model, here's the word to you.

00:03:39
Speaker 2: Yes, I actually have a few topics in mind. Perhaps I should ask you again first, what do you mean by firmware updates, have you somehow narrowed it down to what it could be on the product side?

00:03:53
Speaker 1: Well, we first of all circled it with in-car in any case, so we say everything that is in the car that is not software, but that you have permanently in the car and can still activate via software. So

steering wheel heating, for example, or something that is not quite interior, but also the engine, for example, so that you have improvements there. BMW, I believe, also offers the M version in the engine, i.e. everything that is not software.

00:04:26

Speaker 2: I would like to recruit you for my project right now, because that's exactly what we're looking at for XXX. Let's start at the beginning, that's why I asked. It's less relevant from my point of view, but just so you've heard, um, these classic, I'll call them hardware activations, like... Well, lights are now on the outside of the vehicle, I don't know, sound features or ambient lighting or cruise control or maybe just the navigation system, so anything that has a hardware component, that's quite exciting in the market, because Polestar, for example, they also have such an acceleration boost, as you just mentioned. They also call it over-the-air updates. Technically speaking, but I'm only mentioning this for you in passing because I don't think you need to over-academicize it, there is either the option of installing a completely new function and software via an OTA update, as with your smartphone, simply a software update. What most manufacturers do in the context of what they call FOD, COD by BMW and so on, is that the hardware is already in the vehicle, the software is already there and, to put it simply, it's technically a bit of an "on-off mechanism", which is not a completely new feature idea, but which actually has exciting points of contact. Because the moment you are able to install completely new features via over-the-air updates and perhaps use the existing hardware, you don't have the big, I don't want to call it a problem, but certainly a challenge that exists in this area, namely that these issues are linked to a vehicle project, and vehicle projects... When the XXX for XXX finally comes onto the market next year, it's a vehicle project that has a certain status two or three years in advance. In other words, you have to know years in advance what your vehicle is going to be able to do at some point, including in the digital area, and that will remain the case for much longer as long as this vehicle is on the market. This means that the issue of "time to market" is a bit difficult because you are inflexible to a certain extent and have to define these topics in advance. But that's more the product side of "What do you offer?". If I understand correctly, your key finding is also in the direction of "How do I offer this?", not "What?" per se, and that's an area where I think every OEM is experimenting a bit. So, as you said, traditionally you start with one-off activations, but especially in the area of connected services, there is now an increasing trend towards a subscription model, like Tesla is doing, like BMW is now doing with Digital Premium, and in this context, the question is also a bit like, what is customer preference? You just mentioned this example, also flexibilization, which we have just looked at as an exciting cross-industry example, I don't know, do you know Peloton? These spinning bikes that you get. They also have a very interesting model that can be transferred quite well to the car industry, and that is either you buy your bike and then you have a subscription that goes with it, or you rent this vehicle and then have a certain offer included for the rental period, ergo translated into the automotive world, for the leasing period. And NIO, for example, does something similar with the battery swap, where you also rent the battery. What we are seeing is that the OEMs have two challenges per se. One is the issue that they actually want to offer more and more digital products. But you probably won't get a car customer who hasn't really arrived in the digital world to take out five €3.99 subscriptions for their car. In this respect, I believe that what you have identified in the study addresses precisely this pain point, namely, how can this offer be integrated in such a way that it is attractive to the customer? And the second point, as you rightly say, is that you as a customer only use features that can be booked later if you really need them. In other words, especially when it comes to topics that are either winter or summer, which can go either way, you also see seasonal bookings. And the worst case scenario for such an OEM is that you actually manage to keep your customer in the subscription or booking model for one winter, and then they have to make a new decision every winter. That's why I think it's really exciting what you've come up with. On the one hand, because it pays into this pain point. On the other hand, I think you've also formulated it so beautifully, I can't quite get it together right now. But also this flexibilization beyond what we are familiar with. In my opinion, this is also necessary to keep this offer attractive, because what we see in the market or in our consulting projects is that it doesn't work... A BMW, Mercedes or Audi will not be a Netflix or a Spotify. And so it's definitely a challenge to find out how you can increase revenues accordingly while at the same time creating customer satisfaction. In that respect, I think the approach you're taking is an exciting one. I still have a few thoughts in my head, but you are welcome to comment and ask first.

00:11:01
Speaker 1: So that was very, very good and also a great confirmation of what we've done so far. So thank you for that in any case and with the leasing model itself, there were a lot of opportunities that you mentioned, do you see any other challenges, apart from the product side, so I definitely see that too, we didn't quite focus on that in our master's thesis, but of course it's there. Perhaps you should mention this in one sentence, because it is definitely a challenge, but otherwise in the business model, strategic thoughts or perhaps other cost aspects? Where would a leasing model that has these additional bookable features not make sense? Or what other challenges could you think of?

00:11:45
Speaker 2: Yes, the leasing model would actually be tied for a period of time, or what you meant by quasi dynamic pricing in the sense of "maybe different costs in summer than in winter", are both factors included or are they simply two separate ideas? Just so that I comment correctly.

00:12:12
Speaker 1: The idea is that you have dynamic pricing, but you can also book the features dynamically. In other words, the customer can say exactly what they need in summer, what they might need here, what they need for their vacation. There are probably so many use cases. And the problem with buying a car is that the customer thinks: "I bought a car and it's all mine. Why isn't it all mine?" can be solved by the leasing model. Exactly, that's the approach we want to pursue a little further, but I'm sure OEMs have already had it in mind somehow. What's the catch? Because it just makes so much sense to me. But there must be something else that explains why it hasn't been done yet.

00:13:00
Speaker 2: Yes, well, I think you also have to reflect on where OEMs stand, and the classic topic of "digital products" is also in the organization, and accordingly both in terms of relevance, resources and "Who is dealing with it and with what priority?" Um, still very much in its infancy. So, this is not quotable, but XXX has just introduced a separate department for business development "Digital Products" with a restructuring, which is why we are only now doing the projects we are doing. XXX is also in the process of setting up business steering and its own digital aftersales unit. There are various reasons for this. Firstly, because the volume drivers in the automotive business are of course still vehicles and accessories. So you earn significantly more with X roof boxes than with digital products, which is why this is always a key question in this world: Is it purely revenue-based, what you are doing here, or are parts of it simply part of the customer experience and therefore the competitiveness to ensure certain offers? In that sense, I think you have to admit that this whole digital business is still a bit neglected in the organizations, and I also think one reason why there are even fewer ideas like this is that most of the products that are available today, if you go to the BMW Store or Mercedes Me, or AUDI Functions on Demand, most of the things that you can upgrade here are features that you can already purchase with your vehicle configuration. So let's take the example of, well that's now outside the vehicle, a matrix beam or also inside vehicles: navigation or certain music experience topics, these are usually configuration equipment. Conversely, this means that there are certain limitations for an OEM because you cannot cannibalize your own business or the business of your dealers. At the moment, to use a striking example. You say you have, I don't know, a feature in the vehicle, an unpopular feature. Let's take cruise control, nobody needs it, but it exists. You can equip yourself with it, costs, I don't know, 500 €. Then, from the OEM's point of view, it's also a bit of a benchmark "What can you offer later?". Let's take this regular lifetime unlocking model from a purely price perspective. The moment the customer has to pay €500 for the configuration and then €300 later on, you're cannibalizing your vehicle configuration business and also the business with which the dealers earn their commission. And that's why there are even dealer contracts in some cases. But it's also simple per se, everything that the customer already brings in for configuration is simply much more attractive for an OEM in a first step, because the revenues are in their pocket. I don't have to worry about whether they extend their subscription or lease, whatever the case may be, and I have implications as to what I can offer later. This is being resolved a step further by the fact that subscription models and the like are now also coming along, where you have a little less of this €500, €300 comparison, but also simply really take up this on-demand idea, which is what it actually used to be, and I see that on the one hand as a bit of a challenge,

but at the same time also an opportunity from the idea that you have, namely that the moment it is also integrated into a lease, you both sides... The design has to be looked at in detail, but the idea is that you can do it in such a way that it is equivalent to the regular vehicle configuration business, but at the same time offers greater flexibility. The only thing I know of where a manufacturer is actually working on a subscription so that when you buy and configure your car, you also take out a digital subscription here, so to speak, is the touchpoint break, because... I don't know if you've ever configured a car. I never did that before I had a company car. But it's actually like this, you go to your online configurator, you say, I'd like a black car and matte windows and all the design packages and whatever else, um, and then you send it to the dealer, or you go to the dealer, and then it goes through either a purchase contract or a leasing contract. The moment you buy products digitally, it's usually via an e-commerce store and your own credit card. Or your company's credit card, if your company is kind enough to pay for it, which means that you would also have to bring these worlds together in the implementation, so that you have a leasing contract... And as things stand today, you can already have these configurations in your leasing contract that are both more attractive than what you have now, i.e. more customers would get certain features and at the same time ensure that you also integrate this payment method. These are all questions that go three steps further into "How do you design this?", but they are classic topics that simply come up when you think about how you can make things more flexible. And I believe that the topic mentioned at the beginning should ultimately be more attractive for the OEM, not just for the customer, but also for the OEM than the classic leasing that has been used up to now. That's definitely a big sticking point, which is resolved when you say you're expanding your portfolio. I know we're primarily talking about how, but it's a bit connected when you say you're not doing configuration business, which you can activate later, but you have purely digital products that are then really played into the vehicle in the classic way as software updates. But then again, you also have this issue of touchpoint breakage, because then you already have your vehicle, and then you could say, hey, I can somehow integrate this into my leasing, so where can it be sensibly attached?

00:20:49
Speaker 1: Understood!

00:20:50
Speaker 2: I think these are the reasons why there are perhaps one or two challenges in the implementation or in the overall context of OEM, even if I actually find the idea - this is my personal view - quite attractive, because you measure it a bit by "What does it bring me in terms of business impact", especially with regard to revenues.

