

**THE EUROPEAN ELECTRIC VEHICLE MARKET: AN ANALYSIS OF
CONSUMER PERCEPTIONS AND PREFERENCES:
METHODOLOGICAL INSIGHTS**

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Abstract

This study's group part explores the thriving electric vehicle (EV) industry, particularly focusing on the European EV market. By employing consumer and industry expert interviews, perceptual mapping, and conjoint analysis tools, the study provides nuanced insights into consumer preferences and brand positioning. Findings highlight Volkswagen's practicality, BMW's safety and reliability, Nissan's femininity, and Tesla's contemporary and sustainable image. Additionally, results also demonstrate the importance of factors like price, battery range, and safety in EV purchasing decisions. Drawing from this data, advertisement concepts were devised, and recommendations were made aiming to improve BMW's current standing in the EV sector.

The methodology section, led by an individual research effort, meticulously describes the mixed-method approach utilized. Eleven interviews were conducted to gain a thorough understanding of both consumer and professional perspectives. The interviews included six European EV owners and five industry professionals. These observations served as a basis for the development of surveys for the conjoint analysis and the perceptual map, which addressed important research issues on customer preferences and perceptions in the European EV market. Consumer interviews uncovered a range of reasons why people choose to acquire electric vehicles, including economic effectiveness, comfort, and environmental concerns. Significant differences in preferences were found, including the importance of the maximum driving range, the availability of charging infrastructure, and the impact of incentives from the government. Besides that, the relevance of infrastructure development, cost, environmental impact, "range anxiety," and other factors in influencing customer decisions were also stressed by experts.

In summary, a comprehensive understanding of customer preferences, brand positioning, and important factors impacting the adoption of electric vehicles was made possible by the integration of both individual and group contributions. In order to follow the proposed structure,

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all individual contributions, references, and appendixes not used in my own part (methodology) have been excluded.

Keywords

Electric Vehicles, European Market, Sustainability, Consumer Behavior, Perceptual Map, Conjoint Analysis, Marketing Research, Consumer Preferences

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List of Abbreviations

Abbreviation	Definition
EV	Electric Vehicle
TCO	Total Cost of Ownership
ETS	Emissions Trading System

1. Introduction

Electric vehicles (EV's), as highlighted by Rezvani, Jansson, and Bodin (2015), are increasingly acknowledged as a crucial response to challenges like fossil fuel dependency, escalating CO₂ emissions, and a range of environmental issues, marking a significant shift in automotive industry strategies and consumer preferences. The International Energy Agency (2023) predicts that the market for electric vehicles, a rapidly growing sector in the clean energy industry, will experience a significant trend in which around 20% of vehicle sales in 2023 will be electric.

Despite the obstacles presented by the COVID-19 outbreak and following disruptions in the supply chain, together with rising production expenses caused by higher prices of raw materials (Statista 2023), the EV market has experienced substantial expansion (Carrier 2023a). The ability to withstand and overcome challenges implies a strong and consistent increase in EV sales, which, if maintained, might surpass the sales numbers of conventionally fueled vehicles in the near future (Statista 2023).

This study focuses on the European EV market, which has been selected due to its prominent position in worldwide EV uptake and its ambitious environmental initiatives. Europe's rigorous environmental legislation increased public consciousness, and robust governmental support for EV's make it an exceptionally crucial and relevant market to investigate.

As the EV market evolves, so too do consumer preferences towards vehicles. It is therefore crucial to understand how consumers perceive electric vehicles, what factors they prioritize in these new electric models, and how major automotive brands are addressing these preferences. This understanding is essential for aligning industry strategies with the evolving demands and expectations of consumers in the dynamic EV landscape. In order to obtain a thorough comprehension of the current state and extract managerial implications, this study is structured based on two research questions.

Firstly, it is crucial to examine European consumers' perceptions and priorities regarding various characteristics of electric vehicles. The primary objective of the first research question – *How do European customers perceive the leading brands in the EV competitive landscape when considering a set of core attributes?* – is to comprehend the dynamics of brand perception. The second research question – *Which key attributes do European customers value the most in their purchasing decision of an Electric Vehicle (EV)?* – aims to discover the key characteristics that European customers prioritize when making purchasing decisions for EV's.

The methodology of the present study has been planned to specifically tackle these two research questions. After an in-depth literature review, a set of eleven interviews, including viewpoints from both consumers and experts, were carried out to collect qualitative insights. The interviews conducted aimed to investigate the attitudes and desires of European EV consumers, thereby enhancing the study with a wide range of perspectives. The qualitative data served as the basis for constructing two specific surveys, designed to generate a perceptual map and carry out a conjoint analysis. The perceptual map examines the European customers' perception of the top EV brands, with a specific focus on fundamental characteristics. On the other hand, the conjoint analysis highlights the crucial criteria that customers consider when making purchasing decisions for EV's. The study achieves an in-depth understanding of consumer preferences and brand positioning in the European EV market by incorporating these approaches. This methodology provides a comprehensive examination of the changing dynamics in the electric vehicle business, offering vital information for the players in the industry.

As a matter of fact, it became unequivocal through the results of the performed conjoint analysis, that price, battery range, and safety rating constituted the most essential attributes consumers consider when making an EV purchasing decision. That said, other factors such as charging speed, and especially ecological footprint of battery production were still deemed

significant, albeit less so than those already mentioned. By leveraging these insights, automakers can build EV models better tailored to the customers' needs by prioritizing these attributes at the car design and manufacturing stage and, subsequently, advertise the benefits that such features bring to consumers in compelling and effective marketing campaigns. Shifting gears to brand preferences, Volkswagen emerged as the most favored among consumers, with BMW closely trailing behind, whereas Nissan and, particularly, Tesla faced a lower level of preference among respondents.

From the perceptual map, pivotal conclusions were also derived, notably it was revealed that consumers associate Volkswagen with practicality and sincerity. Similarly, Nissan is also perceived as a practical brand, but more so aligned with a feminine image and negatively associated with sustainability. Regarding BMW, consumers seemingly associate the Bavarian brand heavily with reliability, safety, and good reputation, while Tesla embodies modernity and environmental consciousness, becoming synonymous with contemporary and sustainability. These customer perceptions hold immense value for automakers, insofar as they serve to either confirm or disprove the alignment of desired brand values with consumer perceptions. In cases where there is a mismatch, these insights pinpoint potential areas where brands can improve.

Regarding the overall outline of the present study, following the introduction is a thorough literature review that encapsulates the EV evolution – detailing the history of electric vehicles and the importance of the European EV market –, sustainability concept and types, as well as a section analyzing green mobility and how it relates to consumer behavior.

Afterwards, the methodology employed in this paper is explained, including details about the research approach, preliminary interviews, perceptual map methodology, and conjoint analysis methodology.

This section is then followed by the perceptual map chapter, which not only contains the justification for the choice of certain brand attributes, but also describes how the survey was

designed and the characteristics of the collected sample. It concludes with an interpretation of the findings derived from the multidimensional perceptual map.

Subsequently, the conjoint analysis section is introduced, following the same structure delineated for the previous chapter, as it discusses the pertinence of the choice of the selected attributes and levels, as well as the survey design and the sample characteristics. This section also covers the main findings of the conjoint analysis, comprising not only brand preferences and part-worth utilities, but also the impact of gender and age on consumer preferences.

A bonus section focused on BMW is then introduced, that builds upon the central findings from the conjoint analysis and perceptual map, to provide recommendations not only for BMW's BEV product line, but also for a sustainability awareness campaign aimed at portraying the brand as more environmentally conscious. Besides that, two advertisement proposals were also elaborated to assist BMW in communicating this vision effectively.

Finally, the thesis culminates in a conclusion that discusses how the main findings compare with existing literature, what are the managerial implications of said findings, which research limitations were found and what is recommended for future research. The document concludes with a comprehensive references section and an accompanying appendix.

2. Methodology

2.1 Research Approach

The research approach for this thesis consisted of a mixed (qualitative and quantitative) data collection method, where there was gathering of information with the purpose of answering two different research questions, which will be mentioned further in this subchapter.

First, there were eleven different interviews being conducted, six of these with European (Italian and Portuguese) consumers, and all of them being owners of electric vehicles.

Besides that, five different experts were interviewed, with various backgrounds and positions within the EV industry with the purpose of understanding their points of view, in a more professional and knowledgeable perspective, providing information that the consumers might have missed.

These interviews made it possible to better understand consumer and experts' preferences regarding the EV's in the automotive industry, and to collect data that could be used to create both surveys that led to the creation of the perceptual map and the conjoint analysis.

All the information collected from the interviews was used with the goal of building two separate quantitative surveys.

The first survey was constructed with the main objective of collecting information in order to design the perceptual map and, subsequently, answer the first research question:

RQ1: How do European customers perceive the leading brands in the EV competitive landscape when considering a set of core attributes?

The second survey, however, had the goal of gathering data that made it possible to build the conjoint analysis, that will answer the second research question:

RQ2: Which key attributes do European customers value the most in their purchasing decision of an Electric Vehicle (EV)?

2.2 Preliminary Interviews

This phase was crucial to understand what were the main attributes that the perceptual map and the conjoint analysis should be based on. In this analysis, the interviews targeting experts and consumers were used with the sole purpose of gathering information that made it possible to create the surveys that can be seen further in this study. Therefore, the data gathered in these surveys made it possible to construct both the perceptual map and conjoint analysis. By applying both these methods, the two research questions were answered, facilitating the understanding of how European customers and experts perceive the leading brands in the EV industry in terms of attributes, as well as which key attributes influence their purchasing decision when it comes to electric vehicles. The focus on this regional market relies on the fact that all the authors belong to European countries, which facilitates the reach towards such consumers and specialists.

2.2.1 Interview Design

Both structures for the consumers and experts' interviews can be seen in the Appendix (A.2 and A.3, respectively). All eleven interviews (six with consumers – Appendices A.4 to A.9 – and five with experts – Appendices A.10 to A.14) were conducted through two different methods, either online (via platforms such as Microsoft Teams or Zoom) or face-to-face interviews (with an additional recording that was later transcribed). Each interview was projected to last for a maximum amount of 30 minutes.

Consumers

Starting with the consumers, all of these were electric vehicle owners and lived in a European country, either Italy (two) or Portugal (four), in order to facilitate the reach and contact, since these are some of the nationalities of the thesis' authors. The interview structure was divided into eleven different questions, that can be split between two different sections.

With three different questions, the first section consisted of understanding the landscape, by comprehending if the interviewees have ever owned an EV, and if so, which one and for how long (question 1). Besides that, it was also important to understand what were the motivations behind the decision to purchase an EV (question 2), as well as which brands they considered to be the primary competitors in the industry (question 3).

The second section of the interview was aimed to specifically gauge how important some key features and attributes were to these consumers. Therefore, eight different questions were created with the purpose of understanding how much the interviewees' decision making is impacted by said features. Such attributes involve maximum driving range (and what would be the minimum acceptable range), charging availability, duration, and home charging, price of an EV, environmental impact, government incentives, brand reputation and peer reviews. Besides that, consumers were also asked to rank the following factors by importance when considering an EV purchase, focusing on their top five (5 being the least and 1 being the most important): price, range, brand, charging infrastructure, environmental impact, autonomous driving, infotainment, connectivity, safety features.

To conclude this section and the interview, interviewees were asked if they had any other considerations or concerns (besides those that were already mentioned) that could influence their choice when purchasing an EV.

Experts

Moving on to the experts, every specialist was related to the EV industry in Europe, and these were either German (three) or Italian (two), also due to the fact that these are some of the nationalities of the thesis' authors, which facilitated the interaction with them.

In order to understand why these were called experts, it is important to briefly present them. Firstly, there's an E-mobility Manager at Mercedes-Benz, in Germany. Then there's a partner at Detecon International (Automotive Industry), in Germany. Another specialist is the founder

of Eauto.de, Germany's Leading Second-hand EV Marketplace. The fourth expert is a sales consultant for all brands of the Volkswagen Group at Bonaldi, Eurocar Italian Group. The last specialist is a marketing manager at SCAME S.p.a, an Italian pioneering company in the EV infrastructure and components sector, dedicated to advancing sustainable urban mobility and minimizing environmental impact through innovative solutions.

The structure of the interview was also split into eleven questions that were divided into three different parts. Firstly, there was a section, similar to the consumers' interview structure, that aimed to understand the experts' opinions on how consumers perceive certain key features and attributes of EV's, such as the significance of 'range anxiety' and what advances might address these concerns in the future; the current state of EV charging infrastructure and its impact on consumer decisions; the importance of price in the purchase decision of the consumers; the impact of the environmental footprint of EV's in consumers' decisions; the importance of having governmental incentives and policies that encourage EV adoption; and also how do brand reputation and social influence impact the consumers' decisions.

On another question, based on their expertise, they are asked to identify and rank the top 5 factors consumers prioritize the most when considering purchasing an EV: price, range, brand, charging infrastructure, ecological footprint, autonomous driving, infotainment systems, connectivity, and safety features. To finish this section, the experts were asked about which additional factors that weren't mentioned previously could also be deemed crucial in influencing customer decisions.

The second section consisted of understanding the overall situation, where the EV specialists were questioned about the impact of emerging trends on consumer preferences over the next five to ten years, as well as which companies in the EV sector are the main competitors, and why.

On the last part of the interview, the authors asked for recommendations for the survey design, more specifically if there were any methods or question types that the experts would recommend for the elaboration of the survey.

2.2.2 Interview Results

Consumers

Based on the interviews with consumers, out of six interviewees, three of them own a Tesla Model 3, corresponding to 50% of the grand total, while the other three own an Audi Q4 Sportback e-tron, a Nissan Leaf, and a Mini Countryman Cooper SE.

In terms of the motivation behind the purchase of their EV's, the main aspects that influenced the consumers' decisions were their environmental concerns (mentioned by four consumers), and the convenience in terms of comfort and low-maintenance costs (mentioned by four interviewees). Other factors that also impacted their choices were the governmental incentives (two people) and the ever-increasing fuel prices (two people).

The third question concerned the primary competitors in the EV industry, with consumers highlighting Tesla (every customer mentioned it), followed by Nissan (five voters), BMW (four consumers) and a tie between Volkswagen, Audi, and Hyundai (all with two mentions). Other brands were mentioned only once, such as Mercedes, Lucid, Toyota, Renault, and Porsche.

The second section of the interviews concerned the key features and attributes that consumers value most in electric vehicles. The first aspect to consider is maximum range, where four of the interviewees think of it as a very important feature, while one isn't sure about it and another one does not consider it important, as he prefers cars with shorter ranges and lighter weights. In terms of the minimum acceptable range, the answers tend to vary, with three consumers establishing a minimum acceptable range of 200km, one consumer preferring 100km (the one who prefers shorter ranges), and two other consumers who only accept cars that can provide a

minimum of 400km and 500km, respectively. This results in a mean value of 266,67 km, correspondent to what the consumers define as their minimum acceptable range.

Regarding charging availability and duration, most consumers consider it to be important, and sometimes it can become a problem to find public charging stations, so most interviewees end up having a home charger, with three of the consumers considering their personal Tesla chargers extremely fast and reliable. The one person who doesn't have home charging has the benefit of living near a public charging station.

Another relevant feature to analyze is price, and with only one person considering not important, the vast majority defined it as a key factor, especially in terms of future savings, which brought value to the transaction.

In order to understand if it affected their purchase decision, the consumers were also questioned about the impact of the environmental concerns. In this feature the answers were more leveled, with three people considering an important asset, one defining it as a "plus" that doesn't really make a difference, and two other interviewees finding it irrelevant.

Government incentives are something that many countries have to offer and can play an important part influencing customers' decisions. However, only a minority (two people) considered it to be important for them in terms of affecting their EV purchase, while most interviewees, either didn't know about these incentives (one person) or weren't influenced by them (three people).

In terms of brand reputation, most people (four) didn't consider it very important, with two other people saying it impacted their choices. But, when taking the opinion of their peers into account, there was a tie, with three people saying it doesn't influence their decisions, and three other interviewees considering it an important factor.

On the penultimate question, they were asked to rank the following factors by importance when buying an EV: price, range, brand, charging infrastructure, environmental impact, autonomous

driving, infotainment, connectivity, safety features, focusing on their top five (5 being the least and 1 being the most important). After analyzing their answers, it was possible to conclude that the five most common and important factors voted by the interviewees were firstly, range, then environmental impact, followed by price, then brand, and finally charging infrastructure.

On the last question, after being questioned if there were any other considerations or concerns that could impact their decision to buy an EV, interviewees mentioned comfort, fun while driving, home charging convenience, mechanical simplicity, design/aesthetics, ease of driving, and the resale value of the car.

Experts

To start the interview, experts were asked about key attributes and features of EV's, and the first one was the significance of "range anxiety" for consumers and about what advances might address these concerns in the future. In summary, experts generally concurred that "range anxiety" is a real concern for customers, while opinions on the importance of the issue and possible solutions differ. While some argue that it can be reduced by making small personal adjustments and being more aware of the availability of charging stations, others emphasize the necessity of large-scale fast-charging networks and technology improvements to address these worries and promote the widespread use of EV's.

Based on their assessment of the current state of EV infrastructure and its impact on consumers' decisions, it is possible to state that the experts emphasize that the installation of charging infrastructure is essential to the shift to electric vehicles, especially if an ongoing European investment is made. They stress how crucial it is to identify various client categories and their charging requirements. In Germany, the number of charging stations is expanding quickly, but with larger batteries and quicker charging times, the need for such a broad network is being questioned. Italy suffers from a lack of infrastructure, which makes long-distance travel difficult. In Italy, there are more charging stations than petrol stations, however, most of them

only offer slow charging, and switching to faster ones takes time and substantial investments. Despite these obstacles, Europe's infrastructure for charging is expanding rapidly; by the end of 2022, 450,000 public access charging stations are anticipated. Worries about how energy market volatility would affect the price of EV charging continue. The connection between charging infrastructure and the uptake of electric vehicles is highlighted by these combined insights.

When questioned about the importance of price, experts unanimously agreed that it is a critical factor influencing consumers' decisions to buy EV's. The perception of higher upfront costs, largely attributed to battery expenses, acts as a significant barrier. That said, experts also mentioned that consumers often overlook the Total Cost of Ownership (TCO), which includes maintenance, fuel, and insurance, which could make the option of an EV more enticing. While affordability remains a challenge, especially in certain segments, experts anticipate price reductions by 2030, driven by better access to lower-cost lithium-ion batteries. In conclusion, price sensitivity plays a central role in EV adoption, with a changing landscape ahead that promises more affordability.

Regarding the effect of environmental footprint in the decision of consumers, the experts' opinions vary. Some emphasize the variability of its importance, with economic and personal factors often outweighing environmental concerns. In contrast, in Italy, a substantial portion of EV drivers prioritize environmental benefits. Overall, consumer decisions regarding EV's appear to depend on personal values, awareness, and economic considerations, with growing attention to the ecological footprint shaping choices regarding electricity sources and battery disposal.

The next attribute considered is government incentives, where all of the specialists defend that these play a crucial role in encouraging the adoption of electric vehicles. They stress that the transition to electric vehicles would be much slower without these incentives and that sudden

adjustments to incentive schemes may turn off prospective customers. Experts also emphasize the significance of subsidies for EV-related infrastructures, such as charging stations and photovoltaic installations, in addition to purchase refunds. Government incentives also include use perks like free parking and access to specific places. Notwithstanding their value, several experts believe that incentives could benefit from additional refinement. They state that these are important in lowering the cost and increasing the accessibility of EV's.

Brand and social influence were also considered, with experts pointing out that conventional brand loyalty is gradually declining, which presents a significant opportunity for more recent entrants in the EV market, like Tesla and other Chinese manufacturers. Although there is still some degree of brand loyalty, it has diminished, and customers are more likely to look at other brands that have comparable quality to well-known ones, especially if they offer more affordable alternatives.

On this question, experts were asked to, based on their expertise, rank which factors consumers prioritize most when considering purchasing an electric vehicle – the attributes list included price, range, brand, charging infrastructure, environmental impact, autonomous driving, infotainment, connectivity, safety features. Hence, the five most voted features were firstly price, then range, charging infrastructure, safety, and, finally, environmental impact.

After being questioned whether there were any unmentioned factors that could be crucial to influence consumers' decisions, experts pointed out several, such as the integration of EV's into smart homes, including bidirectional charging and power generation capabilities, as well as concerns about battery manufacturing conditions and the origins of raw materials. Other attributes that were mentioned were additional features dependent on subscriptions, battery durability, ease of use, considerations related to urban traffic restrictions and community engagement, with experts stating that these could also play pivotal roles in shaping consumer preferences in the EV market.

The second part of the interview includes two questions, with the first one being related to the impact of new EV trends on the consumer's preferences over the next five to ten years. With this being said, there were several trends mentioned, such as the switch to solid-state batteries, the increased emphasis on sustainability, the development of technologies like inductive charging and super charging, and the need to take into account vital raw materials.

The second question consisted of pointing out who the main competitors in the EV industry are, and why. The brands that were most mentioned by the experts were Tesla, known for strong marketing and high performance. Then there is BYD, which has extensive experience in batteries and offers good technological products at competitive prices. In third place there was a tie between Audi, Volkswagen, BMW, Mercedes, Porsche, which lead the way in user experience and infotainment. In fourth place there is Fiat (Stellantis Group), recognized for high-quality EV products, and lastly there is NIO, a Chinese brand that offers new concepts with attractive initial prices, although batteries are sold separately.

On the last question of the survey, when asked about what suggestions they might have had to help the authors building the survey, two experts proposed two questions “What were the biggest concerns of now EV owners before buying (e.g., related to range anxiety, an insufficient charging infrastructure, slow charging time, etc.), and were these concerns realized or not?” and “How often in a year are consumers willing to charge externally and be dependent on a foreign infrastructure compared to their own personal charging station?”.

2.3 Perceptual Map Methodology

In this project, the first tool to be used was perceptual mapping, which according to Nigam and Kaushik (2011) consists of the visual method for displaying potential consumers' perceptions. By understanding this, it is possible to conclude that a perceptual map is a good analytical method that can be helpful to understand how customers perceive certain products or services. According to Gigauri (2019) perceptual maps serve the goal of presenting brands and their

advantages based on consumers' perceptions, with similar brands or perks being grouped together, and as a result, advantageous characteristics dictate brand positioning. Gigauri (2019) also defends that a perceptual map's output aids in determining which benefits, according to customer perceptions, are grouped together. Furthermore, it pinpoints the advantages that, in the eyes of consumers, are negatively correlated with one another.

Managers can find chances for product differentiation and develop fresh marketing tactics that highlight the distinctive attributes or benefits of their products by examining the distances between products on the map, as defended by Sinclair and Stalling (1990).

For Gigauri (2019) it is theoretically possible to map subjects that are scored on a variety of attributes to display their relative positions with respect to the evaluative attributes and other subjects.

In conclusion, according to Gigauri (2019), perceptual mapping is a powerful tool for marketing research that can be used for market segmentation, concept development or evaluation, new product planning or positioning, advertising, and additional marketing-related tasks, while also being used to monitor shifts in consumer perceptions in the marketplace. Consequently, perceptual map-based tactics can facilitate more consistent growth and higher profits.

2.4 Conjoint Analysis Methodology

According to King, Labas and Renaudin (2019), the conjoint analysis (CA) appeared in the 1960s, but it was not widely used commercially until the late 1970s and its accessibility to practitioners and academics across various disciplines increased in the 1980s and 1990s, thanks to the emergence of affordable software for designing survey instruments and analyzing results. Eggers et al. (2021) defended the conjoint analysis, which originally evolved from the conventional rating or ranking-based approach in marketing into a comprehensive experimental method for studying individuals' discrete choice behavior, particularly with the introduction of the choice-based conjoint variant.

Green and Rao (1971) state that conjoint measurement, as implied by its name, focuses on assessing the combined impact of two or more independent variables on the arrangement of a dependent variable. For instance, an individual's preference for different houses may be influenced by the joint effects of variables such as anticipated resale value, quality of the school system, tax rates, proximity to work, and other relevant factors. Bridges et al. 2011 (as cited in King, Labas, and Renaudin 2019) defends that CA is frequently employed to simulate the actual decisions individuals make when purchasing products, services, healthcare, and even in the realm of political preferences, among other areas.

The conduct of conjoint analysis typically involves administering a specialized survey wherein consumers are asked to rank the significance of certain features under consideration, and the subsequent analysis of the results enables the firm to assign a value to each feature, as according to Stobierski (2020).

Stobierski (2020) also states that there are four types of conjoint analysis, with one of them being the Choice-Based Conjoint (CBC) analysis, which is used to find out how respondents evaluate different feature combinations. Furthermore, in studies assessing several traits or qualities, Adaptive Conjoint Analysis (ACA) is employed to accelerate the procedure and extract insightful information from every respondent. Full-Profile Conjoint Analysis is an additional technique that asks respondents to select the product that best describes their inclination to buy after displaying a number of full product descriptions. In the last strategy, known as MaxDiff Conjoint Analysis, participants are given a range of alternatives to choose from and are asked to rank them from "best" to "worst" or "most likely to buy" to "least likely to buy." With the goal of understanding how much consumers value certain attributes in electric vehicles, the group has decided to select a choice-based conjoint (CBC) Analysis, as it is considered the most adequate method for this study.

3. Bonus Part

As automakers gradually make the shift towards a fully electric future, be it by consumers' increasing demand for this type of vehicle or by governmental action, it is undeniable that some brands are being more successful than others in that transition. In this chapter, we will explore particularly how BMW has been struggling to make a substantial impact on the electric vehicle market (especially in the BEV segment), still over relying on the sales of internal combustion engine (ICE) vehicles. Drawing from the insights obtained through both the conjoint analysis and the perceptual map, a marketing campaign was devised – comprised of two advertising concepts – aimed at assisting BMW in improving its current market position in BEV.

3.1 Introduction

The European Union's "Fit for 55" climate package represents a pivotal shift in environmental policy. Its aim is to reduce net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels, and it bears profound implications for the automotive industry. At the heart of this initiative is the extension of the emissions trading system (ETS). This system places a price on carbon emissions, economically incentivizing automakers to shift from internal combustion engine (ICE) vehicles to electric vehicles (EV's).

As a result, the continued production of ICE vehicles becomes increasingly costly, nudging manufacturers towards electrification (Bulai et al. 2021). Additionally, the package places a strong emphasis on zero-emission mobility. It focuses on the development of comprehensive charging infrastructure, the creation of an EV battery value chain and the increase in uptake of electric cars through various support mechanisms. These measures not only build the necessary infrastructure but also cultivate favorable market conditions for automakers to invest in EV technology (Motowidlak 2022).

A key component of the package is its objective to cease the manufacturing of ICE vehicles in the EU by 2035. This provides a definitive timeline for automakers to reorient their production

lines to EV's, necessitating substantial investment in new technologies and manufacturing processes (Grzesiak and Sulich 2022). Furthermore, the package includes economic and policy instruments, such as the second emissions trading system for buildings and transport, along with reforms to European energy and climate legislation. These instruments are designed to tighten targets, scopes, and structures within the automotive sector. Such measures make it increasingly advantageous for automakers to invest in electric mobility solutions (Schlacke et al. 2022).

This shift has significant implications for major automakers like BMW, presenting both challenges and uncertainties. For instance, while Volkswagen aims to become the global leader in electric cars by 2025 and Nissan is planning to halt ICE development for Europe by 2025, investing 23 billion euros in an electric offensive by 2026, BMW's strategy appears more cautious. They plan to significantly increase the proportion of electric cars sold by the end of 2023 and aim for at least 50% of global sales to be electric by 2030 (BMW Group 2023a). However, they are also continuing to develop combustion engines and explore alternative fuels like e-fuels and hydrogen. This dual approach reflects their uncertainty about market demand between 2023 and 2035.

In this section, we will focus particularly on BMW and its performance in the EV market. Firstly, it is important to understand the reasons behind the group's choice of analyzing BMW in this bonus part. The first factor relies on the fact that when examining the Conjoint Analysis survey, BMW was the second most preferred brand. Nicola and Bloomberg (2023) highlight BMW's poor performance in the worldwide electric vehicle (EV) industry, specifically noting that Tesla has outperformed German automakers, even operating from within Germany. According to Nicola and Bloomberg (2023), sales of Tesla in the first half of 2023 exceeded the combined sales of Mercedes-Benz Group AG, Volkswagen AG, BMW AG, Porsche AG and BMW AG. However, Nicola and Bloomberg (2023) also defend that the Germans' greatest

danger is their deteriorating position in China, where EV's are predicted to account for 90% of the market by 2030, putting more pressure on the Germans to expedite the development of more competitive EV options.

Therefore, the group has decided to delve deeper into BMW and focus on understanding what could be improved and implemented by the company, in order to face all these adversities and increase its competitiveness in the EV market.

Forbes (2023) states that the business of BMW is the production and retailing of cars and motorbikes, functioning via the subsequent business divisions: Automobiles, Motorbikes, Banking, and Other Entities. Founded in 1916, BMW possesses four different brands under its name such as MINI, BMW, Rolls-Royce and BMW Motorrad.

The challenge for BMW is the potential misalignment with the ambitious goals of the "Fit for 55" initiative, as they continue to invest in combustion engine technology. This approach might expose them to regulatory and market risks, especially if governments worldwide adopt stricter emissions regulations and consumer preferences overwhelmingly favor EV's. It could also lead to missed opportunities in the rapidly growing EV market, where competitors like Tesla, a pioneer in electric vehicles, are making substantial gains.