00:21:19
Speaker 1: That's right. Or how much effort it actually takes to realize that, whether it makes sense at the end. Although I think these would also be super exciting projects to look at again: Okay, where are the touchpoints where you can integrate this perfectly, or where should you look to see where you can reach the customer again in order to sell the digital products. But okay, those were great insights. I'm really glad that I did it. I'm about to hand it in now, but I thought I'd ask again, and that was really good. So thank you very much for that.

00:21:53
Speaker 2: Very, very gladly. So with the fact that I currently have an ongoing project on XXX. So that also reflects the fact that you've hit a relevant core. Exactly, but I think the execution should put it into perspective a little... The question you asked so well, why doesn't anyone actually do it, is that there are actually various factors that play into it. Exactly.

00:22:26
Speaker 1: So, again, I think it's really cool that you have projects like this right now. I'm already looking forward to coming back.

00:22:31
Speaker 2: You can join the project right away! In fact, we will also be conducting a customer study

next year, also with a view to which features are actually basic requirements? What is a customer willing to pay for? And then also the question of how would you like it? Because you're already seeing this 9.99 subscription trend in the industry. I don't know if you've seen BMW Digital Premium in your research. There's a lot going in that direction. Is that what customers want? I don't know. I think we need to find that out again. But that's why this Peloton example, for example, is very close to your idea.

00:23:19
Speaker 1: Yes, yes, that's exactly what I actually wanted to do in my master's thesis, but somehow I didn't have enough time or resources to really ask about this willingness to pay in such a specific way. But there is perhaps one more exciting insight before time is up, which I actually thought was quite cool, or rather I hadn't even thought of it before. I got a lot of answers in the survey about why safety features have to be unlocked? Isn't my car safe? What I also find super interesting again is how you have to be careful as an OEM, especially as a German OEM that stands for quality and safety, to then suddenly say, ah, by the way, can you unlock safety later? Because, as I checked once, there are so many safety features on the BMW website. So it makes sense for the customer to think, wait a minute, isn't my car actually that safe? I also found that super exciting!

00:24:08
Speaker 2: Yes, that's also really exciting. I have two projects, so to speak. One is that, the other is also the marketing of the digital product portfolio, so to speak, that you have to be a bit careful in communication, especially if it's a premium manufacturer, then you somehow buy your car for €100,000, and that should now book something in addition so that it's safer. That's also a contradiction in terms of the customer, and that's also a big issue. In this whole context, there are also a number of media articles on the subject: do I now have to unlock something on top, pay for something that is actually already in my car? In terms of customer communication, I think you could write three master's theses on this. It's also super exciting. Also, how do I actually catch the customer to get into this digital world, because you actually only ever buy a car to get from A to B in quotation marks. And how do you create added value in terms of communication? So... but it's exciting that this came out. Anything else? Now I'm really curious. Where do you say, hey, you really stumbled across that!

00:25:24
Speaker 1: Um, what I also found exciting was a factor from the competitive analysis, in which I also took a close look at NIO, was communication and community. When you say: Okay, if something is recommended in the community, the entire NIO community somehow sticks together. One person shares in the community that they like the feature, the next person downloads it. And that NIO also communicates with all the customers in this community as the OEM itself. We have communication again, because they just say, look, we have this new feature. And that's what you told me last time, it was also requested by the community. They simply have a much better communication structure. But I saw that in my survey, for example, because I also asked how German customers would see it. I thought fewer people were interested in such a community, which I also found super exciting. So, we don't have a random sample of 1000 people, but 110, I think, which was also good.

00:26:22
Speaker 2: Yes, that's not bad!

00:26:22
Speaker 1: Right? I was really proud of that too. Exactly, but I also found it very exciting that somehow the German customer doesn't feel so much like exchanging ideas with others, which shouldn't be a willingness-to-pay factor in this case, in my survey.

00:26:42
Speaker 2: But I find it super exciting, so in that sense it doesn't completely surprise me. Especially in the German market, you kind of have the grumpy Birkenstock customer in mind. Nonetheless, it's also something that every OEM is tinkering with a little, so that you have "elite loyalty programs" and the like, because I think that at least every car manufacturer from the traditional world has now slowly

understood that you have to somehow get your customers into this digital world, because otherwise... otherwise you just have a complete black box and just hope the customer buys your car again. NIO is already doing that really well, even if they still have a limited amount of market success. But I think there are a lot of approaches where I agree - I think it's cool.

00:27:32
Speaker 1: Yes, so now also through my master's thesis, NIO, the brand itself, I really have to say that I'm excited. What they do differently and think a bit out of the box with so many things. Also the whole incentive system, the incentives they give, this points system. Whether that will go down well in the German market is another matter, but I find it so interesting.

00:27:56
Speaker 2: Yes, yes, they were also the first to really go in this direction, including this subscription model, and simply have a completely different approach. Even though I've been told by our customers that they've test-driven one and felt sick, that the vehicle still has a bit of room for improvement. Nevertheless, they do a lot of things right. And I don't know what I did, I once downloaded the NIO app out of interest and somehow, no matter what I want to share, I always have the feature that I can send the direction, so you have that down here, then "Send to teams" or somehow in your photos, I can always share it somehow with NIO. It's really integrated, so it's really cool, I have to hand it to them!

00:28:40
Speaker 1: Yes, I've already downloaded the NIO app as part of a consulting project, configured cars in it and had a look at everything. Mega cool! It's simply not an OEM app, but much more. That's really admirable.

00:29:09
Speaker 2: Yes, yes, that's really cool. Oh great, I'm looking forward to seeing you here. I think we have some project needs with our dear customers right now. Is there anything else I can help you with? Now I've just randomly saved my thoughts.

00:29:28
Speaker 1: That was exactly perfect, that's exactly what I wanted, feedback, challenges, opportunities for the idea. So I don't want to steal any more time from you. It was perfect, and I'm very glad that we did it again.

00:29:40
Speaker 2: Very, very gladly! If there's anything else: Just get in touch and I'll ask you about your NIO experience when you're here. Then we can do a reverse expert interview. Cool, but good luck for the final spurt and have a wonderful Christmas! #00:30:04-9#

A18. Transcription of the expert interview from 14/12/2023 with BMW

00:00:06
Speaker 1: Ich winke mal in die Runde. Hallo!

00:00:08
Speaker 2: Ich lasse die Kamera vielleicht auch einfach hier so stehen. Vielleicht kannst du uns ganz kurz noch mal abholen. Ich habe den Kollegen deine Fragen schon mal einfach zur Einleitung weitergeleitet, aber vielleicht kannst du das nochmal ganz kurz zu deinem Thema abholen, und dann starten wir vielleicht auch schnell durch, weil wir haben leider nicht so viel Zeit.

00:00:28
Speaker 1: Ja, das dachte ich mir. Perfekt, super, also vielen, vielen lieben Dank erst mal an alle, dass ich das jetzt hier einmal so kurz vorstellen darf. Also ganz grob noch einmal, wir haben uns in der

Masterarbeit damit beschäftigt, welche Differenzierungsmerkmale es denn für Deutsche Premium OEMs gibt, die gleichzeitig auch neue Revenue Streams in Aftersales darstellen können. Nach sehr viel Research haben wir uns dann für den Innenraum, also die In-Car Experience, entschieden, genauer gesagt, Connected Services über Software- und Firmware-Over-The-Air-Updates. Vor allem weil der Kunde, vor allem der Deutsche Kunde, das mittlerweile schon erwartet, aber noch nicht so wirklich bereit ist, dafür zu zahlen. Dann haben wir uns gesagt, okay, welche Faktoren könnten diese Willingness-To-Pay denn erhöhen? Und haben Elemente aus der Wissenschaft und Wirtschaft kombiniert und uns in einem Technology Acceptance Model Variablen aus einer Wettwerbsanalyse reingeholt. Und da haben wir uns NIO und Tesla genauer angeguckt: Was machen die denn anders? Branding mäßig, Sales Model mäßig, ganz grob, warum die Kunden da eher bereit sind, für diese Firmware-Over-The-Air-Updates und Connected Services zu zahlen. Und diese ganzen Ergebnisse aus Wettbewerbsanalyse - da gehe ich jetzt nicht drauf ein, die Zeit reicht leider nicht - haben wir in einer Umfrage im deutschen Markt getestet, und das wichtigste Ergebnis war, dass Flexibilität bei Zahlungsmodellen entscheidend ist. Also der Kunde möchte die Entscheidung haben oder die Möglichkeit haben, zwischen einem einmaligen Kauf und einem Abo-Modell wählen zu können, für diese Connected Services. Ist jetzt erst mal nichts Neues. Auch BMW Connected Drive bietet ja schon verschiedene Optionen an und wir sind auch drüber gestolpert, dass BMW auch schon mal versucht hat, in einem Abo-Modell die Sitzheizung nachträglich freizuschalten, was auf weniger gute Rückmeldung im deutschen Markt gestoßen ist. Und da wir an einer Business School sind und Flexibilität so ein großer Faktor war, sollten wir auch ein neues Geschäftsmodell oder ein paar neue Ideen mit reinbringen. Und da kam dann eben dieser Approach von dem dynamischen Leasing Modell auf, basierend auf Over-The-Air-Updates, bei dem der Kunden dann diese Features je nach Bedarf aktivieren oder deaktivieren kann, aber mit entsprechender Anpassung der Leasingrate. Also ein Beispiel wäre eben, um nochmal auf die Sitzheizung zurückzukommen: Im Winter ist die Leasingrate dann ein bisschen höher, weil man dann die Sitzheizung nutzen kann, vielleicht auch eine verbesserte Fahrdynamik bei Glatteis. Dafür zahlt man im Sommer dann weniger oder den gleichen Preisen und man bucht sich was anderes dazu. Differenzierungsmerkmal wäre ganz klar, kein anderer OEM bietet so ein Leasing Modell an. Also auf jeden Fall haben wir nichts anderes gefunden, und der Vorteil zum Autokauf ist, dass die Kundenwahrnehmung eine ganz andere ist, weil der Kunde nicht mit das Gefühl hat "Hey, das ist mein Auto, ich habe so viel Geld dafür bezahlt. Warum darf ich nicht alles nutzen, wenn es eh schon im Auto drin ist", sondern in diesem Leasingmodell nutzt der Kunde und zahlt der Kunde vor allem nur genau das, was er auch braucht. Das wäre jetzt mal so im Schnelldurchlauf unsere Idee, und genau dazu vielleicht einfach ganz grob mal euer Feedback, ob ihr die Idee gut findet oder ob es vielleicht einen trivialen Grund gibt, warum so ein Modell völliger Blödsinn ist. Wir haben es in unserer Umfrage auch getestet, aber vielleicht, um es mal vorwegzunehmen, nur ganz grob diese Idee, ob das Modell die Zahlungsbereitschaft erhöhen würde. Also, wir haben jetzt keine weiteren Faktoren getestet, warum ist es so? Welche Vorteile hat der Kunde noch in so einem Leasingmodell? Um uns mehr damit zu beschäftigen, wollte ich einmal kurz diesen Austausch haben.

00:03:46
Speaker 3: Coole Sache, auf jeden Fall, vielen Dank. Das heißt, wenn du die Ergebnisse dann komplett hast, die würden wir uns schon gerne anschauen. Das wäre echt super.

00:03:54
Speaker 1: Ja, sehr gerne.

00:03:56
Speaker 3: Sonst, wenn ich anfangen darf, also wir haben uns schon mal damit auseinandergesetzt, weil sehr, sehr, sehr viel Feedback von den Märkten kam, dass wir irgendwas bauen müssen, dass man bestimmte Feature in die Leasingrate nachträglich integrieren kann. Das heißt, die einzige Challenge, die wir sozusagen haben, ist, dass man so eine Leasingrate momentan, was die Vertragskonstrukte... Geschichte anbelangt, nicht einfach so aufbrechen kann und ändern kann. Das heißt also, sagen wir mal, wir aus Geschäfts- oder aus Businesssicht, wir wollen unbedingt sowas haben... können, nur bauen muss es halt für uns irgendwie eine Bank oder SF, dass eben diese Leasingrate tatsächlich anpassbar ist. Das heißt, in dem Augenblick, wo jetzt irgendjemand dir aus der Bank oder von SF bestätigt, "Hey, absolut kein Problem, wir haben da eine Möglichkeit, dass wir tatsächlich diese Leasingrate aufbrechen, Zeug

reintun und wieder rausnehmen." In dem Moment sind wir komplett an Board und mit dabei. Das Einzige, als Frage, weil du meintest, der Kunde will ja nur das zahlen, was er nutzt, und er hätte ja sozusagen heutzutage die Möglichkeit, wenn er im Winter oder sorry, wenn er im Sommer unterwegs ist, weil auf den Winter will ich nicht eingehen, wenn im Sommer unterwegs, dass er sich so ein Driving System Plus für einen Monat oder für drei Monate bucht, und dann würde er genau diese drei Monate zahlen. Aber wieder die Challenge, die zahlt halt dieser Business-Kunde dann aus seiner eigenen Tasche und er hat nicht die Möglichkeit die Leasingrate aufzubrechen und das in die Leasingrate mit reinzupacken, was halt superwichtig wäre, und ich glaube auch für uns ein Mega Business, Mega Business on top. Weil sehr, sehr viele Leasingkunden werden sagen, wenn es nicht eine Leasingrate läuft, wenn es nicht mein Unternehmen zahlt, sondern ich aus der eigenen Tasche, dann mache ich es halt nicht. Also ich glaube, die einzige Challenge, die wir haben, ist, Leasingrate aufbrechen können, um Sachen rein und wieder raus tun zu können, weil ich habe irgendwie Angst ein bisschen... Ich habe mich auch nicht damit auseinandergesetzt, ob das nicht jemals immer ein neuer Leasingvertrag sein muss, der im Hintergrund entstehen muss, bei jeder Änderung.

00:06:02
Speaker 1: Okay, auch sehr interessant und auf jeden Fall eine Challenge, die man mit aufnehmen müsste. Ja.

00:06:08
Speaker 4: Hattet ihr da denn schon Kontakt mit SF, Lisa?

00:06:12
Speaker 1: Nein, tatsächlich noch nicht. Also ich habe jetzt einmal von der Beratungsseite schon mal ein Experteninterview geführt, und jetzt mit euch, aber mit SF hatte ich noch keinen Kontakt.

00:06:21
Speaker 4: Weil, das wäre wahrscheinlich also, die sind dann eher für dieses Thema verantwortlich, und wie man sagt, dass das wahrscheinlich die größte Challenge, das umzusetzen. Was wir schon wissen, Tom, ich glaube, du warst da auch noch mehr involviert. Es gab mal eine Studie, wir haben bei uns jetzt bei den Connected Drive Upgrades ein Abo-Modell, monatlich kündbar, überwiegend würde ich sagen, eher Entertainment und Navi Features, und da wurde schon mal abgefragt, ob denn ein Leasingkunde da bereit ist, das aus eigener Tasche On Top zu zahlen. Und da war die Rückmeldung in der Studie ja also, er würde das quasi wirklich monatlich selber zahlen, unabhängig von der Leasingrate. Mein Verständnis jetzt auch bei den ersten Gesprächen mit den Kollegen vom Flottenmanagement war aber, dass der Kunde für Funktionen, die wirklich Fahrzeug nahe sind, eben eher erwartet, dass die Teil der Leasingrate sind. Also das, was Ivan auch schon meinte. Von dem her, das System, wäre super, glaube ich. Man könnte das dem Kunden viel schmackhafter machen, die Systeme zu buchen oder die Produkte zu buchen. Umsetzungsseitig, glaube ich, ist es schon sehr komplex. Was man auch immer berücksichtigen muss, dass die Laufzeiten, die man dann bucht, eben auch entsprechend der Leasing Laufzeiten irgendwie angeglichen wird. Das heißt, wahrscheinlich dürfte man dann nur noch Monatsangebote machen, weil du weißt ja nicht, wie lange läuft generell der Leasingvertrag noch, wie lange das Produkt. Und ein Thema war immer noch das Thema Restwert-Thematik. Also, du änderst dann den Restwert des Fahrzeugs, das ist auch eine Challenge.

00:08:01
Speaker 3: Eben, zusätzliche Challenge, Lisa, was du ja absolut richtig sagst. Du willst es ja auch noch zusätzlich flexibel gestalten. Das heißt nicht, dass er es nur nochmal dazu buchen kann oder dass es dann bis zum Ende des Leasings mitläuft, sondern dass er es auch jederzeit wieder rückgängig machen kann, und das dann mit dem Restwert ist auch nochmal die Hölle. Ganz ehrlich!

00:08:20
Speaker 1: Ja, das kann ich mir vorstellen. Das stimmt, ja.

00:08:22
Speaker 3: Der geht dann hoch, wieder runter, wieder hoch, also long story short: Wenn uns irgendjemand aus Versicherungs-/Bankensicht sagt, absolut kein Problem, wir machen das, dann in dem Augenblick müssten wir sofort sagen, so und jetzt bauen wir dafür Produkte.

00:08:36
Speaker 1: Ja, okay. Das ist aber schon mal super interessant, das auch zu hören, dass da von eurer Seite auch das Interesse da ist. Aber es halt einfach diese Challenges, gibt vielleicht auch zu große Challenges, gerade dass es Mehrwert bringen könnte. Schon mal sehr, sehr, sehr guter Input. Sonst auch weitere Input von eurer Seite?

00:08:57
Speaker 5: Bei Dynamic Pricing, da gibt es keine Parallelen dazu, oder? Dass man das irgendwie kombinieren könnte?

00:09:10
Speaker 4: Du meinst, dass man sagt, man bepreist die Produkte über Businesskunden anders?

00:09:17
Speaker 5: Aber ja, genau auch mit dem Dynamic Pricing, dass man sagt, lieber Leasingkunde, du hast jetzt die Ausstattung A, B, C in deinem Fahrzeug, jetzt zahlst du nur noch das Delta, oder, keine Ahnung, ob man das halt anpassen könnte auch mit dem Dynamic Pricing, also jetzt wirklich sehr laut gedacht.

00:09:36
Speaker 3: Ja, genau nimm das auch mal mit, Lisa. Was wir uns momentan auch anschauen, ist eben eine Art Dynamic Pricing, also sagen wir mal, nach Fahrzeugart. Aber es kann auch nach Kundenstruktur am Ende funktionieren, dass man da ein Tool hat, um für Businesskunden spezielle Preise anzugehen. Das ist momentan in Deutschland superwichtig. Ich weiß nicht, bei den Befragungen hast du es vielleicht mitbekommen, da sind jetzt einige Connected Drive Verträge in Deutschland, die eben nicht mehr drei Jahre laufen dürfen, weil sich da irgendein Gesetz geändert hat, sondern wir dürfen nur maximal zwei Jahresverträge anbieten. Mit der Quintessenz, dass sehr, sehr viele Leasingkunden, die ein Fahrzeug für drei Jahre haben, relativ sauer sind, weil der Connector Drive Dienst neuerdings nach zwei Jahren ausläuft in Deutschland. Genau, und da kannst du vielleicht mit Dynamic Pricing noch mal was überlegen.

00:10:29
Speaker 1: Okay, ja!