With a total amount of assets of 43.2B€ in 2022, BMW showed a gross profit of 550.6M€, which shows a growth when compared to the previous year (155.7M€). The positive result of the Company was mainly impacted by a positive interest margin of 26.8M€ (26.3M€, in 2021) and a profit on financial transactions of 532.3M€ (130.0M€, in 2021), according to BMW Group (2023c). Besides that, the company has shown another increase in terms of net income, going from 119M€ in 2021 to 404M€ in 2022. This makes it possible to conclude that BMW has been positively recovering since the pandemic, from a financial point of view.

In terms of electrified (electric and hybrid) vehicles delivered, BMW also states that it has sold over 430 thousand vehicles just in 2022. According to BMW PressClub (2023), the company informed that its global sales of fully electric vehicles sold by the BMW Group increased significantly by 83.2%. In the first quarter, sales of completely electric vehicles under the BMW brand more than doubled, with nearly 56,000 EV's delivered to consumers (+112.3%). However, when analyzing the overall EV market in the first quarter of 2023, it is possible to understand that no BMW car is between the top 10 most sold electric vehicles, with the Tesla Model Y completely surpassing the competitors, selling 71.6 thousand units (Retourné 2023). The second place also belongs to Tesla, with its Tesla Model 3, but this car “only” sold 19,6 thousand units. According to Mir (2023) and Carlier (2023b), it can also be stated that BMW isn't even in the top 10 brands with the highest market shares in the EV industry, being placed at number 12, with a market share of only 2.8%. With this being said, it becomes of extreme importance to understand exactly why BMW is failing to face its competitors in the EV industry. Despite the brand has been increasing its sales, it still isn't enough to be considered a relevant contender in the electric vehicles industry.

The primary objective of the upcoming section is to formulate an advertising campaign grounded in the insightful data produced by the two surveys conducted. The researchers aim to expand on these results by conducting in-depth research and analysis, emphasizing the utilization of data-driven insights to bolster BMW through effective advertisement strategies.

3.2 Conjoint Analysis Findings and Advertisement Proposal

To further understand the complexity of this issue, our team tried to reach out to a contact at BMW, specifically someone who could not only provide more detail about BMW being seemingly a laggard in the BEV segment, but also shed some light on the feasibility of the ideal EV identified in our conjoint analysis survey (see Appendix B.3) and whether it aligned with

BMW's current product strategy. Unfortunately, this didn't come to fruition, due to time constraints and the unavailability of our BMW contact to be interviewed. However, it is pivotal to point out that this laggard status is not exclusive to BMW, as many other German carmakers are also falling behind, namely the Volkswagen Group (which includes the Audi brand), Mercedes and others (Boston 2023) – all of which cater to market segments very similar to those that BMW serves.

As observed previously, one of the main obstacles for EV mass adoption is the affordability of said vehicles, which, albeit increasingly cheaper, still exceed the average price of a gas-powered car by a few thousand dollars (Lindwall 2023). Nevertheless, the challenge of bringing prices down might not be as hard as initially believed and it could indeed be feasible to build the ideal electric vehicle identified in our conjoint analysis survey in the coming years. In fact, if we observe models developed in other markets as well as some arising technology trends in the electric vehicle sector, that possibility seems quite likely.

Take the VW ID.3 or even the Mercedes EQS as examples of EV's that have suffered price cuts in an attempt to compete with the very low prices of other Chinese competitors (Johnson 2023a; Bloomberg 2022) or the recent claim from VW's CEO that a 20,000€ EV will be possible around 2025 (Johnson 2023b). Similarly, Elon Musk has promised a 25,000€ Tesla as well (Waldersee 2023a), but these claims are yet to be materialized. Besides that, the recent arrival of Chinese automakers with very competitive prices (though it is yet to be determined if these are a result of an efficient cost structure or Chinese government subsidizing production – European Commission 2023), such as BYD and NIO, to the European market (Waldersee 2023b) could make EV prices more attractive for the masses. Simultaneously, the costs of batteries dropping annually due to technological improvements (Goldman Sachs 2023) will also help in driving prices down substantially.

All the aforementioned factors taken together should suffice as evidence that price points between 25,000€ and 44,999€ might indeed be achievable in at least 5 years or so, but being achievable doesn't necessarily mean they're desirable, at least for BMW, especially considering its image as a luxury brand, with exclusivity unquestionably being one of its defining values. In fact, BMW's CEO, Oliver Zipse, has recently said it is not interested in engaging in price wars with competitors, as the company is already hitting its EV sales targets ahead of schedule, so there would be no need to decrease prices at the expense of lower EBIT margins, which currently sit at around 9.0 - 10.5% (Waldersee 2023c). That said, Tesla, being one of the main competitors in the EV space and also positioned in the luxury segment, has achieved a significantly higher EBITDA margin in Q3 2023 than BMW, currently standing at 16.1% (Tesla 2023), thereby demonstrating that it is indeed possible to keep healthy margins while selling high volumes of cars at similar (though slightly less expensive) price points. Therefore, as long as BMW's supply chain is not constrained and allows that to happen (differently from what has occurred throughout most of 2023 – Automotive News Europe 2023a), BMW could also adjust its pricing strategy accordingly in the coming years.

As a matter of fact, from as early as September 2023, BMW introduced a new model in the BMW iX1 product line (which started in November 2022 – Electric Vehicle Database 2023a), the BMW iX1 eDrive20, which the company describes as an “economical entry into the world of premium electric mobility” (BMW Group 2023b), being the cheapest BEV offered by the Bavarian brand until now, which shows that BMW recognizes the need for EV's at less expensive price points, thus cementing our findings.

Beyond the pricing aspect, evaluating the feasibility of other features highlighted in our top-ranked conceptual EV (see Appendix B.3) is also essential. Pertaining to battery range, BMW vehicles seem to do well in this regard (with some models achieving 360 km and high-end

variants reaching up to 520 km – Electric Vehicles Database 2023h), and while the concept car that ranked first in the conjoint analysis survey boasted a driving range that exceeds 500 km, the concept EV that ranked second only required approximately 201 km – 500 km of range, which could be considered the optimal balance for automakers moving forward, given the popularity of this range level among our survey respondents.

Safety-wise, most BMW vehicles also achieve high safety ratings, ranging from 4 to 5 stars in the Euro NCAP rating (Euro NCAP 2023), hence, that is another area where the company is already attending to the high demands of consumers. In terms of charging speed, we concluded that most EV's already support DC Fast Charging, and BMW is no different with charging speeds ranging from 130kW to 207kW (Electric Vehicle Database 2023b).

Regarding the ecological footprint of battery production, according to the BMW Group (2022), since 2020 the company has “only purchased cobalt and lithium for battery cells directly from certified mines in Australia and Morocco”, but one cannot rely solely on BMW’s word, so we conducted a more in-depth investigation. Some sources have claimed that there are irregularities that go against labor and environmental laws in a Moroccan cobalt mine that BMW resorts to, but the Bavarian company has sought to clarify these claims and wants the mining firm to comply with their high environmental standards (Automotive News Europe 2023b). With the benefit of the doubt, this could indicate that BMW was not aware of these alleged law infringements of one of its suppliers, and it seems to be taking action to solve them. Apart from that, the automaker has also claimed to be more interested in investing in recycling battery materials from other EV's, than in mining these (Waldersee and Amann 2023), which again seems to demonstrate its commitment in this area and might align with a low ecological footprint of battery production, as identified in our conjoint analysis for the ideal electric vehicle.

Having examined and validated the feasibility of the physical attributes associated with the concept car that secured the highest ranking, it is critical to understand how BMW could effectively advertise these attributes and the benefits they bring to their customers through a well-executed marketing campaign that builds upon the main findings from the conjoint analysis, as well as the perceptual map.

So as not to overwhelm consumers with a great variety of features, we decided to select only a subset of the most important attributes for BMW when devising their advertising. As such, according to the results gathered from the conjoint analysis, we could verify that within the BMW brand: price, driving range and vehicle safety are the top 3 most important features (refer to Appendix B.2) and these should, therefore, be the main focus of BMW's marketing campaign for its "ideal" EV.

Price

In terms of price, our suggestion for BMW is to position their new EV within the 40,000-44,999€ range (i.e., within the upper interval of the 25,000€-44,999€ range recommended by the conjoint analysis), provided that this price is economically viable for BMW. This pricing choice aims to strike a balance by offering an economical entry point to BMW's electric segment, while preventing an excessively low price that could otherwise dilute BMW's luxury brand image, given that price serves as a key signal of brand quality to consumers (Erdem et al. 2008), making it a central element of this car's advertising. Besides that, this would also be a very competitive price among its main rivals, especially Tesla, with the Model 3 prices currently starting at around 44,000€ (Electric Vehicle Database 2023c).

Range

Regarding range, it is unequivocal that range anxiety is still a prominent concern for many drivers, constituting a barrier to EV mass adoption (Mildner 2023). As such, it is pivotal that

BMW effectively informs its potential customers and eases their concerns by building an EV that has a driving range capable of attending most people's needs (within 201-500 km) and advertises this factor in a way that people can grasp how far their car can go on a full charge.

Safety

And finally, with respect to safety, BMW should make clear to drivers that their ideal EV is very safe and that no compromises were made in that regard by highlighting features that convey to the customer how secure the car truly is (e.g., automatic emergency braking, lane departure warning or adaptive cruise control to name a few). Additionally, the company could also exhibit high safety ratings from independent car safety assessment agencies (be it Euro NCAP or some other accredited organization) in their advertising materials.

Advertising Proposal

Considering the three previously mentioned attributes, we devised the ad for BMW's future EV included below, using Microsoft's Bing Image Creator AI for image generation (with the prompt "An ad of an affordable BMW EV facing the sunset"), with the text being added afterwards in PowerPoint.

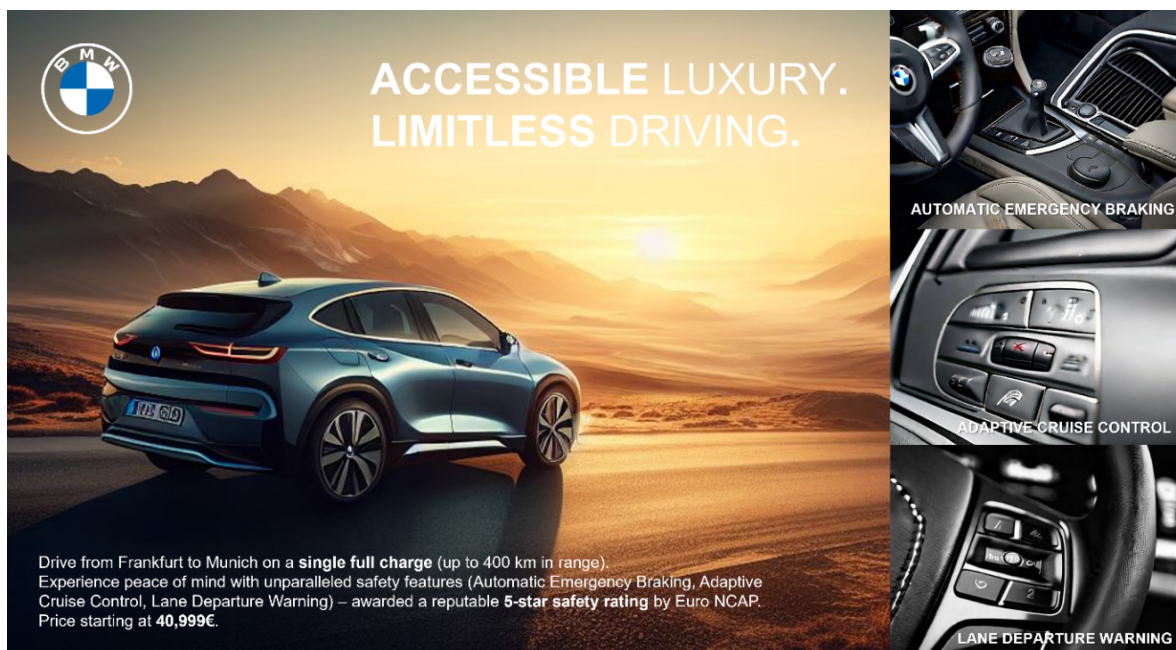


Figure 1 AI Generated Ad for BMW's Future EV

This advertising material for BMW's "ideal" EV presents two short but meaningful taglines ("Accessible Luxury"; "Limitless Driving") that convey to the consumers how they should perceive this new BMW model: affordable and packed with a very competent battery that will allow them to drive long distances on a single charge – which is then complemented by the smaller text included at the bottom that provides some more details into the exact driving range as well as price. The line "Drive from Frankfurt to Munich on a single full charge" is intended to be an example for the German market of how far the car's battery lasts – this statement should obviously be tailored to suit the specific country in which the model is being promoted, ensuring comprehension across different publics.

Besides that, this piece of advertising also draws attention to three main safety features that this car possesses and that will make the driving experience much more secure and worry-free for drivers. The visuals themselves captivate potential customers with the model's attractive and contemporary design, whereas the inclusion of BMW's logo serves not only to convey the ad's subject but also to connect it with the brand's esteemed reputation and sophistication.

3.3 Perceptual Map Findings and Advertisement Proposal

This section aims to develop an advertisement proposal for BMW, based on the insights gained from Perceptual Map analysis and its brand image. Keller (1993) defines brand image as the way consumers perceive a brand, influenced by the associations they have with it in their memory. Our goal with this plan is to enhance BMW's image in terms of innovation and sustainability while maintaining the brand's esteemed reputation and securing its status as a symbol of excellence and prestige. De Chernatony (1999) highlights that a brand's reputation reflects its consistent ability to deliver beneficial outcomes to a diverse range of stakeholders. Therefore, this plan will focus on leveraging BMW's history of positive actions and outcomes, while strategically enforcing its commitment to forward-thinking and environmental responsibility. BMW's reputation has been built over time, earning it a prestigious place among

the world's top 15 most valuable brands in 2022 (Faria 2023a). By 2023, BMW further solidified its standing, ranking as the fourth most valuable brand in the automotive sector, with a brand value of 20.9 billion U.S. dollars (Faria 2023b). As illustrated by its proximity to the 'reputation' attribute on the perceptual map, this 'reputation' is part of BMW's core identity, shaped over decades through consistent communication, product performance and customer experiences that reinforce these values.

In the context of brand extensions, consumer trust in a brand's reliability becomes an important factor. This is particularly relevant when an established brand like BMW ventures into new product categories, such as electric vehicles. Dacin and Smith (1994) state that brand reliability is critical in reducing the perceived risk associated with purchasing a brand extension. For BMW, the trust built over the years through engineering expertise and commitment to safety is instrumental in its successful expansion into the electric car segment. This trust is crucial, particularly in the luxury car segment, where buyers expect a confluence of premium quality and technological sophistication.

Maintaining and growing consumer trust in a brand is vital in today's competitive market, where consumers can easily switch their loyalties based on attractive offers from competitors.

A key aspect of the campaign for BMW is to reinforce the perception of BMW's commitment to sustainability. Although consumers currently do not strongly associate the BMW brand with 'Sustainability', BMW is making efforts to change this perception. This perception is likely influenced by BMW's historical emphasis on combustion engines and high-performance luxury vehicles, a space in which it has established its dominance and brand identity. However, the company is actively promoting sustainable practices to alter this narrative, such as the BMW i Vision Circular concept, which involves using 100% recycled or bio-based materials and ensuring the vehicle's full recyclability at the end of its lifecycle (BMW Group 2023a).

However, Oliver Zipse, CEO of BMW, acknowledges that while BMW is moving towards sustainability, it cannot yet completely move away from the combustion engine market, which remains its primary source of income. Zipse declined to commit to a specific deadline for ending the production of such vehicles, a contrast to the approaches taken by Volkswagen and Mercedes-Benz (Waldersee 2023d). Hence, the authors proposed to develop an information campaign to highlight BMW's efforts in sustainable technology research and development.

The perceptual map also provides insights into BMW's competitive landscape. It emphasizes the importance not only of intrinsic brand attributes but also the relative positioning against competitors. BMW is well-distinguished from Nissan and Volkswagen in the luxury and performance space but, analyzing its position, could face future competition from Tesla in the sustainability and modernity aspects. BMW, traditionally viewed as a brand of luxury and performance, needs to assert its commitment to sustainability to maintain relevance in an industry shifting towards eco-friendly technologies.

To effectively guide a specific campaign, it is crucial to have a comprehensive knowledge of the intended market. As the leading luxury car brand worldwide with 2.4 million vehicle deliveries (Carlier 2023c), BMW has a distinct market segment. According to Foedermayr and Diamantopoulos (2008), market segmentation involves differentiating various customer groups in a market, each potentially approached with unique products or marketing strategies. BMW's clear target group simplifies consumer targeting, allowing for more focused and personalized marketing strategies. This strategic advantage ensures that marketing efforts are direct and tailored to meet the unique needs of luxury car buyers.

Furthermore, BMW should work on strengthening its image as a "contemporary" brand in order to sustain its leadership in this competitive market. Being competitive is crucial for maintaining a competitive advantage in the continually expanding automotive industry (Rotjanakorn, Sadangharn and Na-Nan 2020).

The market moves so fast that it is impractical for companies like BMW to change their entire range of vehicles without being overtaken by new developments. To remain competitive, it is essential for BMW to continuously improve by updating and advancing its technology. In the automotive industry if a brand wants to be “contemporary”, it should increment the latest technological innovations, these can be related to both advancements in electric vehicle technology but also connectivity and autonomous driving features (Bhovichitra and Shrestha 2022).

To effectively communicate these innovations and contemporary aspects of the brand, the advertisement should therefore project a vision of BMW as a brand in step with the future, highlighting cutting-edge technologies, avant-garde designs, and strategic alliances. BMW is preparing to reinvent itself and lead the way in modern automotive innovation with the launch of its all-electric Neue Klasse vehicles in 2025. This move marks a revolutionary period in design, development, manufacturing, and distribution (BMW Group n.d.).

In addition, as BMW ventures into the electric vehicle market, the marketing narrative should reinforce the brand's performance heritage. The perceptual map indicates proximity to 'Performance', suggesting that BMW's transition to electric vehicles does not compromise its legacy of a dynamic driving experience. Consumers choose brands like BMW for their performance and the marketing should celebrate the seamless integration of BMW's performance pedigree with its electric offerings.

As a final point, addressing BMW's traditionally masculine image is another critical aspect. This perception has developed due to various factors, including BMW's brand positioning and prior marketing methods. BMW's automobile design is mostly perceived as aggressive, and the brand's emphasis on performance and a dynamic driving experience has resonated with attributes traditionally associated with masculinity (Williams and Bennett 1975). Consider the analysis of BMW's 'Star' commercial as an illustrative example. In this advertisement, the use

of the car's speed and agility to exert dominance reflects broader cultural narratives that associate high-performance vehicles like BMWs with masculine ideals of status and control (Jain 2005).

Following a comprehensive examination of the perceptual map and an evaluation of BMW's present performance, we have pinpointed five crucial factors that could serve as focal points for BMW's advertising approach. The following aspects will form the basis of our forthcoming advertisement proposal, offering direction on how BMW could communicate this to achieve the most influence.

Commitment to Sustainability

The importance of sustainable practices in advertising has grown significantly because of their influence on value generation and consumer allegiance. This is because consumers now opt for companies that exhibit a sincere dedication to environmental stewardship (Servera-Francés et al. 2020). It is essential to showcase sustainability in the automobile sector to foster brand loyalty and to align with the Sustainable Development Goals (SDGs). The transition towards sustainability not only addresses the desires of consumers but also provides a strategic edge in a fiercely competitive industry (Lukin et al. 2022).

Emphasis on Innovation and Future Vision

In a time characterized by swiftly changing consumer preferences and expectations, advertising that places importance on innovation and a future-oriented perspective is crucial for effectively captivating audiences and maintaining competitiveness in the dynamic marketplace (Rizomyliotis et al. 2017).

Contemporary Image

A modern brand image is essential in advertising as it reflects a brand's conformity with current trends and cultural changes, thus increasing its significance and reinforcing its connection with contemporary consumers in a dynamic and competitive market (Kučera 2019).

Brand Extension Trust

Brand extension trust plays a crucial role in advertising by increasing consumer trust in new products that are connected to a well-known brand. This strategy efficiently utilizes the existing reputation of the brand to ensure that the new items are accepted and successful in the market (Chung and Kim. 2014).

Gender Inclusive Branding

Gender-inclusive branding is crucial in contemporary advertising as it not only questions conventional gender stereotypes but also conforms to the changing societal standards of gender fluidity and inclusivity, therefore attracting a wider and more diversified audience (Cooke et al. 2022)

Advertising Proposal

Considering these five crucial characteristics, following the same procedure described for the previous advertising concept, we used an AI picture generator to create an ideal image that could be used as an advertisement by BMW.



Figure 2 AI Generated Ad for a BMW Sustainability Campaign

This piece of advertising aims at raising the public's awareness to the initiatives that BMW is taking to make its entire value chain carbon-neutral by 2050 at the latest (as the company itself

claims to pursue – BMW Group 2022). Hence, the advertisement highlights BMW's dedication to sustainability by presenting a cityscape filled with greenery, complemented by the presence of an electric vehicle, thus emphasizing the brand's environmentally conscious values – which are encapsulated in the tagline included at the top – “Driving sustainability with innovation and materials recycling”. The mention of materials recycling is grounded in BMW's assertion, as reported by Waldersee and Amann (2023), that the company is prioritizing investment in battery materials recycling over mining activities, whereas the car's modern style and features emphasize innovation, suggesting the use of intelligent, eco-friendly technology. Furthermore, BMW's contemporary image is portrayed through the modern fashion and varied assembly of informally dressed persons, symbolizing gender inclusion and brand credibility by showcasing a diverse collection of customers who exemplify the brand's principles and attractiveness. Finally, a call to action is made at the bottom of this advertisement, encouraging those that might be more interested in BMW's dedication to a sustainable future to explore further details on their website. By integrating sustainability, innovation, a modern image, brand extension trust, and gender-inclusive branding into their advertising strategy, BMW can enhance brand loyalty and competitiveness. This approach would also help establish them as a progressive and socially aware leader in the automotive industry, attracting a wider and more diverse audience, and maintaining brand relevance in a rapidly changing market.

4. Conclusion

4.1 Discussion

Based on the results from the Conjoint analysis, it becomes clear that consumers do not prioritize the environmental element of sustainability alone. Instead, they seek a product that incorporates all aspects of sustainability. Besides that, according to the literature review in the dissertation and the interviews conducted with consumers, this discovery can be partially ascribed to the notion of the Triple Bottom Line and the incorporation of three pillars for sustainability namely environmental, economic, and social. Consumers typically assess multiple attributes that align with the three fundamental principles when contemplating the purchase of an electric vehicle, with consumer decision-making coming from a complex interplay of environmental factors (e.g., the effects of vehicle battery production), and social aspects, as displayed by brand reputation. Also, the findings from the conjoint analysis indicate that customers do not consider these factors separately, but rather show a balanced and discerning preference for the interconnected components which need to be carefully balanced.

According to Sukitsch, Engert, and Baumgartner (2015), customer perception has a substantial impact on companies' dedication to sustainability. The perceptual map provides clear evidence of how different brands are specifically linked to sustainability characteristics. Tesla is strategically positioned on a perceptual map that emphasizes the 'Contemporary' and 'Sustainability' characteristics in the automotive sector. This positioning reflects Tesla's strong dedication to modern design and environmental awareness, while BMW does not closely align with these characteristics, indicating a distinct strategic orientation in its brand positioning. On the other hand, Volkswagen and Nissan appear on the polar opposite of the spectrum, being therefore perceived as less environmentally friendly and technologically advanced.

The disparity between these two factors might have a substantial influence on corporate strategy, as corporations may discover it is advantageous to synchronize their sustainability

endeavors with customer perspectives. Furthermore, the findings emphasize that customer perceptions of brand sustainability play a crucial role in influencing purchasing decisions. This reflects a broader pattern motioned in the literature review in which consumer behavior is transitioning towards a mindset that prioritizes sustainability (Tran and Paparoidamis 2020).

On a different note, and as discussed by Hidrue et al. (2011), Liao et al. (2016) and Ogidan et al. (2022), high prices still act as a major obstacle to EV mass adoption. Through the conjoint analysis results, we could infer that there is an immense demand for affordable EVs, insofar as there is a strong preference for lower price points (especially under 25,000€ and from 25,000€ until 44,999€) over higher ones.

The emphasis on green transportation as a crucial element for environmental sustainability is directly echoed in the prominence of EV's as well (Carlucci, Cirà, and Lanza 2018). This is reflected in the conjoint analysis findings, where attributes like ecological footprint and battery range are significantly valued, indicating a consumer preference for EV's that are not only efficient but also environmentally conscious.

Regarding the ecological footprint of battery production, the conjoint analysis produced distinct results across brands. Hence, the battery ecological footprint has only proven to be a decisive factor for the Tesla average consumer (where it ranked first), since in every other brand, it has ranked second to last. Nevertheless, environmental concerns still manage to be a relevant factor regardless, gathering at the minimum a relative importance of 15.1%. This might suggest that there are distinct ecological preferences across consumers of different brands, but overall, it supports the conclusion sustained by Chaudhury et al. 2016, Nichols et al. 2023, and Qing et al. 2023 that environmental awareness is increasingly more shaping customers' purchasing decisions. Conversely, a study by Russo, Morrone, and Calace (2015) instead found that there is a disconnect between this heightened environmental awareness and the adoption of eco-friendly behaviors, but our conclusions, as stated previously, show the importance of this

component, even if it doesn't rank among the primary factors the average customer considers.

In fact, it is still unquestionable that some individuals certainly make purchasing decisions fully guided by environmental responsibility, though they do not represent the average consumer.

By analyzing the positioning of brands in the Perceptual Map, the group understood how European customers perceive various electric vehicle brands. As described by Sinclair and Stalling (1990), it is evident that the perception of each brand is influenced by a range of characteristics, moving from practicality and reliability to sustainability and luxury.

As such, the perceptual map resonates with these adoption factors by positioning companies like Tesla and BMW as leaders in sustainability and performance. This is further supported by the conjoint analysis, which shows a strong tendency towards dependable and sustainable EV's, as top priorities include safety, range, and low environmental impact. This shows that buyers are moving more and more towards EV's that suit their demands and environmental principles.

Besides that, an effective communication of a brand's environmental values can foster consumer trust, as illustrated in the perceptual map. One example is Tesla, known for its environmental focus as they only produce BEV, being favorably positioned in terms of innovative and sustainable attributes, demonstrating the power of green marketing in shaping brand perception.

Regarding brand trust, research by Yang et al. (2020) and Jiang et al. (2021) highlights the crucial role of a brand's image in the EV purchasing process. Factors like brand awareness are mentioned as substantial contributors to reducing the perceived risk associated with choosing a product from a particular brand. The conjoint analysis survey data seems to corroborate this perspective, as it reveals distinct preferences for certain brands, with strong preferences toward Volkswagen and BMW compared to Nissan and especially Tesla. Therefore, this observation supports the notion that established brands (BMW and Volkswagen) tend to enjoy greater preference than less experienced ones like Tesla (Nissan being an exception, which, despite being an older brand, follows a different pattern, perhaps because it is relatively less renowned).

These results, especially those pertaining to Tesla, might indicate that respondents are more apprehensive about buying cars from relatively “immature” brands as they perceive there is a greater risk associated to them.

Range-wise, Hidrue et al. (2011) also mentions range anxiety and lengthy charging times as two of the primary concerns consumers have when considering an EV as their future car, and this was not only corroborated by some of the interviews conducted by the authors, but also by the conjoint analysis results, given that, specifically, driving (or battery) range was consistently selected as one of the main attributes to take into consideration when making an EV purchase. Charging speed, on the other hand, while still relevant, was all throughout the least important attribute out of all, which doesn't fully support the aforementioned study's conclusions.

Apart from discussing price, manufacturer reputation and brand image as decisive factors, Abu-Alkeir (2020) also mentions safety ratings as a crucial force driving customers' EV buying intentions, and such conclusion is also validated by our conjoint analysis findings, with safety being extremely important for consumers. In fact, safety scored the highest part-worth utility in the case of Nissan and Volkswagen, and the second highest for Tesla.

In conclusion, the success of EV's in the market hinges on a holistic approach that encompasses environmental responsibility, technological innovation, consumer-centric marketing, and robust brand trust. This comprehensive view provides valuable guidance for manufacturers, policymakers, and marketers, underlining the need for informed strategies to promote the widespread adoption of EV's.

4.2 Managerial Implications

First and foremost, it is important to establish that while the following implications apply specifically to the brands we have identified – Nissan, BMW, Tesla, and Volkswagen – they, nonetheless, offer a comprehensive understanding of consumer attitudes and industry trends, making them generally applicable to the EV market. Consequently, they can facilitate strategic adaptations and innovations. The research used a perceptual map to examine and interpret the perception of European buyers towards major manufacturers in the competitive landscape of electric vehicles. The findings indicate that each brand has an individual position and can thus address the first research question – *How do European customers perceive the leading brands in the EV competitive landscape when considering a set of core attributes?* – as follows.