00:10:31
Speaker 4: Szenarien von Dynamic Pricing einmal ist tatsächlich, dass wir sagen, wir passen die Produktstruktur... den Preis an die Produktstruktur an, die der Kunde bereits hat, also er zahlt nur noch das Delta, und auf der anderen Seite ist es... Hilf mir ganz kurz, Anna, Produkt basiert. Wir sagen, wie Ivan meinte, bestimmte Kunden, bestimmte Fahrzeuge kriegen andere Preise.

00:11:00
Speaker 6: Auch beim Fahrzeugalter, ja.

00:11:01
Speaker 1: Okay. Ja, dann nehme ich das auf jeden Fall einmal mit.

00:11:05
Speaker 6: Was vielleicht noch ein guter Hinweis ist. Also in dem Fall sind ja die "Leascos", die Fahrzeugbesitzer, und die haben auch einen gewissen Anspruch darauf, dass sie mitbestimmen, was der Kunde überhaupt kaufen kann. Also das wäre auch was, was in so einem System dann möglich sein müsste, dass Leasco überhaupt definiert, was kann der Kunde am Ende buchen, was nicht, und die

Leasco auch die Transparenz hat, was wird gebucht? Also das wird wahrscheinlich auch... Man muss da auch der Leasco wahrscheinlich den Vorteil aufzeigen, was sie daran gewinnen.

00:11:44
Speaker 1: Ja, definitiv, das ist auch wieder die Frage, ob es wirklich so ein großer Revenue Stream sein könnte oder so viel Revenue bringt, dass es dann auch Mehrwert bringt, oder ob es vielleicht nur wirklich Branding Sache ist zu sagen, hey, guck mal, wir differenzieren uns dadurch und bieten dem Kunden eben noch mal mehr oder mehr Flexibilität, was bei uns ein Faktor war, da steigt, die Willingness-To-Pay, aber ist halt die Frage, wie sehr und ob sich das dann da am Ende lohnt.

00:12:14
Speaker 6: Aber ich glaube, für den Endkunden wäre es eine super Sache.

00:12:24
Speaker 3: Ja, aber für uns ist es ja super, superwichtig. Du weißt ja auch, wir haben immer. mehr Anteil an Businesskunden oder Finanzierungskunden oder wie auch immer, ähm, und irgendwann werden wir nicht nur von Oster-Paketen leben zu Dreiviertel Umsatz, sondern wir werden immer mehr genau diese monatlichen Pakete und Subscriptions verkaufen. Und in dem Moment werden wir eben nicht das meiste Geld an Fahrzeugen älter als drei Jahre verdienen, sondern eben genau an den ganz jungen Fahrzeugen, die in dem Fall dann tatsächlich in Business-Hand sein werden, eben für die ersten sechs Monate, ein Jahr oder zwei Jahre. Und wenn wir bis dahin nicht es geschafft haben, ein entsprechendes Angebot auch tailored Businesskunden zu schaffen, dann hätten wir ein Problem. Aber genau deswegen arbeiten wir auch gerade dran. Zwar noch nicht so viel, aber wir müssen uns da ein bisschen reinschmeißen in das Thema.

00:13:10
Speaker 1: Ja, superspannend!

00:13:12
Speaker 7: Ähm, und vielleicht noch ein letztes Thema, und zwar die Leasingrate an sich wird natürlich meistens von der Firma bezahlt, und der Fahrer, der zahlt natürlich seine Steuern. Das heißt, der Fahrer hat nicht unbedingt sofort einen Vorteil, wenn erst mal die Leasingrate im Monat ein paar Euro niedriger ist. Also wenn wir sagen, wir machen es wir nach Funktionen, sehr, sehr flexibel. Entweder schalte ich jetzt meine Driving Assistance frei für nochmal 8€ im Monat zusätzlich oder 20 € im Monat zusätzlich. Der Fahrer hat ja in der Basis, der das Vorteil genießt, diese Funktion, hat ja in der Basis nichts von diesen 10 oder 20 € höheren Preis, sag ich mal. Ich glaube, das ist auch nochmal wichtig zum Verständnis. Also der Entscheider oder der, der das Vorteil von der Funktion genießt, ist nicht unbedingt auch derjenige, der, der dafür zahlt. Nur das hat natürlich wieder eine gewisse Auswirkung auf diese Steuerung vom Fahrzeug, weil der Fahrer bezahlt natürlich jeden Monat irgendwie sein Geld, einen Vorteil für dieses Fahrzeug. Und wenn du ein Firmenfahrzeug hast, dann hast du halt so eine Rate. Die sagen dir, du darfst 1000 € im Monat ausgeben, und was halt die Leasingkunden als Businesskunden. Also wenn du wirklich so eine Business Fahrzeug hast, die reizen die halt dann erst mal aus.

00:14:36
Speaker 1: Okay, das ist auch superspannend diesen B2B-Faktor noch mitaufzunehmen!

00:14:39
Speaker 7: Irgendwann habt ihr gar keine Luft mehr nach oben!

00:14:47
Speaker 1: Ja, das könnte auch noch ein Problem werden. Aber das ist ja genau das, was ich wollte, einmal so diese Challenges, aber auch Chancen mit aufzunehmen, und es war schon mal mega, mega, mega Input. Also vielen, vielen Dank dafür, und ich glaube, die Zeit ist wahrscheinlich auch schon rum, oder da will ich euch gar nicht mehr Zeit klauen.

00:15:07
Speaker 2: Aber superspannend, wie Ivan meint, es wäre super, wenn du die Ergebnisse danach mit uns teilen könntest.

00:15:13
Speaker 1: Auf jeden Fall mache ich sehr gerne. Super, dann verabschiede ich mich schon wieder. Vielen, vielen Dank nochmal, dass es so kurzfristig geklappt hat, und frohe Weihnachten! #00:15:25-6#

A19. Translation of the expert interview from 14/12/2023 with BMW

00:00:06
Speaker 1: I'm waving into the round. Hello!

00:00:08
Speaker 2: I might just leave the camera here. Maybe you can pick us up again very briefly. I've already forwarded your questions to my colleagues for the introduction, but perhaps you can pick them up again very briefly on your topic and then we can perhaps get started quickly, because unfortunately we don't have that much time.

00:00:28
Speaker 1: Yes, that's what I thought. Perfect, great, so thank you very, very much to everyone for allowing me to present this so briefly. So, to recap, in the master's thesis we looked at what differentiating features there are for German premium OEMs that can also represent new revenue streams in aftersales. After a lot of research, we then decided on the interior, i.e. the in-car experience, or more precisely, connected services via software and firmware over-the-air updates. Mainly because the customer, especially the German customer, now expects this, but is not yet really prepared to pay for it. Then we said to ourselves, okay, what factors could increase this willingness to pay? And we combined elements from science and business and used variables from an advertising analysis in a technology acceptance model. And then we took a closer look at NIO and Tesla: What are they doing differently? Branding-wise, sales model-wise, very roughly why customers are more willing to pay for these firmware-over-the-air updates and connected services. And all these results from competitive analysis - I won't go into them now, unfortunately there's not enough time - we tested them in a survey in the German market, and the most important result was that flexibility in payment models is crucial. In other words, customers want to be able to decide or have the option of choosing between a one-off purchase and a subscription model for these connected services. This is nothing new at the moment. BMW Connected Drive already offers various options and we have also come across the fact that BMW has already tried to activate seat heating as part of a subscription model, which has met with less positive feedback in the German market. And since we are at a business school and flexibility was such a big factor, we also needed to bring in a new business model or a few new ideas. And that's where this approach of the dynamic leasing model came in, based on over-the-air updates, where the customer can then activate or deactivate these features as required, but with a corresponding adjustment of the leasing rate. So an example would be, to come back to the seat heating: In winter, the leasing rate is a little higher because you can then use the seat heating, perhaps also improved driving dynamics on icy roads. In return, you pay less or the same price in summer and book something else. The differentiating feature would clearly be that no other OEM offers such a leasing model. So in any case, we haven't found anything else, and the advantage to buying a car is that the customer perception is completely different because the customer doesn't have the feeling "Hey, this is my car, I paid so much money for it. Why can't I use everything if it's already in the car anyway?" Instead, in this leasing model, the customer only uses and pays for exactly what they need. That's our idea in a nutshell, and perhaps we'd like your feedback on whether you think it's a good idea or whether there's a trivial reason why such a model is complete nonsense. We also tested it in our survey, but perhaps, just to anticipate, only very roughly this idea of whether the model would increase the willingness to pay. So, we didn't test any other factors, why is that the case? What other advantages does the customer have in such a leasing model? I wanted to have this exchange briefly so that we could look into this more closely.

00:03:46
Speaker 3: Cool thing, definitely, thank you very much. That means, when you have the complete results, we'd love to have a look at them. That would be really great.

00:03:54
Speaker 1: Yes, with pleasure.

00:03:56
Speaker 3: Otherwise, if I may start, we've already looked into it, because we've had a lot of feedback from the markets that we need to build something that allows certain features to be integrated into the leasing rate retrospectively. In other words, the only challenge we have, so to speak, is that you can't just build a leasing rate like this at the moment, as far as the contract constructs... history, cannot simply be broken up and changed. In other words, let's say we want to have something like this from a business perspective... but somehow a bank or SF has to build it for us so that this leasing rate can actually be adjusted. In other words, the moment someone from the bank or SF confirms to you, "Hey, absolutely no problem, we have a way of actually breaking up this leasing rate, putting stuff in and taking it out again." At that moment, we're completely on board and on board. The only thing, as a question, because you said that the customer only wants to pay for what he uses, and nowadays he would have the option of booking a Driving System Plus for one month or three months if he is on the road in winter or sorry, if he is on the road in summer, because I don't want to go into winter, if he is on the road in summer, and then he would pay for exactly these three months. But again, the challenge is that this business customer then pays out of his own pocket and he doesn't have the option of breaking up the leasing rate and including it in the leasing rate, which would be super important, and I think it would also be mega business for us, mega business on top. Because many, many leasing customers will say, if it's not a leasing rate, if it's not my company paying, but I'm paying out of my own pocket, then I won't do it. So I think the only challenge we have is to be able to break up leasing installments to be able to put things in and take them out again, because I'm a bit scared... I also haven't looked into whether it's always going to be a new lease that has to be created in the background every time there's a change.