Considering Volkswagen's practical and sincere identified image, coupled with the fact that VW was also considered the most preferred brand in the Conjoint Analysis, it is therefore unquestionable that consumers find brand sincerity and practicality in vehicle design immensely valuable. As such, Volkswagen should focus on traits it is currently underperforming at; hence, it should look to strengthen its image as a young, contemporary company and further prioritize its commitment to sustainability, as the brand's image development depends on finding a balance between these factors.

Nissan, on the other hand, embodies a more balanced position with an identified focus on femininity. Therefore, the Japanese brand should continue to focus on making EV's accessible and affordable, emphasizing features that appeal to a broad customer base, including women, who represent an increasingly important market segment, and one which has a considerable preference for Nissan, as seen in the Conjoint Analysis.

Furthermore, BMW has seen the brand become less associated with sustainability, especially if compared to Tesla, and more associated with safety and reputation. BMW should therefore focus more on its commitment to sustainability and innovation, as described in detail in the

bonus part of this paper. A contemporary, gender-equitable brand image should be integrated to build trust in sustainability and appeal to a broader, more diverse customer base.

Tesla, on the other hand, is perceived as modern and focused on sustainability, suggesting a perception of premium prices and advanced technology, but less so as a practical car brand.

To fill perceived market gaps, Tesla might intentionally intensify its emphasis on affordability by putting their models within the luxury class, but at price points that are more attainable. This method would enable them to strike a balance between the attractiveness of luxury and enhanced affordability while simultaneously continuing to innovate and maintaining their dedication to environmental sustainability and avoiding being “stuck in the middle” in their differentiation strategy.

To address the second research question – *Which key attributes do European customers value the most in their purchasing decision of an EV?* – this study employed a conjoint analysis to examine the impact of several attributes on consumer decision-making in the EV industry. The results offer crucial insights and valuable managerial implications for stakeholders in the automotive sector, focusing on the development and marketing of electric vehicles.

Specifically, automakers in the electric vehicle business should prioritize the extension of battery range. The strong inclination of consumers towards EV's with a minimum range of 201 to 500 kilometers, and preferably above 500 kilometers, signifies their demand for cars that are well-suited for long distances. As such, the emphasis on enhanced ranges could effectively satisfy the consumer's desire for long-distance capacity.

In addition, companies in the EV market should look for ways to offer their products at more competitive prices in view of the pronounced price sensitivity. This could be achieved through economies of scale or technological advances. Consumers' strong preference for affordably priced EV's, especially in the low to mid-price segment (below €24,999 or between €25,000 and €44,999), underscores the need for careful pricing to effectively target the broad market

and drive demand. Furthermore, safety reflects an important factor in consumer preferences. Therefore, managers should focus on safety features and emphasize advanced safety technologies and safety ratings to consumers. This would gain customers' trust and thus also increase the attractiveness of the vehicle as a reciprocal effect.

Lastly, decision-makers in the automotive sector should take consumers' environmental awareness seriously and recognize that a smaller ecological footprint is clearly preferred. It is crucial to invest in sustainable production methods. In particular, the manufacturing methods for car batteries offer great potential for investment to minimize the environmental footprint. This not only meets the growing consumer demand for environmentally friendly vehicles, but also promotes an ecologically responsible brand image.

In conclusion, as the demand for EV's expands and the competition in the EV market gets fiercer, it will become increasingly crucial for a brand to be able to differentiate themselves from the rest. Hence, one way they could do so, as previously mentioned, is by effectively conveying its dedication to sustainability to maintain a strong market position, as not only was that an area where some of the analyzed brands lacked in the perception of customers, but especially because sustainability was identified in the Conjoint Analysis as an important characteristic valued by customers. Therefore, leveraging green marketing effectively can serve as a key differentiator in a competitive market, given the importance consumers place on environmental benefits. Further, there is a need for a strategic focus on sustainability and technology, where managers should emphasize the development and marketing of EV's that address both environmental concerns and consumer demands for advanced features. Moreover, it is also imperative to align firm strategy with evolving demands for affordability and technological advancement, insofar as these factors play a substantial influence on consumer preferences in the EV market. This strategy will not only meet current market demands but also help promote future growth and widespread adoption of electric vehicles globally.

4.3 Limitations and Recommendations for Future Research

In this section, the research's main limitations will be addressed, detailing which factors could be improved upon by authors developing future research within the same domain or related topics. Specifically, sampling limitations (namely, regarding gender and geographical imbalances) are discussed, as well as the exclusion of certain brands and attributes from the study that could be explored further down the line in future research.

4.3.1 Sample Limitations and Recommendations

As mentioned previously, two main sampling methodologies were employed to collect responses for both surveys. Convenience sampling was used in an initial phase, when the surveys were being primarily shared with relatives and friends. But once initial answers proved to be largely insufficient to attain a minimum sample size of 150, self-selection sampling was resorted to afterwards, meaning that the surveys were also published in other social media platforms, especially Reddit, where volunteers were asked to fill in the questionnaires. The two sampling strategies were implemented mainly due to their ease, cost-effectiveness, and being relatively less time-consuming when compared to other methods, such as random sampling.

Nevertheless, these sampling methodologies also introduce biases, and therefore reduce the sample's representativeness of the European EV consumer population, making potential generalizations flawed at best – take for instance the substantial gender disparity found on both surveys, where male respondents accounted for roughly 70% of responses, while there's nearly a 50-50 gender distribution of the European population (McEvoy 2023). This can be mostly attributed to the survey having been heavily promoted on Reddit, which has a predominantly male audience (Dixon 2022), and while measures were taken to avoid such disproportionality, by, for instance, publishing the questionnaires on Facebook and LinkedIn, these proved to be insufficient at best. Apart from bias being introduced by the platforms where the survey was promoted, the sample may have also been affected by self-selection bias, as respondents were

not chosen at random, rather they were the ones who selected these surveys and decided to answer them. So, hypothetically, most of them could be, for example, electric vehicles enthusiasts, and since their preferences might be misaligned with other regular consumers that are not as demanding, the data could be less representative of the average consumer.

Another sample limitation of this study is related to the geographical concentration of survey responses. From the total responses (n=191) of the Perceptual Map, the majority come from Portugal (25%) and Italy (17%), and the same applies to the Conjoint Analysis (n=152), where most of the answers come from Portugal (28.9%). This could lead to a bias in capturing the view of the European EV market, insofar as the imbalance in the sample may not accurately represent the range of views and inclinations that exist in the wider European market.

To reduce this bias and provide a more representative picture of the continental market, future research should aim for a more balanced sample across different European nations. Nevertheless, it should be noted that although our focus on the European market provides in-depth regional insights, it most likely does not adequately capture the global dynamics of the EV business or the differences in customer preferences across continents. As such, given the increasing importance and development of the electric vehicle industry in Asia, particularly in China and Japan, it is crucial that this area is also thoroughly analysed by future researchers, to seek a better understanding of how EV customer preferences and perceptions vary from region to region. Such insights could prove to be invaluable for automakers, as they could guide them in tailoring their car models to align with the distinct preferences of each market.

Besides biases, the relatively small sample size gathered (especially for the conjoint analysis survey) also constitutes a considerable limitation. In fact, the team only managed to collect 152 responses in total, while the platform Conjointly recommended at least 400 answers, due to the relative high number of different combinations that exist considering the variety of attributes and respective levels included in the survey. This limited sample size resulted primarily from

time constraints, since, given more time, it would have been possible to gather a larger and more representative sample, likely reaching the target of 400 responses. This, in turn, could have produced more generalizable results and potentially revealed different insights compared to those obtained in this research.

Taking all the aforementioned factors into account, it is therefore pivotal that future researchers allocate more time whenever possible to collect larger and higher quality (i.e., more representative) samples, thus mitigating the potential biases that could affect the sample and improving results' generalizability.

4.3.2 Attribute Selection Limitations and Recommendations

Future research should also consider other attributes that were left out of the conjoint analysis survey due to their inclusion implying a heightened complexity that could easily overwhelm respondents. Hence, future studies could consider incorporating additional elements such as infotainment systems, interior/exterior materials, ease to drive (features like one-pedal driving, for example), comfort, car design/aesthetics, as well as car size or type (e.g., SUV, Sedan, Hatchback, etc.) to obtain more granular data and understand customers' preferences for an EV more comprehensively.

Apart from specific features, an unexplored avenue that could be analyzed by subsequent studies pertains to hybrid cars – be it Plug-in Hybrid Electric Vehicles (PHEV's) or simply Hybrid Electric Vehicles (HEV's) –, as our research mostly focused on Battery Electric Vehicles (BEV's) and hasn't addressed any hybrid-specific features, such as their dual-engine composition, or the potential benefits they bring as a transition vehicle still able to rely on fossil fuels while the EV charging infrastructure catches up.

4.3.3 Data Selection Limitations and Recommendations

Another limitation of the thesis pertains to the choice of brands that were selected for the analysis. This limitation affected both the Perceptual Map and the Conjoint Analysis research.

The four main EV manufacturers that were the subject of our research were Tesla, BMW, Volkswagen, and Nissan. Although this was a sensible decision (whose reasoning is explained in Appendix B.1), it left out well-known companies such as BYD, Mercedes and Audi, all of which were frequently mentioned in our initial interviews with both experts and consumers. Furthermore, other relevant brands that were excluded, Hyundai, Renault, and Peugeot, are considered important competitors in the EV market. As such, the omission of these brands may have affected our understanding of the European EV industry, as they play crucial roles in shaping the market landscape, contributing to technological advancements, and influencing consumer preferences. Their exclusion translates into an insightful though incomplete understanding of the EV market.

An additional limitation identified in the data selection relates to the Perceptual Map technique, which may have overlooked important characteristics that can be related to EV's. Other attributes, such as stylish, boring, sporty and urban friendliness, had been considered but were subsequently removed. Such features should be included in future research to improve the perceptual mapping technique. In fact, the exclusion of these attributes may have resulted in a less thorough understanding of customer attitudes. Hence, future research could explore extending the list of attributes to include a wider range of customer preferences and concerns, so as to garner a more comprehensive understanding of the characteristics that define brands in the EV market.

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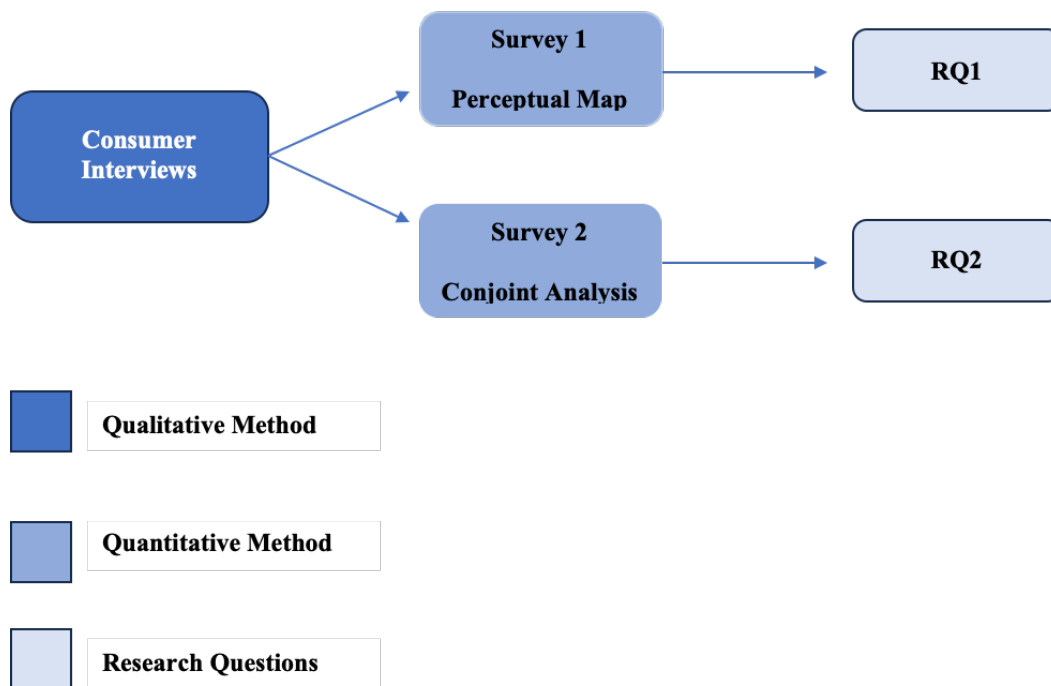
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Appendices

Appendix A.1: Methodology Structure



Appendix A.2: Consumers' Interview Structure

Introduction

Thank you very much, (Mr./Ms.) for agreeing to participate in our interview as part of our Master's thesis.

Currently, we are in the process of writing our Master's thesis, in which we are analyzing consumer preferences regarding electric vehicles (EV's) in the automotive industry. As part of this, we are conducting several interviews with consumers in this field. The interview will take approximately half an hour.

To ensure a structured approach and to not omit anything, we have prepared a guideline that will lead us through the interview. This does not exclude any interim questions or deviations; rather, it serves as a guideline.

We will be running the recording device during the conversation. This is purely for the control of our transcription. Should anything be published, it will be submitted for authorization.

Thank you for your support!

Understanding the landscape

1. Have you ever owned an EV? If so, which model and for how long?
2. What motivated your decision to buy an electric vehicle?
3. In your opinion, who are the primary competitors in the EV industry?

Key Features & Attributes

1. How vital is an EV's maximum driving range to you, and what's your acceptable minimum range?

2. What do you think about EV charging availability or duration? Does home charging appeal to you?
3. How important is the price of an electric vehicle in your decision-making process when considering a purchase?
4. How does your environmental impact influence your preference for EV's?
5. Do you know about any government incentives for EV's, and would they sway your decision?
6. How much does a brand's reputation or the opinions of your peers influence your decision when considering an electric vehicle?
7. Rank the following factors by importance when considering an EV purchase, focusing on your top 5 (5 being the least and 1 being the most important): price, range, brand, charging infrastructure, environmental impact, autonomous driving, infotainment, connectivity, safety features.
5. Apart from the factors we've discussed, are there any other considerations or concerns that would influence your choice in purchasing an electric vehicle?

Appendix A.3: Experts' Interview Structure

Introduction

Thank you (Mr./Ms.) for agreeing to take part in our interview as part of our Master's thesis.

We are currently in the process of writing our master's thesis, in which we analyze consumer preferences regarding electric vehicles (EV's) in the automotive industry. As part of this, we conduct several interviews with experts in this area. The interview will last approximately half an hour.

In order to enable a structured approach and to not forget anything, we have created a guide that will guide us through the interview. This by no means excludes questions and deviations, but rather serves as a common thread.

We will leave the recording device running during the conversation. This is purely to check our notes. If something is published, it will be submitted for authorization.

Thank you for your support!