00:06:02
Speaker 1: Okay, also very interesting and definitely a challenge that should be included. Yes.

00:06:08
Speaker 4: Have you already had contact with SF, Lisa?

00:06:12
Speaker 1: No, actually not yet. I've already conducted an expert interview on the consulting side and now with you, but I haven't had any contact with SF yet.

00:06:21
Speaker 4: Because that would probably be more responsible for this topic, and as they say, that's probably the biggest challenge to implement. What we already know, Tom, I think you were even more involved. There was once a study, we now have a subscription model for the Connected Drive upgrades, monthly cancelable, I would say mainly entertainment and navigation features, and we asked whether a leasing customer would be prepared to pay for this on top out of their own pocket. And the feedback in the study was that they would really pay for it themselves each month, regardless of the leasing rate. However, my understanding from the initial discussions with my colleagues from fleet management was that the customer expects functions that are really close to the vehicle to be part of the leasing rate. In other words, what Ivan already said. In that respect, I think the system would be great. You could make it much more attractive for customers to book the systems or products. In terms of implementation, I think it's very complex. You always have to bear in mind that the terms that you then book are somehow adjusted to the leasing terms. In other words, you would probably only be allowed to make monthly offers, because you don't know how long the leasing contract will generally run, how long the product will last. And the issue of residual value was still an issue. So, you then change the residual value of the vehicle, which is also a challenge.

00:08:01
Speaker 3: Exactly, an additional challenge, Lisa, which you are absolutely right to say. You also want to make it flexible. That doesn't mean that he can only book it again or that it will run until the end of the lease, but that he can cancel it at any time, and that with the residual value is also hell. Honestly!

00:08:20
Speaker 1: Yes, I can imagine that. That's right, yes.

00:08:22
Speaker 3: It then goes up, then down, then up again, so long story short: if someone from the insurance/banking perspective tells us that it's absolutely no problem, we'll do it, then we'd have to say immediately that we'll build products for it.

00:08:36
Speaker 1: Yes, okay. But that's super interesting to hear that there's interest on your part. But there are simply these challenges, there are perhaps too big challenges, just that it could bring added value. Very, very, very good input. Any other input from your side?

00:08:57
Speaker 5: There are no parallels with dynamic pricing, are there? That you could somehow combine them?

00:09:10
Speaker 4: Do you mean that they say that products are priced differently for business customers?

00:09:17
Speaker 5: But yes, also with dynamic pricing, that you say, dear leasing customer, you now have equipment A, B, C in your vehicle, now you only pay the delta, or, I don't know if you could adjust that with dynamic pricing, so now really thinking out loud.

00:09:36
Speaker 3: Yes, take that with you, Lisa. What we're also looking at at the moment is a kind of dynamic pricing, let's say by vehicle type. But it can also work according to customer structure in the end, so that you have a tool to offer special prices for business customers. That's super important in Germany at the moment. I don't know, you may have noticed in the surveys that there are now some Connected Drive contracts in Germany that are no longer allowed to run for three years because some law has changed, but we are only allowed to offer a maximum of two-year contracts. The bottom line is that many, many leasing customers who have a vehicle for three years are relatively angry because the Connector Drive service now expires after two years in Germany. Exactly, and maybe you can think again with dynamic pricing.

00:10:29
Speaker 1: Okay, yes!

00:10:31
Speaker 4: One scenario of dynamic pricing is actually that we say we adjust the product structure... the price to the product structure that the customer already has, so he only pays the delta, and on the other hand it's... Help me very briefly, Anna, product based. We say, as Ivan said, certain customers, certain vehicles get different prices.

00:11:00
Speaker 6: Even with the vehicle age, yes.

00:11:01
Speaker 1: Okay. Yes, then I'll definitely take that with me.

00:11:05
Speaker 6: Which is perhaps a good hint. In this case, the "Leascos" are the vehicle owners, and they also have a certain right to have a say in what the customer can buy. So that would also be something that would have to be possible in such a system, that Leasco defines what the customer can book in the end and what not, and that Leasco also has transparency as to what is booked? So that will probably also... You probably also have to show Leasco the advantage they gain from it.

00:11:44
Speaker 1: Yes, definitely, that's also the question of whether it could really be such a large revenue stream or bring in so much revenue that it then also brings added value, or whether it's perhaps just really a branding thing to say, hey, look, we're differentiating ourselves and offering the customer even more or more flexibility, which was a factor for us, the willingness to pay is increasing, but the question is just how much and whether it's worth it in the end.

00:12:14
Speaker 6: But I think it would be a great thing for the end customer.

00:12:24
Speaker 3: Yes, but it's super, super important for us. As you know, we have an increasing proportion of business customers or financing customers or whatever, um, and at some point we won't just be living off Easter packages for three quarters of our turnover, but we'll be selling more and more of these monthly packages and subscriptions. And at that point, we won't earn most of our money from vehicles older than three years, but precisely from the very young vehicles that will actually be in business hands for the first six months, a year or two years. And if we haven't managed to create a corresponding offer tailored to business customers by then, then we would have a problem. But that's exactly why we're working on it right now. Not so much yet, but we have to throw ourselves into the subject a bit.

00:13:10
Speaker 1: Yes, super exciting!

00:13:12
Speaker 7: Um, and perhaps one last topic, namely the leasing rate itself is of course usually paid by the company, and the driver, of course, pays his taxes. This means that the driver does not necessarily have an immediate advantage if the monthly leasing rate is a few euros lower. So if we say we're going to do it according to function, we're going to be very, very flexible. I can either activate my Driving Assistance for an additional €8 per month or an additional €20 per month. The driver who has the benefit of this function in the basic package has none of this €10 or €20 higher price, I'd say. I think that's also important to understand. So the decision-maker or the person who enjoys the benefit of the function is not necessarily the one who pays for it. But of course that has a certain effect on the control of the vehicle, because the driver pays his money somehow every month, a benefit for this vehicle. And if you have a company vehicle, then you have a rate. They tell you that you can spend €1000 a month, and that's what the leasing customers get as business customers. So if you really have a business vehicle like that, they'll max it out first.

00:14:36
Speaker 1: Okay, that's also super exciting to include this B2B factor!

00:14:39
Speaker 7: At some point you'll have no more room to add more things!

00:14:47
Speaker 1: Yes, that could still be a problem. But that's exactly what I wanted, to include these challenges, but also opportunities, and it's already been great input. So thank you very, very much for that, and I think the time is probably already up, or I don't want to steal any more of your time.

00:15:07
Speaker 2: But super exciting, as Ivan says, it would be great if you could share the results with us afterwards.

00:15:13
Speaker 1: In any case, I'm very happy to do it. Great, then I'll say goodbye again. Many, many thanks again for making it happen at such short notice, and Merry Christmas! #00:15:25-6#

A20. Transcript from Expert Interview with BMW on bio-based materials
David Kopczynski 0
:13
Well, thank you very much, I don't want to, I'll say.
Your time is all spoken for?
Can we get started right away?
Zoebelein Kai, AK-31 0
:23
Yes.

David Kopczynski 0
:26
First of all, were there any questions where you can't quite answer them, right?

Zoebelein Kai, AK-31 0
:32
At the bottom, once somewhere, what is with this text or something, I can say something about why we work with the works but recently so very deep metal, if I'm not in there.

David Kopczynski 0
:42
Okay, fine, let's just start at the top. I hope that I can organize the interview in such a way that it's not just a cool one, a bit organic, but sustainability is, let's say, the big topic at the moment and that's also something that moves the automotive industry.

Zoebelein Kai, AK-31 0
:53
Yes.
Yes.

David Kopczynski 1
:05
What trends and challenges do you see in this area in particular and possibly also more precisely in the interior, because of course you can already see that sustainable materials are being used very frequently.
Zoebelein Kai, AK-31 1
:19
Yes, well, I mean, basically it's about the fact that this is not so important specifically among your, but with regard to the entire vehicle, there is of course an interest in reducing the carbon footprint or the carbon footprint of the vehicle and this is broken down to each individual component and to look at that, which is one level of the one strand, the other strand is a lot.
But in fact this question of compliance with human rights, supply chains, how come how complex or what raw materials are in certain things? And then, for example, it is better to go into alternatives from a human rights point of view, to replace something.
And then the big trend now, hovering between the two things, is a bit of a secondary material quota,

where you say ok, you don't always have to work with primary raw materials, you can also possibly increase the proportion of recycled materials in the vehicle.
But because they are also good for the part in the end, because they generally have lower CO2 emissions than the primary materials.

David Kopczynski 2
:27
Yes, I see, now you said something briefly about the supply chain, which is also very interesting, that I can? Now, I have only vaguely in my head was in my old that.

Zoebelein Kai, AK-31 2
:31
Yes.
Well, but to give you a very, very specific example, leather, for example, is a material that can certainly be discredited as being responsible for the clearing of forests because they need cattle farms. It doesn't all matter what happens there, we have always had a vital interest in this. To clearly highlight the origin of the leather and if, for example, it is now being used illegally, in research or the violation of the rights of indigenous peoples, especially when they look at the Amazon.
David Kopczynski 3
:11
Mhm.

Zoebelein Kai, AK-31 3
:11
Then there are dimensions where we say and then it's not just about the material itself and, and and what is, but simply that we say that it doesn't meet the requirements we have for a supply chain, a clean, sustainable supply chain and that's why alternatives are interesting for us. That has to be said, until there are alternative materials with which such problems occur, it is definitely worth a look.