Key Features & Attributes

1. How significant is 'range anxiety' for consumers and what advances might address these concerns in the future?
2. Can you provide an assessment of the current state of EV charging infrastructure and its impact on consumer decisions?

3. How important do you think the price factor is in a customer's decision to purchase an electric vehicle?
4. How does the environmental footprint of EV's influence consumer decisions?
5. To what extent have government incentives and policies encouraged EV adoption?
6. How do intangible aspects such as brand reputation and social influence factor into consumer preferences?
7. Based on your expertise, what factors do consumers prioritize most when considering purchasing an electric vehicle? Please identify and rank the top 5 factors from the following: price, range, brand, charging infrastructure, ecological footprint, autonomous driving, infotainment systems, connectivity, safety features.
8. What additional factors that have not yet been discussed could be crucial in influencing customer decisions?

Understanding of the overall situation

1. How do you think emerging trends in the EV sector will shape consumer preferences over the next five to ten years?
2. Which companies in the EV sector stand out as key competitors, and on what basis (e.g. price, features)?

Recommendations for survey design

1. Are there any specific methods or question types you would recommend for our consumer survey?

Appendix A.4: Interview with Consumer Carlo Belluz

Interviewer: Hi Carlo, we can start with our interview. Thank you for deciding to participate.

Let's begin with the first question. Have you ever owned an electric vehicle? If so, which model and for how long?

Interviewee: Yes, I had a Tesla Model 3 for 3 years. I should check it. I thought for 3 years. And that's it.

Interviewer: What motivated you to buy an electric car?

Interviewee: If I have to be honest, I don't care about the fact that it doesn't pollute. There were a lot of subsidies to buy it because in Italy, apart from the bureaucracy, there was all this thing, like the incentive. For example, they gave you 15,000 euros to buy it, and it is a great way to have a car that has 400 horsepower but doesn't pay the "superbollo" (additional car tax).

Interviewer: I didn't know that!

Interviewee: Tesla is a car that goes from 0 to 100 in 3 seconds, and usually, for that kind of car, you have to pay the "superbollo." But for this car, you don't because it is electric, and the way in which they measure the power of the car, I am talking about Italy, is like the maximum power that can be rolled for like half an hour. So in the test, it doesn't come out that it has all these horsepowers.

Interviewer: I don't believe it. Okay, good to know. Perfect, the third question: According to you, who are the main competitors in the electric vehicles sector?

Interviewee: The first one that comes to mind is Tesla. This is because it is a car that is in the European market with very competitive prices, with good performance, and with a battery that is sufficiently charged. In my opinion, it is in the sweet spot of all those requirements that an electric car should have. They just launched a new model, Model 3, that is much more comfortable than the model I took; they have increased the comfort and the range. Anyway, the question was about competitors. I know that there are many European brands that are entering

the electric car market, such as BMW, Audi, and Mercedes, but honestly, I don't see them as direct competitors.

Competitors, yes, but I don't see them as able to compete in the electric world because they make cars of a completely different setting. I could be a little biased by the fact that before they were wind-thermal. This is something that we need to see. If you tell me about other electric cars that I know, I know that there is already one that is being developed in the United States. In Italy, they don't sell it yet, but it is very interesting because it has a very high charging speed, a very high battery capacity, a great comfort. It is one of the most comfortable cars I've ever been in; it is called Lucid. I also did a test drive. They made the batteries and motors of the Formula 1 electric car, the Formula E, and then, from what they learned by doing these things, they started to produce electric cars. I tried it in Monaco, I was at a conference. There was hydrogen, photovoltaic, batteries, and electric mobility. So it was full of companies that made colonies and charging stations. The other thing I strongly recommend you to look at is the Chinese cars because I see the Chinese as electric car manufacturers; they have prices that are much lower than those you can find in European manufacturers. It is difficult for Europeans to fight in a market like this.

Interviewer: But why do you think so?

Interviewee: I think that Europeans started developing engines hundreds of years ago, they knew the technology, and they specialized and everything. But now, fundamentally the car is becoming a battery pack with an electric motor attached, and at that point, everyone is good at doing it, in particular the Chinese because they have been making electric motors for a long time. The car is a matter of aerodynamics, suspension, and set-up; the Ferrari, for example, is famous because it is beautiful, and has a great engine, because it always had great engineers.

Interviewer: So you're saying that now we are losing our competitive advantage?

Interviewee: Yes, I think so.

Interviewer: Okay, very interesting. Now let's move on to the main attributes. How important is the maximum autonomy of an electric vehicle for you, and what is the minimum acceptable autonomy?

Interviewee: That's a difficult question. You should go and target this question. You have to understand that the question is being asked by a person who drives in the city, a person who drives for a job.

Interviewer: Exactly, because I did this interview with another gentleman, and he travels a lot for work, and he told me that for him the limit is a car with 200 miles of range.

Interviewee: Exactly, I would give you the same answer. I would say, in my opinion, it is acceptable. The minimum distance you can do is 300 kilometres. If you want to be able to go somewhere far. While if you want a car that you use in the city or at the weekend, if you want to go a little further, the city car, as long as you can do 100 km, it is OK. Anyway, yes, if you take a distance of 100 km. The absolute answer is that an electric car should do at least 300 km. If we're talking about city cars, a hundred kilometres is enough. But it is extremely limited to the city. It means that you already know that you can't take that car out of the city.

Interviewer: Sure. So 300 kilometers of autonomy. And what do you think about the availability or duration of electric vehicle charging? Are you interested in home charging?

Interviewee: So I'll tell you, having the charging station at home is a convenient thing, but I actually personally never use it. I have one but I never use it for the simple fact that the way the infrastructure works today in Italy. If you don't get three-phase, which is a way of transporting energy that allows you to have higher loads, which there is in Germany instead, it is too long a process. In Germany, you can absorb a lot of electricity from the grid. In Italy, you can't do that because all the electrical systems are single-phase unless you ask for three-phase, which costs more and still requires commitment, and unless you have to open a factory or a big office or something, you don't do it. That is to charge a car at home in Italy, verisimilarly from 0 to 100

takes you more than a day. This is because, for example in my case, I have 6 kilowatts at home, 3 kilowatts I use to power the house, and the remaining 4 kilowatts I use to charge the car, and that's about 8/9 hours of time. But then there is a whole other consideration if you charge the car at home because you have solar panels because then you can charge it at night. As for the urban charging system, however, if there was not the charging system that is there today, I believe that no one would buy an electric car. For example, when I chose to get a Tesla, I decided to buy it precisely because there was the Tesla ecosystem, and I would never have bought it otherwise. Then things are changing a lot, and there are a lot more charging solutions. The way I see it anyway, it is going to be a problem because it is true they are building so much and they are investing so much by creating an interesting infrastructure. This year I also started to see that on highways there are a lot of charging stations, right now I am referring to fast charging. I am satisfied with the grid, that is, the charging infrastructure. However, I have big doubts about what will happen in the next few years.

Interviewer: But how long does it take you to load a car?

Interviewee: It depends, the answer always depends, that is when the battery is completely discharged, it recharges very quickly when the battery is charging and it is close to being full, it slows down a lot the speed.

Interviewer: What do you usually do while charging the car on the road?

Interviewee: This is my favorite question. Very often I play games, I chose the Tesla also for that, there are games inside the Tesla, and there is Netflix. Tesla was smart for that because they said let's make a playground so people when they stop to charge the car, they use the little game, you can go to YouTube or Netflix, you can surf the internet, you can do whatever you want. A person who is working gets to work, and answers emails, it is convenient. Eventually, stopping is not a commitment. In my opinion, to have an electric car you have to be very organized; that's the absolute answer. If you are a person who is always in a hurry, running right

up to the last second, you can't do it. Then I tell you about my dad who does thousands of kilometers a month, and he has an electric car he uses, he doesn't mind at all stopping to recharge it. He stops for half an hour and he answers emails.

Interviewer: How does the street payment system work?

Interviewee: It depends, in my case, for example, if you're with Tesla when you buy it, you directly make a Tesla account and when you stop to recharge the car is automatically recognized and automatically credited to your credit card.

Interviewer: And how much do you pay approximately for a full tank?

Interviewee: It depends on the price of energy, I've seen sometimes electricity that costs 20 cents, other times it costs 60, so it depends a lot. But on average, I've always paid around 20 or so. Speaking of infrastructure, I don't just charge my car from Tesla's columns, those are kind of the last resort when there's nothing else to go to because they are fast, they work and everything, but there are actually a lot of companies in Italy that make you a flat subscription. You, for example, pay 100 euros per month and they give you 400 kilowatt hours to charge per month, I'm assuming these numbers.

Interviewer: How important is the price of an electric vehicle in your purchasing decision-making process?

Interviewee: It is important; it depends on how you reason. My family reasoned by saying I definitely want to save money in the long run, so I prefer to make an initial investment. However, if in the future I have to buy a car, I will buy a car that I am sure to resell at a higher price than the one I bought it for, so definitely not an electric car.

Interviewer: How does your environmental impact influence the preference for electric vehicles?

Interviewee: Zero, I don't care about the emissions, and I don't think it will be electric cars that will save the world.

Interviewer: Are you aware of government incentives for electric vehicles, and would these influence your decision?

Interviewee: Yes, absolutely. That was the reason we took it. That's why I tell you, in my opinion, the electric market is crazy speculation because you get incentives to buy it and so you buy it. Unless you get the environmental warrior who wants to cleanse the world and has no desire to pollute, in my opinion, the average person you will find will be the one who says I'll get the electric car because it costs me less, because in the long run, it is convenient for me, because there are incentives. Maybe I live in Milan, I live in the cities and I want to get into area C, with the electric car you can enter for free. I remember that when we got the car in Pordenone, for example, I could park in all the paid parking lots for free. I told you, I don't pay stamp duty. But otherwise, if it had exactly the same costs, I would probably choose the diesel car.

Interviewer: But how much does a brand's reputation or the opinion of your peers influence your decision to purchase an electric vehicle?

Interviewee: I would say it doesn't influence that. In this sense, I always thought and still think. I would be interested only in case I become an employee of a company that invests so much in sustainability, but apart from special things, no.

Interviewer: Rank the following factors according to their importance in evaluating the purchase of an electric vehicle, focusing on the top 5, with the 5th being least important and the 1st being most important. Price, range, brand, charging infrastructure, environmental impact, autonomous driving, infotainment, connectivity, and safety features.

Group Part (Paul Lennard Gärtner + Maxim-Leon Daniel Schwenk Covelo + Agnese Borgonovo + Duarte Fazenda São Pedro + Guilherme Vieira de Bastos Brito de Sá)

Interviewee: I would say first autonomy, second charging infrastructure, then safety features, infotainment and connectivity, and least environmental impact.

Interviewer: In addition to the factors we discussed, are there any other considerations or concerns that would influence your choice to purchase an electric vehicle?

Interviewee: Maybe I would say Comfort. In my opinion, this is one thing that you could consider. Comfort is an important thing to evaluate.

Interviewer: Okay. Perfect, we have reached the end of our interview. It was very helpful to talk to you; you are very knowledgeable about the topic. Thank you very much.

Interviewee: Yes, I'm often at conferences around the world because my dad is in the industry; you're welcome, thank you, it was a pleasure. See you soon.

Appendix A.5: Interview with Consumer João Meireles

Interviewer: Hi João, thank you very much for agreeing to be interviewed by us, your help is greatly appreciated! The first question I have for you is if you ever owned an EV? If so, which model and for how long?

Interviewee: I've been driving a Mini Countryman Cooper SE (PHEV) for about three and a half years.

Interviewer: Awesome! And what exactly motivated your decision to buy an electric vehicle?

Interviewee: I thought it was the most fitting for my needs, so I believe that what motivated me the most to get it was because it seemed like a nice car for daily use.

Interviewer: Ok, now let me ask you this: in your opinion, who are the primary competitors in the EV industry?

Interviewee: That's an interesting question, I'd say that probably four main brands come to mind: Toyota was the brand that really kicked off the EV massification (with the Prius) and is one of the few brands that is actively investing in improving the technology.

Then, I think BMW, because, in my opinion, it did a good job in gradually electrifying its entire product line, while keeping competitive prices, which becomes all the more competitive if we think of the quality of the products offered by them.

Then, probably, Nissan, since it made the electric car commonplace (with the Leaf, at one point holding the title of the world's best-selling electric car).

And lastly, Tesla. I believe it is an inevitable brand name in this market, particularly due to the revolutionary advancements it offers – something people are increasingly seeking in an electric car.

Interviewer: That's an insightful answer! Now, let's try to focus instead on some particular features that you may or may not find alluring. So, tell me: how vital is an EV's maximum driving range to you, and what's your acceptable minimum range?

Interviewee: I think that the bare minimum should be at least 100 km. As for the maximum range, I don't deem it important. I prefer electric cars with shorter range, lighter weight, and better handling/driving over the extravagant models that are being sold.

Interviewer: Ok, that's definitely an interesting perspective! What do you think about EV charging availability or duration? Does home charging appeal to you?

Interviewee: I'm only interested in home charging. I view public charging as a last resort solution, I'd much rather charge my car at home than outside.

Interviewer: How important is the price of an electric vehicle in your decision-making process when considering a purchase?

Interviewee: It is significant, but what truly matters to me is the value I'm getting for the price I pay, and I think that electric cars often fall short in this regard.

Interviewer: How does your environmental impact influence your preference for EVs?

Interviewee: I think that's a simple question for me. It doesn't.

Interviewer: Do you know about any government incentives for EVs, and would they sway your decision?

Interviewee: As far as I know, I'm not aware of any government incentives for EVs.

Interviewer: How much does a brand's reputation or the opinions of your peers influence your decision when considering an electric vehicle?

Interviewee: I'd say that a brand's reputation does influence my decision a bit. As for the opinions of peers, I'd say that not at all. That's for people without a personality.

Interviewer: Ok, I see. Now, I would ask you to rank the following factors by importance when considering an EV purchase, focusing on your top 5 (5 being the least and 1 being the most important): price, range, brand, charging infrastructure, environmental impact, autonomous driving, infotainment, connectivity, safety features.

Group Part (Paul Lennard Gärtner + Maxim-Leon Daniel Schwenk Covelo + Agnese Borgonovo + Duarte Fazenda São Pedro + Guilherme Vieira de Bastos Brito de Sá)

Interviewee: 1 – Price; 2 – Range; 3 – Connectivity; 4 – Brand; 5 - Safety (ultimately, I don't consider safety to be that important if I'm being honest).

Interviewer: Right! I only have one last question for you, which is: apart from the factors we've discussed, are there any other considerations or concerns that would influence your choice in purchasing an electric vehicle?

Interviewee: Yes, the only thing that matters to me in a car, whether electric or not, is how much fun it is. Everything else for me is secondary.

Interviewer: Great, that's very useful information! Let me thank you once again for agreeing to take part in our interview, your answers will prove to be extremely helpful in our study.

Thank you so much!

Appendix A.6: Interview with Consumer Mauro Riucuperati

Interviewer: Hey Mauro, thank you very much for agreeing to be interviewed today. Let's start with the first question, have you ever had an electric vehicle (EV) before? If yes, could you please tell us the model and how long you held it?

Interviewee: I do, in fact, drive an electric car, it is an Audi Q4 Sportback e-tron and I bought it one and a half years ago, in 2022.

Interviewer: That is wonderful to know. I now ask you the first question, why did you choose to purchase an electric vehicle?

Interviewee: Let me think about that. There were several things. My initial thought was obviously on an environmental level, the idea of having an electric car makes me feel more "right." I always tried to avoid taking my old car, which was diesel, for short distances and to move around my city by bicycle. However, now that I own a fully electric car, I am more satisfied. I must say that I am fully satisfied with my choice, and I would not go back to combustion cars. Then of course there are all the economic reasons that convinced me to buy an electric car, one of them being the lower maintenance expenses. Another reason is the growing expense of fuel was starting to worry people. When I purchased this vehicle, Italy's gasoline prices were at their highest level, and I began to consider electric cars as a longer-term, more cost-effective alternative. Last, but not least, I was reading a lot about government incentives for EVs, such as tax cuts, cheaper insurance, (almost) total exemption from paying stamp duty, access to ZTL zones, and free parking in blue lines, which undoubtedly influenced my choice.

Interviewer: Okay, nice. Who, in your perspective, are the main rivals in the EV market?

Interviewee: I believe that Tesla is the most well-known EV manufacturer and has a big market share. Nonetheless, renowned automobiles like BMW, and Audi, and established automakers like Nissan, and Volkswagen are also fierce competitors. But given that the industry is

expanding, I believe there is rivalry from other businesses. Particularly China, this country continues to present models in Europe that are super-competitive, at significantly lower prices than cars produced by European brands. Incidentally, I read a few weeks ago that the European Commission is announcing the opening of an anti-dumping investigation into imports of Chinese electric cars into Europe.

Interviewer: Of course, I say. Now let's talk about features. Talking about the driving range of an EV, what would be your threshold for an acceptable minimum range?

Interviewee: I believe the maximum driving range to be very significant. I need a range that will easily fulfil my daily demands, which is, sometimes, roughly 250 miles or more because I frequently go greater distances for business, and I need to utilize my car. When I have to go in the day from Bergamo to Turin, I have to be able to be self-sufficient. Because of this, I would find anything less than 200 miles to be too restricting and problematic.

Interviewer: I see what you're saying now. What do you think about the duration or availability of EV charging, though? Do you like the idea of charging at home?

Interviewee: The infrastructure for charging is essential. I like the ease of home charging, and I actually have one in my garage, I usually use my home charging when I have to do long work distances and can't afford to use street charging as a matter of time, otherwise, I always use public charging, they are faster and more efficient. However, there should be plenty of public charging outlets accessible, and there are, especially for longer excursions. Concerns about charging time make fast-charging solutions more desirable because of their ease.

Interviewer: When considering a purchase, how relevant is the price of an electric car in your decision-making process?

Interviewee: Price is undoubtedly a key consideration. Even though I think there will be long-term cost benefits, the purchase price still factors. I wish there were more reasonably priced EV choices available. Although there are eco-incentives, buying an electric car becomes more

affordable, approaching the cost of a combustion vehicle of the same level, however, if we consider endothermic cars, they still remain cheaper to buy. Nonetheless, in this my first year of use, at a rough estimate, I have found that I have saved more than 30 per cent on fuel compared to before.

Interviewer: How does your concern for the environment affect your preference for electric vehicles?

Interviewee: It has a significant impact. Since I actually care about the environment, I think that using an EV helps cut down on pollution. Environmental effect is therefore a key factor for me.

Interviewer: Are you aware of any government incentives for electric vehicles? If so, would they influence your choice?

Interviewee: Yes, I am aware that there are various advantages, like tax breaks and lowered registration costs. They undoubtedly increase the allure of EVs and may favorably affect my choice. Both the Ecobonus and the bonus that pays 80% of the cost to buy and install a charging station are available in Italy. The Ecobonus is used to reduce the cost of buying an automobile. For example, I know that last year, car incentives increase from a maximum of 5,000 euros to 7,500 for those who buy a car with emissions between 0 and 20 g CO₂/km (basically, full electric and very high-performance plug-in hybrid) and scrap an old car. However, this was not my case because the car must be priced under 30,000 euros.

Interviewer: When selecting an electric car, how much does a brand's reputation or the opinions of your peers matter to you?

Interviewee: I care about a brand's reputation, particularly in terms of dependability and customer service. Peer endorsements may also influence my choice. Being an executive in my company requires me to always be "presentable," and in my situation, the automobile serves as a status symbol. This is especially true because of the workplace setting in which I find myself.

Group Part (Paul Lennard Gärtner + Maxim-Leon Daniel Schwenk Covelo + Agnese Borgonovo + Duarte Fazenda São Pedro + Guilherme Vieira de Bastos Brito de Sá)

Interviewer: Yes, I got your point. Now can you please prioritize your top 5 variables when ranking the following elements in order of significance when you think about buying an EV (5 being the least important and 1 being the most vital): Price, range, brand, infrastructure for charging electric vehicles, environmental effect, infotainment, connection, and safety features.

Interviewee: Sure, here's where I rank: Range; Brand; Impact on the environment; Infrastructure fees; Cost.

Interviewer: I appreciate your ranking. Thank you very much for your time! And now, last but not least, aside from the issues we've covered, are there any additional variables or worries that could affect your decision to buy an electric car?

Interviewee: That's a good question, I think that the resale value of EVs is another issue. I want to know that the car will properly keep its worth over time.

Interviewer: Okay, good to know. Thank you for expressing your thoughts. Your advice is crucial to our study. We value your involvement and time.

Interviewee: Thank you very much. I'm happy to add to your master's thesis. Wishing you success with your study!

Appendix A.7: Interview with Consumer Paulo Vieira

Interviewer: Hi Paulo, thank you very much for agreeing to be interviewed by us, your help is greatly appreciated! The first question I have for you is if you ever owned an EV? If so, which model and for how long?

Interviewee: Yes, I have a Tesla Model 3 LR that I've been driving since November 2022.

Interviewer: And what exactly motivated your decision to buy an electric vehicle?

Interviewee: The main factors I took into account were mostly convenience and environmental impact.

Interviewer: That's great to hear! Now, please tell me who do you think are the primary competitors in the EV industry?

Interviewee: When I think of electric vehicles, these are the brands that usually come to mind: Tesla, Hyundai, Nissan, Renault, and also Porsche.

Interviewer: Now, let's try to focus instead on some particular features that may be important for you in an electric vehicle. So, tell me: how vital is an EV's maximum driving range to you, and what's your acceptable minimum range?

Interviewee: I'd say that range is very important for me. I believe that for an EV to be appealing to me personally it must offer a driving range of at least 500 km.

Interviewer: Ok, now what do you think about EV charging availability or duration? Does home charging appeal to you?

Interviewee: From what I've experienced, the infrastructure in Portugal is quite lacking, and the payment process is cumbersome and complex. That said, Tesla Superchargers work smoothly, but I tend to charge my car at home in my condominium's garage.

Interviewer: How important is the price of an electric vehicle in your decision-making process when considering a purchase?

Interviewee: I consider it relevant – when I bought my Tesla it was a significant investment, but it was something I had in my mind for some time already.

Interviewer: How does your environmental impact influence your preference for EVs?

Interviewee: Considerably so, not only in terms of the environmental impact of production but also in the car's constant consumption, and the overall positive health impact it has due to the absence of emissions.

Interviewer: Are you aware of any government incentives for EVs, and would they sway your decision?

Interviewee: Yes, I'm aware of them; unfortunately, their criteria/qualifications change regularly, and I didn't qualify for them. I find that the way they are presented doesn't make much sense. That said, I don't pay the Vehicle Tax (IUC – *Imposto Único de Circulação*) for my Tesla.

Interviewer: How much does a brand's reputation or the opinions of your peers influence your decision when considering an electric vehicle?

Interviewee: Just a little. Unfortunately, I hate Tesla's CEO [*referring to Elon Musk*], but that doesn't make the brand any better or worse – well, except in some respects.

Interviewer: Oh, I see. Now, I would ask you to rank the following factors by importance when considering an EV purchase, focusing on your top 5 (5 being the least and 1 being the most important): price, range, brand, charging infrastructure, environmental impact, autonomous driving, infotainment, connectivity, safety features.

Interviewee: 1 – Environmental Impact; 2 – Fun while driving (it accelerates from 0 to 100 very quickly); 3 – Ease of driving (e.g., one pedal driving); 4 – Autonomous driving; 5 – Silence

Interviewer: Very interesting selection! Just one more question for you: apart from the factors we've discussed, are there any other considerations or concerns that would influence your choice in purchasing an electric vehicle?

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Interviewee: Well, besides the factors that were mentioned, I'd would probably also consider how convenient is home charging and mechanical simplicity.

Interviewer: This information is extremely valuable! I want to express my gratitude once more for your participation in our interview; your responses will be of tremendous assistance in our research. Thank you very much!

Appendix A.8: Interview with Consumer Pedro Oliveira

Interviewer: Thank you very much, Pedro for agreeing to participate in our interview as part of our Master's thesis. Currently, we are in the process of writing our Master's thesis, in which we are analysing consumer preferences regarding electric vehicles (EVs) in the automotive industry. As part of this, we are conducting several interviews with consumers in this field. The interview will take approximately half an hour.

To ensure a structured approach and to not omit anything, we have prepared a guideline that will lead us through the interview. This does not exclude any interim questions or deviations; rather, it serves as a guideline.

We will be running the recording device during the conversation. This is purely for the control of our transcription. Should anything be published, it will be submitted for authorization.

Interviewee: No problem, I'm more than happy to help!

Interviewer: Alright, let's start with the first question... have you ever had an electric vehicle before? If so, for how long did you have it or have had it?

Interviewee: So, I currently have a Tesla Model 3 and I bought it in 2021, so I've had it for 2 years.

Interviewer: Perfect! Why did you decide to purchase an electric vehicle?

Interviewee: Good question. I would say that the main reason behind my purchase was because of environmental concerns and the desire to contribute towards a better world. I know I am just one person, but we, as a society, have to start somewhere. Besides that, I also studied many options before making my purchase, and the fact that I admire Elon Musk and his futuristic mindset that can be seen in the car, also played an important role in my decision.

Interviewer: Great! And which brands would you consider to be the main competitors in the EV industry?

Interviewee: Here in Portugal, I would probably say Tesla, Nissan and maybe BMW or Volkswagen.

Interviewer: Would you consider that the vehicle's maximum driving range is important to you? If so, what's your acceptable minimum range?

Interviewee: Of course, it is important! If I'm being honest, the higher it is, the better the vehicle, since I travel a lot between Lisbon and Porto. My minimum acceptable range would probably be 400km in a single charge.

Interviewer: Alright. And what do you think about charging availability, duration and home charging? Is this last one something that appeals to you?

Interviewee: I think charging availability and duration are taken into account, but since I have a home charger, I don't really think about it too much. I do the same path nearly every week, so I usually always charge at the same station in Porto, and when in Lisbon, I charge my car at home. The duration doesn't bother me a lot because I organize myself well enough to have time, and the Model 3 usually charges fast, so it doesn't really play a big role. But yeah... in conclusion, I'm very happy to have my home charger, otherwise I would be way more concerned about the other factors.

Interviewer: Thank you for your answer! Another factor, of course, is price. Did it play a big part on your decision-making process when considering a purchase?

Interviewee: Not really. I bought the Tesla Model 3 because I really liked the car, and it was inside the initial budget that I had previously set. I could've bought cheaper electric cars, but I just went with my favorite one.

Interviewer: What about the environmental impact? I know you mentioned it in the beginning of the interview, but I would like to ask you to elaborate on that.

Interviewee: As I said before, the environment is something I started worrying more about over time and since all my previous cars ran either on diesel or gasoline, a few years back, in

2021, when my car's engine broke down, I finally decided that it was time to switch it up and go fully electric. I could have fixed it, but I saw it as an opportunity to "go green". And 2 years after, I don't regret it at all and I'm very happy with my decision, yeah.

Interviewer: That's great! Besides all these factors, do you know anything about government incentives for EV's? Did they affect your decision?

Interviewee: Yes, I've heard about it, but it didn't affect my decision at all. As I said, the environmental impact was definitely the main factor behind my choice.

Interviewer: That makes sense. How much would you say that a brand's reputation or the opinion of your peers can affect your decision?

Interviewee: It affected my decision. As I said before, I really like Elon Musk, so Tesla was always my first option. In terms of opinions, I talked to a few friends of mine who also have electric vehicles, some advised to go for different brands, others suggested Tesla. But after all, I trusted my own opinion and experience and that's what mattered the most.

Interviewer: Ok! Now we're nearly reaching the end of our interview and for this part, I would like to ask you to rank the following factors by importance when considering an EV purchase, focusing on your top 5, with 5 being the least and 1 being the most important: price, range, brand, charging infrastructure, environmental impact, autonomous driving, infotainment, connectivity, safety features.

Interviewee: Let me think for a bit. Ok... I would probably say: 1-Environmental Impact; 2-Brand; 3-Price; 4-Range; 5-Charging Infrastructure

Interviewer: Awesome! So, this is our final question and for that I would like to ask you: apart from the factors we've discussed, are there any other considerations or concerns that would influence your choice when purchasing an electric vehicle?

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Interviewee: Yes! One thing that also played a role on my preference for Tesla was the design and aesthetics of the car itself, which I really like. I know it might seem simple, but besides a functional vehicle, I also want one that looks good and clean.

Interviewer: Alright! Thank you very much for your time and help, Pedro. It was great to talk to you.

Interviewee: No need to thank me, it was my pleasure!

Appendix A.9: Interview with Consumer Rita Silva

Interviewer: Thank you very much, Rita for agreeing to participate in our interview as part of our Master's thesis. Currently, we are in the process of writing our Master's thesis, in which we are analysing consumer preferences regarding electric vehicles (EVs) in the automotive industry. As part of this, we are conducting several interviews with consumers in this field. The interview will take approximately half an hour.

To ensure a structured approach and to not omit anything, we have prepared a guideline that will lead us through the interview. This does not exclude any interim questions or deviations; rather, it serves as a guideline.

We will be running the recording device during the conversation. This is purely for the control of our transcription. Should anything be published, it will be submitted for authorization.

Interviewee: Thank you for having me! I hope I can help you with your thesis.

Interviewer: Of course you will! Firstly, let's begin with the first question... have you ever had an electric vehicle before? If so, for how long have you had it?