David Kopczynski 3
:34
Okay, that's also very interesting, it's a good point that I can also look at in more detail in my master's thesis. The aspect is very good.

Zoebelein Kai, AK-31 3
:41
Mhm.

David Kopczynski 3
:45
Now, of course, we've also talked about it, ok, as a company you also want to make sure that you produce more sustainably in some way.
Is it driven by a demand that comes from the customer side or do you say ok, you want to set a positive example and?
Tell me the customer in quotation marks, I say, force yourself in that direction.
Admittedly.

Zoebelein Kai, AK-31 4
:15
That's, that's, that's really hot, partly.
Of course there is the issue of sustainability, which we ourselves have said is a big wish on the customer side, and we realize that even if we somehow make something more sustainable or come up with a particularly good solution. There is also a positive response from customers, but it really varies from market to market. So there are countries where some issues simply have to be different, where

they say it's worth more or less or?
 Well, to stay with the example of everyone, that's never been the case in some Asian countries anyway. It was this really big thing. Would they be more likely to value the name second in the classic European markets?

David Kopczynski 5
:01
Mhm.

Zoebelein Kai, AK-31 5
:01
So that's probably also depends on how visible the part is. For example, we once had the experience that we
had a beautiful solution for the interior of
the BMWI 3.
from China, which is a flags-like plant, but then people just didn't like the look of it, so we simply believed that the message of sustainability was getting through more strongly and people said yes, it may be that the thing is somehow sustainable, but I don't think it looks as nice as the plastic I had before and then yes, they somehow have a problem there too, but it's actually both, so it's partly the coup.

David Kopczynski 5
:24
Mhm.

Zoebelein Kai, AK-31 5
:40
From us and some real test customers.

David Kopczynski 5
:41
Mhm.
 Okay, so they would then also have the experience, let's say, that optics can often be a bit more important than the idea of sustainability.

Zoebelein Kai, AK-31 5
:53
Yes, so it's the overall package has to be right, no, so that's sometimes people are quite amazed when they're next to here we're going to be before or that's why text is still to come, but if they have materials somewhere that feel like leather and you think they're great, if I'm the story of the better the beginning afterwards, but then again this point that you say Well, well, there are certain parts in the vehicle that are, they also have to be in terms of.
David Kopczynski 5
:56
Yes.
 And?
 Mmm.

Zoebelein Kai, AK-31 6
:21
durability, so a leather seat like that has been sitting on it for several years and that's why we've always had discussions about artificial leather or something like that, because with real leather we know how the material behaves. With other materials, it's a learning process. We may only find out later whether you have the same material properties as other materials and have used them before, but if there are no differences and the advantages are elsewhere, that is of course a great solution.

David Kopczynski 6
:53
Yes.
Ne I definitely understand and we have short times. The customer segment. So I can already hear that BMW is also focusing more on Europe with sustainable products, especially in Europe, where the topic is now being driven very strongly.

Zoebelein Kai, AK-31 7
:08
No, no actually it is worldwide, so you have to have a variety of things, and I say if Asian prefers a fabric solution and now less leather or something, but that is ultimately a worldwide issue and if one market is not so far ahead, others will follow at some point and then there is the issue.

David Kopczynski 7
:24
Hm.

Zoebelein Kai, AK-31 7
:29
Regulations and, especially when it comes to Co 2, they are also. It is also in our own interest to use materials in our vehicles. That have a low carbon footprint and then what? That's why it's a global issue, but always with different characteristics. So if you look at today.
Of course, you can also configure BMW endlessly and have the choice as a customer and then you can also solve it by giving customers the choice of what they ultimately take into the vehicle and how they then design themselves.
In the places where it is not possible, I could make everything somehow flexible, somehow, but for the most part?

David Kopczynski 8
:02
Okay.
Yes.
Yes, ok.
Well, let's say all well and good, the whole idea of using sustainable materials tells me that, but if you want to do that next, what kind of impact does that have? The materials, so you can really say that the stop is really clear, if we now only go to leather seats, is perhaps a small part, but how big is this impact on co 2 emissions?
Let's say supply chain, how can you measure that, how big is it?

Zoebelein Kai, AK-31 8
:42 There's a lot of things coming
together and, above all, you mustn't forget one aspect that is, I think that's very important again, if we look at this issue of electrification, that we will be driving cars electrically more and more in the future.
Then the carbon footprint of a vehicle will change completely. Today, with an internal combustion engine, the majority of the vehicle's emissions are generated during the use phase, i.e. when it is on the road. If we now assume that you have an electric vehicle and also have the opportunity to drive with green electricity, then the lump is completely eliminated - production in and of itself is always relative. We had a relatively small footprint in the whole game. But that means that in the future.

David Kopczynski 9
:17
Mhm.

Zoebelein Kai, AK-31 9
:27
With electrified vehicles, a large proportion of the emissions are generated in the supply chain and then it's really about what materials do they have?
And, and and how were they ultimately obtained and used? And then that will ultimately have a very strong influence on the carbon footprint of a car.

David Kopczynski 9
:44
Mhm.
Okay, I see.

Zoebelein Kai, AK-31 9
:47
And as I said, and then of course, when you look at the age of leather here, they have a relatively high carbon footprint compared to alternative materials and then there are other materials where it may not be so pronounced, but if, for example, they also have recyclability and can then keep the thing running via secondary materials, the carbon footprint improves again and again by a factor.
In the end, it really is the policy of small steps, so it's a bit here, a bit there, a bit there, but ultimately I think it's worth saying OK, we'll look and then simply try to achieve something bigger through the individual steps.

David Kopczynski 10:27
Yes, yes, definitely, and now you've also mentioned recycling.

Zoebelein Kai, AK-31 10:34
Yes.

David Kopczynski 10:35
Also read that BMW already had a high recycling, then on.
Also strives in the future how?

Zoebelein Kai, AK-31 10:41
Mhm.

David Kopczynski 10:44
How does the BMW proceed? So what, what are there so a bit yes the?

Zoebelein Kai, AK-31 10:48
Yes, so that's one thing, so you have to differentiate a bit between the secondary material quota and the recycling quota Recycling quota is the reason for putting the vehicle out the back, which is prescribed by law and is basically the same for all manufacturers at the moment in Europe 95%, which means 95% of a car is always recyclable, but 10% of it is also thermal. In other words, you can burn something and then simply recover the energy, but 85% is definitely recyclable. What we intend to do. But when it comes to new vehicles.

David Kopczynski 11:00
Mhm.
Uh-huh.

Zoebelein Kai, AK-31 11:20
Ideally, 50% of it should be secondary material in the long term. In other words, it has already been recovered and then reused. This is relatively simple, if you look at things like steel or aluminum, you can take a metal, you can melt it down and reshape it and reuse it, depending on the degree of purity,

and with the other stories, the challenge with the secondary materials is that they
reduce the number of materials in the vehicle
as much as possible
and to realize a higher Si quota, because the problem is not the major challenge today.
The technical implementation, that we could say that we can't get more material in than today, but the challenge of getting these materials at all and recovering them in recycling, that's the most difficult step at the moment, so basically there isn't really such a comprehensive recycling industry that earns money by procuring things and then recycling them again and making them available as raw materials.
So what if they do?
Take something like in the Hochwald storage facility, the things last longer than we expect and that's why some are coming back at the moment, but if they were returned, we could recycle them almost completely, i.e. get the cell chemistry back out almost 1 to 1 and reuse the new Hochwald in the same way, but the problem is simply that there is no return, so that's the limiting element at the moment.

David Kopczynski 12:38
Mhm.
Yes.
Okay, can you then perhaps unfortunately not be quite as involved in this recycling matter as a car? In which steps are they recycled, but is it possible to make the suppliers a bit more responsible?

Zoebelein Kai, AK-31 13:03
In.
Yes, absolutely, that's exactly the point, so of course you approach the suppliers and tell them to take a look.
We want to increase the secondary material quota, so we want them to see that they increase their secondary material quotas, that's the be-all and end-all and also, for example, reduce the variety of materials, so they have to be in the game, because in the end a lot happens there and that's also happening today, so there are many suppliers who are already sourcing and relying on secondary materials themselves, because, as I said, we ourselves have the opportunity to do so, I want to say that myself. In the area of our value chain.

David Kopczynski 13:22
Mhm.
Okay.
Okay.

Zoebelein Kai, AK-31 13:49
Then we won't do much at all. Then we really have to rely on this supplier, for example.

David Kopczynski 13:53
Mhm.

Zoebelein Kai, AK-31 13:56
Yes Hello, for example now? A classic example is aluminum rims, so you have an indifferent supplier who actually makes the thing completely from one hundred percent secondary material from the car container?
And if they then have a supplier like that, all the better, then great? Then they've already solved that part and so it's ultimately about all the components in the vehicle.
David Kopczynski 14:08
Yes.
Yes.
Okay, that's also a bit of an obligation for the shopper, of course, and then also the delivery, yes.

Zoebelein Kai, AK-31 14:22
Yes, exactly. Purchasing also has the development that you just say.

David Kopczynski 14:26
Yes.

Zoebelein Kai, AK-31 14:27
How can I go to Spielsweise? And also build the supplier of the Golden Bridge, which is somehow easier or something and then of course you must not underestimate and suppliers we also have a real innovative strength and think about it and in turn continue their suppliers. At the end of the day, we are all involved in complex tasks.

David Kopczynski 14:48
Very nice, we're doing well, then we can also, I'll say a little bit about the strategic positioning of BMW or the general positioning of BMW in terms of what does it actually look like in the future? What are BMW's plans? With sustainable materials? So, for example, should the new BMW five-series, I believe it was launched last year, be made entirely from sustainable vegan materials, at least in the interior.

Zoebelein Kai, AK-31 15:10
Mhm.

David Kopczynski 15:18
What could at least be read.

Zoebelein Kai, AK-31 15:20
Yes, there's also a new range of equipment where it's completely us.
Yes, it's in the customer's interest to say that if a customer is very interested, you can offer them that, it's not that easy.

David Kopczynski 15:35
Mhm.

Zoebelein Kai, AK-31 15:36
That's always a question of definition, for example, when I used to have a lot to do with Peter, with the animal welfare organization.

David Kopczynski 15:43
Mhm.

Zoebelein Kai, AK-31 15:45 There was something to be said for them if it was leather-free, but of course they also have an incredible amount of other animal materials somewhere in.
In adhesives, in, in, in, in other materials - that's not without its challenges, so it's definitely an effort, but basically you say you want to increase the proportion of secondary materials in vehicles or or in the Excel interview, by the way, just as continuously, as I said, the target figure should be in the region of 50%.

David Kopczynski 16:01
Yes.

Zoebelein Kai, AK-31 16:20
And then of course all these materials, you mustn't forget that just because they are of plant origin or represent alternatives, there are still other sustainable aspects, so we also have to look into these supply chains.
Is there any violation of human rights involved? No, in the worst case, something like child labor,

these are all things that were perhaps not such a problem with another older material, but which can now somehow come up and then the question is also quite open with plant-based materials.

David Kopczynski 16:43
Yes.

Zoebelein Kai, AK-31 16:57
Is there any competition with agriculture, for example? It's not a good solution to say that I'm going to use something here that ends up in the car, that people will somehow suffer from hunger because of it, no, it's going to want to take a holistic, sustainable approach somewhere, which means getting as many secondary materials in as possible, getting the CO2 balance of the vehicles down, but also looking at the other aspects and human rights et cetera, so that's the end of the vehicle.
Basically, this is the best we can offer at some point with all the services we have.

David Kopczynski 17:33
Yes.
Ne make but still in any case are then we can equal, I have to push times briefly between a question I times between purely now quite well fits just and on the subject of this text yes so yes is yes not the only manufacturer with the BMW I say times together or or? The text says ok here in Mexico cacti are already growing here anyway.

Zoebelein Kai, AK-31 17:40
Mhm.
Yes.
Mhm.

David Kopczynski 17:57
We simply use them now and don't have to clear any additional forests or somehow, that's also for FIBO, for the soil is often without monoculture can also be bad and they say no, they're already there anyway, we'll just use them now.

Zoebelein Kai, AK-31 18:16
Mhm.

David Kopczynski 18:17
What, what do you actually expect from this partnership, because I think it's still relatively young and I say?

Zoebelein Kai, AK-31 18:27
Yes.

David Kopczynski 18:29
But I say in the experimental phase, right?
Zoebelein Kai, AK-31 18:31
Yes, exactly, but it's an interesting option, no, it's exactly what fulfills what I just said. So it's an interesting variant of the material.
It's amazing when you touch it and look at what, what comes out of it in the end.
What what what comes out of it? And?
Yes, so I think it's a promising story and therefore worth supporting for us somewhere, so if, if that were actually the case now, that you actually had to start again, as Grad said?
I'd have to plant something new here again, although that's not always a no-go, but if the situation is such that you can really say that there's something lying around that you can ultimately just use and make use of.

David Kopczynski 19:12
Yes.

Zoebelein Kai, AK-31 19:21
And if you have an innovative idea, it's always good, so that's, I think, the whole background to the whole story and then of course you have to pursue it further and then the question is that will always have to be shown, if I scale something like that up and then simply arrive in larger quantities, to what extent do such models still carry?

David Kopczynski 19:38
Mhm.

Zoebelein Kai, AK-31 19:38
But at least this way and at this stage we have to support it.

David Kopczynski 19:43
Okay, very good, but if you now say ok.
If you scale its up, I want to sell my BMW already variety of cars per year.

Zoebelein Kai, AK-31 19:52
Yes.
But we're not the only customer, even now from the, no matter if I now if there comes a point where you say so no, now you really have to start clearing forests again and consciously planting something again, right? Or if there are other conflicts or something like that, then you have to take another look and observe again.

David Kopczynski 19:54
We have.
Oh.

Zoebelein Kai, AK-31 20:11 The
way it is now.
As I said.
Seems promising.

David Kopczynski 20:18
Okay, but let's say now is still no, is still not very easy for the series Life.

Zoebelein Kai, AK-31 20:25
Not that I know of, but that's another one of those things where I said, I'm not deep enough in with us in the developers to kind of see and look at the end of the day. I know that it's just a story that we like and that we just think is good.
David Kopczynski 20:29
Yes.
Okay, what if you say now?
We are increasingly focusing on sustainable materials for use. Do you think that this is also in connection with foreign competition, especially from Asia? I mean, Neo is also making really great new cars and always and please and was always think that they are also doing this here. We have installed bamboo here and whatever, but if they now say ok, we're not pushing that, they think it stinks, especially now, because I'm not focusing more on the German market either. We also have a competitive advantage here.

Zoebelein Kai, AK-31 20:59
Mhm.

I think that's something we've already seen.
Curiously, for example, we always look at fleet customers first.

David Kopczynski 21:29
Mhm.

Zoebelein Kai, AK-31 21:30
So that means that if large companies or organizations buy several hundred vehicles here, it could be another industrial group or something? Just like us, they usually have a sustainability policy, which is based on the motto of being as sustainable as possible in terms of materials, CO2 emissions and everything else.
That they are somehow frontrunners in this respect and then design their purchasing policy accordingly, there is this saying that the private customer likes to demand sustainability and then doesn't necessarily pay attention to it when buying, but I think that's also a thing of the past, so I think that colorful ones are rightly looking at it more and more often.
And they also take it into account and pay attention to it.
And attach importance to it and in that respect it's all a bit of a thing in the long run.
I don't want to say that it's the only criterion, but it certainly doesn't weaken competitiveness, it strengthens it, so I do believe that it has something to do with.

David Kopczynski 22:36
Mhm.

Zoebelein Kai, AK-31 22:38
When competition can be an advantage if you have what it takes.

David Kopczynski 22:42
Mhm, okay now just briefly inserted that I haven't paid attention to this so far, but do you possibly have such a ratio? Sales to private customers and fleet customers at BMW somehow?

Zoebelein Kai, AK-31 22:57
That varies from market to market, but we're not talking about.

David Kopczynski 22:57
You are.

Zoebelein Kai, AK-31 23:01
Small thing, but that can already be in the range of 30 - 50% however market.

David Kopczynski 23:06
Okay, we are still quite interesting, maybe as later.
Zoebelein Kai, AK-31 23:08 Well, that's quite
a volume, isn't it?

David Kopczynski 23:13
Okay, I mean, at some point, possibly through detours and buybacks etc., the fleet vehicles often end up with the customer as used cars.
London, the fleet vehicles often end up with the customer as used cars, so it can still be very nice, but of course significant.

Zoebelein Kai, AK-31 23:23
Or?
Again.
Are you right?

David Kopczynski 23:31
Very nice now actually just the last question, because that fascinated me a bit. Maybe it goes a bit too much into well, additional marketing is not really possible, but maybe you can answer it anyway. The BMW five is there an option here for sustainable materials?

Zoebelein Kai, AK-31 23:46
Mhm.

David Kopczynski 23:47
If you look at it now, at least that's how I felt, if you don't really look at it now, okay, I want to buy a new car with really sustainable materials. Then I didn't notice that the BMW 5 Series offers that.

Zoebelein Kai, AK-31 24:03
Mhm.

David Kopczynski 24:03
So what's it like?
Yes, the marketing strategy might also have to be put on it more from the BB side sometimes.

Zoebelein Kai, AK-31 24:13
Yes, that's where I am now.
As a press spokesperson, that's not really the job of the marketing colleagues, where they're out and about.

David Kopczynski 24:20
Yes.

Zoebelein Kai, AK-31 24:22
I think that's actually the case at the moment, but that's really my guess.
On the one hand, Mans is perhaps not being so aggressive in its advertising at the moment.
Because, of course, a lot of what you make of it can perhaps be misunderstood as greenwashing. But I can't say anything about the details, that would actually be more of a question from someone who is active in marketing somewhere in our company.

David Kopczynski 24:49
Yes, okay, well, that's a good point of reference for compliance, but of course you can also follow up on that.
To what extent car manufacturers also want to avoid, let's say, greenwashing a little bit and I mean, that's a real endeavor, yes, but also like this, if we overshoot the mark to such an extent, then again, no.
Zoebelein Kai, AK-31 25:07
Yes.

David Kopczynski 25:12
And then again you can give me a Gative back these days, unfortunately.

Zoebelein Kai, AK-31 25:16
Yes, as I said there.
It's not my area of specialization, but it's just the way wood is these days.
You have to be very careful how you communicate the topics.

David Kopczynski 25:27
Yes.
Yes.
Okay, well, that's actually it with the flags, we've definitely given you 23 points of reference, which

I'll shed some more light on, especially with regard to the supply chain. That is very interesting. I only vaguely know that there is now a new supply chain protection law, something like that.

Zoebelein Kai, AK-31 25:35
Mhm.
The wrong due diligence obligations, yes, that's exactly where a European one comes in now, where it's simply a matter of them.

David Kopczynski 25:49
Exactly.

Zoebelein Kai, AK-31 25:56
Trans or that they simply know somewhere in their supply chain and, and, and, and can rule out any group things happening.

David Kopczynski 26:04
Mhm.

Zoebelein Kai, AK-31 26:05
The problem here is always the transparency, right? Do they really have full transparency? Often it's not always the case that the supplier tells you that you have your things.

David Kopczynski 26:14
Mhm.

Zoebelein Kai, AK-31 26:14
And that's not necessarily bad faith or anything? It's just that sometimes a good source of supply has been found.
And then, of course, he doesn't want to make that known in order to be a competition somewhere.
He said to himself, "I had the advantage because I did a lot of research and found something, and if I tell everyone where I got it, then the advantage is gone, so sometimes that can also be a motivation not to create full transparency.
But for us it ultimately means that we really have to work with our suppliers again.
We have to have clear rules that they comply with, so we already do that anyway, but then it's also enshrined in law.

David Kopczynski 26:56
Yes, no, for example, a company like Jahr Text is actually also relatively, especially now for seats.
Zoebelein Kai, AK-31 27:06
Yes no, that's exactly when they have to prove that he's complying with everything et cetera and of course it has a bureaucratic burden on my suppliers from time to time, because then certain things have to be proven, but basically it's not a bad thing.

David Kopczynski 27:06
Quite good.
Now we still have maybe one last last fly we just talked about the year text they might have still applies the same, I say, what they what we? This text also applies to several, so from from.

Zoebelein Kai, AK-31 27:29
Mhm.
How can I still choose? So I know them even less? I know, I know the story, but I'm not involved in it myself and I also asked because they asked, because I think that's somehow in it. Unfortunately, I don't have a contact person at one or the other.

David Kopczynski 27:43

Mhm.
Yeah, that's not a problem at all. I have, that's okay, but not.

Zoebelein Kai, AK-31 27:54
As I said, I'm just too far away from them in terms of content.

David Kopczynski 27:57
Yes, yes, no, that's not a problem at all, but I mean I can still project that onto any company, even if it's a startup or not, say that they still have to comply with it, that's all understandable.

Zoebelein Kai, AK-31 28:09
Of course, well, without exception yes.

David Kopczynski 28:12
Yes.
Ne very good.
Thank you very much we have now kept to the half hour for all but 2 minutes, so perfect.

Zoebelein Kai, AK-31 28:21
Very nice.

David Kopczynski 28:23
Many, many thanks again, this has definitely helped me.

Zoebelein Kai, AK-31 28:26
Gladly.

David Kopczynski 28:27
Bring me even now a few approaches and?
Exactly if you want, I can tell you, I say, and then with the Masterline tax as a thank you or I can also give you a copy afterwards, if you want?

Zoebelein Kai, AK-31 28:43 What do
you prefer? But the fact that I have him.

David Kopczynski 28:46
Okay no I mean that's very much appreciated by you in any case and thank you very much I wish you still.

Zoebelein Kai, AK-31 28:52
Mhm.

David Kopczynski 28:54
Have a nice Thursday and a nice weekend.

Zoebelein Kai, AK-31 28:58 Do
I wish you the same?

David Kopczynski 29:00
Thank you.

Zoebelein Kai, AK-31 29:01
Take care, see you later.

A21. Constructs used in the proposed model, their correspondence with the questionnaire items, and their reference source.

Construct	Variable ID	Description/Question wording
Expectation of Performance	EP1	Do you believe that synthetic leather alternatives (e.g., made from plant fibers) can provide the same comfort as real leather seats?
	EP2	Do you think that bio-based leather seats are as durable and of the same high quality as genuine leather seats?
Hedonic Motivation	HM1	Would you claim to be attentive to sustainability in your everyday life?
	HM2	How likely are you to choose a vehicle based on its sustainability and environmental friendliness?
	HM3	How important is the use of sustainable and environmentally friendly materials in the automotive industry to you?
	HM4	How important is it for you to understand the origin of the material and the conditions under which it was produced?
Luxury Perception	LP1	Do you believe that vehicles with bio-based leather seats can be considered luxurious and of high quality?
	LP2	Do you think that premium automotive manufacturers (Audi, BMW, Mercedes-Benz) should offer bio-based leather seats instead of genuine leather seats?

A22. Reliability analysis

Constructs	Item ID	Reliability factor
Expectation of Performance - EP	EP1	**0.338** (Pearson Correlation)
	EP2	
Hedonic Motivation - HM	HM1	**0.858** (Cronbach's Alpha)
	HM2	
	HM3	
	HM4	
Luxury Perception - LP	LP1	**0.418** (Pearson Correlation)
	LP2	

A23. Descriptive statistics of study constructs and WTP.

Construct	Mean	Std. Deviation	No. of observation
EP	1.3894	.62689	104
HM	2.0577	.90992	104
LP	1.4423	.68019	104
WTP	1.57	0.148	104

A24. Correlation coefficients and hypothesis testing status for WTP constructs.

Construct	WTP	Hypothesis
HM	.403	H1
EP	.282	H2
LP	.221	H3

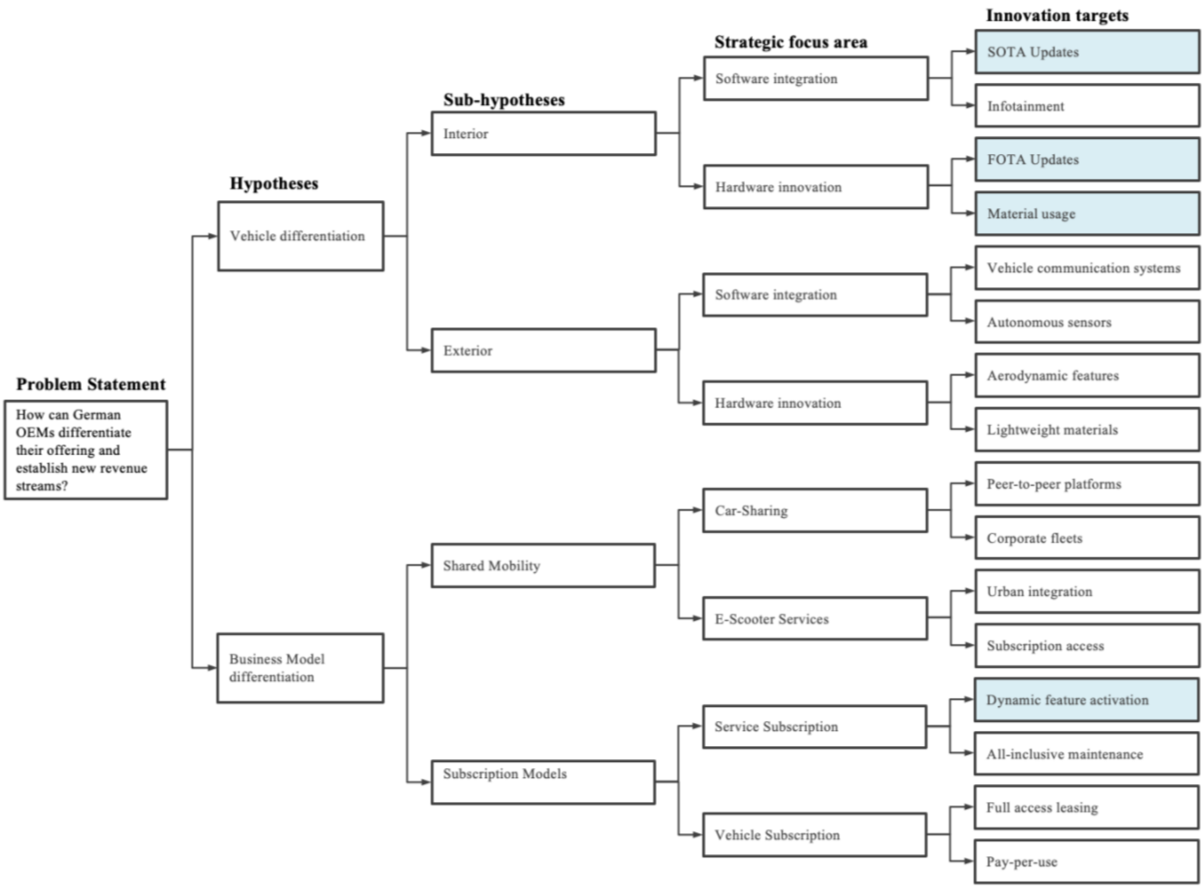
A25. Model summary statistics for WTP

Summary Statistics	R^2	Adjusted R^2	Std. Error of the model	F test
Model SOTA	.175	.15	1.394	7.059

A26. Detailed overview regression analysis

Model Variables	Standardized Coefficients	t-test	Hypothesis	Status
EP	.138	1.208	H1	Confirmed
HM	.383	3.302	H2	Confirmed
LP	-.084	-.686	H3	Not confirmed

A27. Strategy Tree



A28. Strategic Recommendations for German OEMs: Action Plans and Rationale for Enhanced Connectivity Services

1) Implement subscription models	
Action plan	Introduce flexible subscription options for connected services.
Rationale	Aligns with evolving consumer preferences for adaptable and customizable services.
Key consideration	Offer security features within subscription models with caution. Maintaining brand integrity around safety and quality is crucial, especially for German OEMs known for their high standards.
2) Developed tiered SOTA update package	
Action plan	Offer a range of SOTA packages at various service levels (basic, standard, premium) to cater to different customer segments.
Rationale	This approach allows customers to select services that best fit their needs and budget, enhancing customer satisfaction and loyalty
Additional step	Introduce a reward system for adopting SOTA updates. This not only encourages regular updates but also foster ongoing customer engagement and enhances the perceived value of the services.
3) Launch innovative leasing models with integrated OTA updates	
Action plan	Develop and implement a dynamic leasing model where OTA features are integrated into vehicle's leasing contract. Customers can activate/ deactivate features as needed, with corresponding adjustments in the leasing rate.
Ratio	This innovative approach addresses customer perceptions, offering a more palatable alternative to buying a car with pre-installed features.
Challenges & solutions	Contract Flexibility: Collaborate with financial institutions and legal experts to create flexible and adaptable leasing agreements Residual value management: Develop sophisticated valuation models to manage and stabilize residual value, even with changing feature sets. Prioritization shift: Realign organizational strategies to focus on digital products and services, reallocating resources as necessary.

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