Interviewee: I do have one, yes. I have a Nissan Leaf and I've had it for one year and a half.

Interviewer: Great! And why did you decide to purchase an electric vehicle?

Interviewee: I would say mainly because of the fact that petrol is becoming more and more expensive and is also extremely pollutant. Besides that, I also like cars that don't make a lot of noise while still being comfortable, and the Nissan Leaf fits these categories.

Interviewer: Ok, perfect! In the EV industry, which brands would you say are the main competitors?

Interviewee: I am not the biggest connoisseur of cars, but I would say Tesla, Nissan and Hyundai, maybe. I'm not sure about this last one.

Interviewer: No problem, that's a valid answer. What do you think about the vehicle's maximum range? Is that something important to you? If so, what's your acceptable minimum range?

Interviewee: I would say it is important, yes. I am not a big fan of spending time charging my car, so the higher the range, the better, I would say. However, that's one of the main problems with my Nissan, because it has a maximum range of 200 and something kilometers, which sometimes can be a bit low. I would say that's my minimum acceptable range.

Interviewer: What's your opinion on charging availability, duration and home charging? Does home charging appeal to you?

Interviewee: It is very good to have a home charger, but I don't have one. I'm thinking of buying one, but since I live in a remote area near a gas station, I usually charge there. It is very rare to have someone there charging their car, so I can easily charge my car there, yes.

Interviewer: What about price? Was it an important factor, when buying your car?

Interviewee: Yes, it was very important. The Nissan Leaf is a cheap car, when compared with a lot of other electric vehicles. I bought mine from a family member, so it was even cheaper than the market price.

Interviewer: Did the environmental impact affect your decision when buying an electric car?

Interviewee: I would call it a "plus". I was looking for a car that wouldn't cost a lot and when the opportunity came along, I decided to go for it. I am very happy to have a better car for the environment, however, it wasn't the main factor behind my purchase.

Interviewer: That's fair! Have you heard about government incentives for EV's? Did they affect your decision?

Interviewee: Yes, I've heard about it and I consider it a positive thing, because it pushes people to buy these vehicles. But since I bought my car second hand, I didn't gain any incentives.

Interviewer: How much did the brand's reputation or the opinion of your peers affect your decision?

Interviewee: The brand reputation didn't matter much for my choice, since I don't actually favor any brands in particular. What was more important was the opinion of my family member, who is someone I trust a lot and assured me that this was a good car and that I wouldn't regret it. So far, so good. I haven't had any problems with my Nissan.

Interviewer: Ok! This is the second to last question and I would like to ask you to rank the following factors by importance when buying an EV. State your top 5, with 5 being the least and 1 being the most important: price, range, brand, charging infrastructure, environmental impact, autonomous driving, infotainment, connectivity, safety features.

Interviewee: Ok no problem! I would go for: 1-Price; 2-Range; 3-Environmental Impact; 4-Charging Infrastructure; 5-Brand.

Interviewer: Perfect! For our final question and I would like to ask you if apart from the factors we've discussed before, are there any other considerations or concerns that would influence your choice when purchasing an electric vehicle?

Interviewee: I wouldn't say so. I think you have pretty much mentioned every single important aspect when it comes to buying an EV.

Interviewer: In that case, it is over! Thank you very much for your time, Rita. You were extremely helpful.

Interviewee: No problem! I wish I have helped you with your thesis and hope it all goes well with your Master's!

Appendix A.10: Interview with Expert Christina Beilfuss (E-Mobility Manager at Mercedes Benz)

Interviewer: Good morning, Mrs. Beilfuß. I'd say let's just get started. Please introduce yourself, tell us about your involvement in the electric car industry, and maybe a few words about your career path.

Interviewee: I've been working with Mercedes Benz for over 20 years. For the past two and a half years, I've been responsible for the "Own Retail" area, which means for Mercedes-Benz's own branches, especially concerning the topic of electric mobility. Here, the focus is less on the product itself but more on the processes that occur in our branches. Of course, this also involves implementing the corporate strategy at our locations. We appropriately manage and guide these processes. Regarding my career path, I previously held various key account positions and, as such, collaborated with numerous major clients.

Interviewer: Okay, thank you for that introduction. Let's get straight into it. We'll start with general key features and attributes. For the first question, I'd like to know: How significant is 'range anxiety' for consumers, and what advancements could address these concerns in the future?

Interviewee: Essentially, range anxiety is very real and still prevalent among many people. You will surely notice this in your interviews with customers. Therefore, we must take these concerns seriously. However, what we observe is that this fear dissipates for many people once they've had personal experiences with an electric vehicle. They then realize that the range is generally sufficient. Nowadays, almost all manufacturers offer ranges between 400 and 600 kilometers, which is entirely adequate. Still, this concern persists, and the only remedy is firsthand experience and utilizing the now well-developed charging infrastructure. I think many people simply aren't as aware of this infrastructure as they are of a conventional gas station.

Interviewer: Very interesting, thank you for that. From the interviews, I've often heard that perhaps it is also a matter of convenience. On average, I believe a car is driven around 35

kilometers a day. Very few will frequently use the 400 to 600 kilometers range that you just mentioned. Do you also see it as potentially a matter of convenience?

Interviewee: Yes, indeed many people are used to quickly driving to a gas station and completing the refueling process within five to ten minutes. With an electric vehicle, you have to adapt, especially if you don't have charging capabilities at home. While there are now charging stations at gas stations where you can charge quickly, if I'm in a residential area, I might need to find a charging point in the evening to charge the car overnight. I think that's the mindset of many people. But in reality, you adjust your behavior. That means I charge while I'm on the move. Let's say I go to a restaurant – the best parking spot is then the one with the charging point. There, I can easily charge the car for a few hours. So I charge while I'm taking a break or lingering somewhere.

Interviewer: Great. Let's continue directly with charging. You mentioned it earlier. Can you give an assessment of the current state of charging infrastructure for EVs and explain its effects on consumer decisions?

Interviewee: The numbers I'm providing can be found at the Federal Network Agency. Currently, we have about 100,000 charging points in Germany. However, the federal government's goal is to increase this number to 1 million. I think this goal needs a more nuanced view. I'm no longer sure if it remains the right target for the future, given technological developments. And here's why: While we certainly need more charging infrastructure, batteries are becoming more powerful. A single battery can now store much more energy, meaning I need to use a charging point less frequently. Moreover, the number of fast chargers is increasing. We started with fast chargers with 75 KW, and today there are those with up to 400 KW. This means that, despite larger battery capacities, the time I spend at a charging point is continually decreasing. So yes, we definitely need more charging stations, but I think the widespread fear regarding this is unwarranted.

Interviewer: From a consumer's perspective, how do you see this? Do you believe that the charging infrastructure is a decisive point for consumers, especially when making a purchasing decision? Or do you think that aspects like range and the car's general technical functions are more important?

Interviewee: Well, it is similar to range anxiety. It is a concern that many consumers have. Of course, it is also the manufacturers' responsibility to take this seriously. However, I think we can effectively show consumers the real situation. For instance, there are maps, like those from the Federal Network Agency, that show how many charging points there are now and how dense the network is. Many probably aren't as aware of the numerous charging stations as they are of traditional gas stations. But when you look closely, you realize there are already many charging points. In the vehicles themselves, for example at Mercedes, there are technologies that show you where the next available charging station is. The navigation system and its associated app can display this. These are very useful features to alleviate people's concerns.

Interviewer: Yes, great. Thank you. Let's move on to the next feature. In your opinion, how significant is the price factor in a customer's decision to purchase an electric vehicle?

Interviewee: Naturally, the elimination of environmental bonuses, especially for commercial customers, had a significant impact. Suddenly, price became a major focal point, and many thought, "This is now so expensive." However, we shouldn't just look at the purchase price in isolation. It is wise to look at the entire lifecycle cost development. Electricity prices have indeed risen, but the costs of diesel and gasoline are not exactly low either. Looking at future forecasts, fuel prices are likely to increase more than electricity prices. So, it is worth comparing the cost per kilometer driven of an electric vehicle with that of a combustion engine. It is not as if government incentives have disappeared entirely. There are various support programs, even at the state level. Additionally, there's the greenhouse gas (THG) quota that can be utilized. We

should look at the issue holistically. But of course, a decision for ecological reasons isn't always purely based on conviction.

Interviewer: Okay, okay, to sum it up briefly. You do consider the price factor as crucial, especially for the purchasing decision and that the adoption and government incentives that were provided are, of course, guiding in terms of demand.

Interviewee: Correct. But as I mentioned, it is worth taking a holistic view. To look at the price in its entirety, not just in the moment.

Interviewer: Total cost of Ownership. Yes, great. Let's continue with the next key feature. Specifically, how does the ecological footprint of EVs influence consumer decisions?

Interviewee: First and foremost, I believe that sustainability is becoming more and more important, both for companies and for consumers. In that sense, I believe sustainability itself is becoming very important for many people, wanting to be sustainably mobile. And an electric vehicle can certainly be a way for one to be more sustainable. But here again, we have to differentiate a bit, I think. Of course, if I decide for an electric vehicle and make a conscious choice for it, then other considerations come into play. Where does my electricity come from? Just as an example, and what happens to the battery afterward? So, there are many questions being raised. However, I believe that it has become a very significant aspect.

Interviewer: Okay, great, thank you. Let's move on. We've just touched upon how governmental incentives and policies have promoted the adoption of EVs.

Interviewee: For the consumers themselves, this is, of course, a strong incentive, especially when many initially focus on the moment of purchase. And, naturally, incentives provide a significant motivation. We don't need to fool ourselves; I think we all react the same way. If I get something extra, then it is immediately appealing. However, I still believe it is important to not only consider the vehicle itself but also to look at what else is available around it. Especially for homeowners, for example. What can I get subsidized? The wall box for charging, or in

combination with a photovoltaic system? So, apart from the vehicle itself, there are many opportunities to get subsidies. Proper advice is essential because I believe customers expect it and it can influence their purchasing decision.

Interviewer: Okay, great, thank you. Let's continue. How does the ecological footprint of EVs influence consumer decisions?

Interviewee: Brand loyalty isn't as strong as it was in the last century. There used to be very strong brand loyalty. Nonetheless, I believe that the expectations remain high, especially when I relate it to our brand. The expectation regarding the quality of vehicles, the features, and also safety. These are aspects Mercedes stands for, and I assume that when customers decide on a Mercedes, these are very important factors.

Interviewer: Absolutely. I find it interesting to see, as you just mentioned, that brand loyalty, as we've known it in Germany given our background, has changed over the last century. This change has been partly due to electric vehicles. Take Mercedes as an example, a very traditional brand known for its premium quality and features. But to clarify once more, do you feel that with electric cars, maybe because the technical components across brands are on such a good average level, brand reputation is no longer as decisive as it once was?

Interviewee: It is indeed noticeable. Especially considering, of course, many competitors, particularly from the Chinese market, are entering the scene and might initially seem more appealing in terms of price. Whether that's the case, I'll leave it open, but at first glance, it can lead customers to orient differently, especially if they are very price-sensitive.

Interviewer: Exactly, great. Based on your expertise, which factors do consumers prioritize most when considering buying an electric vehicle? Please identify and rank the top 5 factors from the following: Price, Range, Brand, Charging Infrastructure, Ecological Footprint, Autonomous Driving, Infotainment Systems, Connectivity, Safety Features.

Interviewee: It essentially depends on each consumer; it is hard to generalize because everyone has different needs and focuses. As we mentioned, Price is certainly a decisive factor for many. Then there's Range, Charging Infrastructure, Ecological Footprint, and I also think Safety aspects.

Interviewer: Great. Thank you. Now I'd like to ask, are there any additional factors, perhaps not previously discussed, that could also be crucial when a customer or consumer is deciding to purchase an electric vehicle? Can you think of anything we haven't discussed yet?

Interviewee: In my view, a lot of it also comes from the area of sustainability. Yes, the whole topic of electric vehicles is also critically discussed. For example, what are the manufacturing conditions for a lithium-ion battery? That might be a point of inquiry. Or even the whole topic of raw materials, which we haven't touched upon yet. There's also the issue of emotions. I don't know if you've ever driven an electric vehicle, but yes, AMG brings emotions, but so does an electric vehicle. It is indeed fun to drive electrically. I believe a lot of it is about mindset. Electric mobility is often badly spoken about. There are many pub myths circulating, and they can undoubtedly influence consumer behavior.

Interviewer: Okay, great, thanks for that. Then I'd say let's move on to the last two substantive questions that focus on the overall market situation. Namely, how do you assess emerging trends in the EV sector over the next 5 to 10 years shaping consumer preferences? And in your opinion, what trends are there?

Interviewee: I believe that the main focus will increasingly be on sustainability. Therefore, in my opinion, despite all the disadvantages, we cannot avoid electric mobility. But even here, I see rapid development. Batteries are becoming more powerful, require fewer raw materials, and there is an emphasis on ensuring that as many components as possible can be recycled. There are also efforts to produce raw materials from synthetic materials. All of this promotes electric mobility. Additionally, the topic of renewable energy is becoming more and more important.

Currently, we are intensively dealing with finding alternative energy sources, perhaps somewhat out of necessity. This will also have a significant influence on the development of electric mobility, as there may be new charging options in the future. Inductive charging has already been discussed. Although it might be complex, it is theoretically feasible. Or solar panels on the car roof. I am convinced that a lot will happen in this area.

Interviewer: Do you think that consumers' demands for sustainability will also steadily increase? You had it in the ranking, so the ecological footprint always plays a role, 100%. But for almost everyone I've spoken to, it is not the top priority. Do you think this is just a development that still needs time?

Interviewee: Yes, I do believe so. I hope it will continue to rise in importance. At least that's what I wish for.

Interviewer: Yes, we agree on that. Very cool. Let's move on to the next question. Specifically, I would like to know which companies you see as major competitors in the sector or which ones stand out and on what basis.

Interviewee: Fundamentally, German manufacturers, whether it is Audi, BMW, or Porsche, have quite similar approaches. They all offer high-quality products. However, what seems challenging are the Chinese manufacturers who are increasingly pushing into the market. Especially companies like BYD or NIO, which appear with entirely new concepts. One should critically look at how they structure their prices. At first, the prices seem very attractive, but when you consider that you have to purchase the battery separately, the price advantage diminishes. Nevertheless, we cannot ignore these developments. Tesla also pursues a unique approach by giving consumers a lot of freedom to experiment. It doesn't match our philosophy, but they are undeniably market leaders in this area, indicating they've done many things right.

Interviewer: Great, thank you. Then we're done with the content. I would like to ask if there's something you might suggest. Because we will create questionnaires for consumers based on

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the expert interviews. Is there a question you can think of that would be very interesting from a consumer perspective?

Interviewee: From surveys we know: Individuals who already own an electric vehicle seem to have far fewer concerns than before purchasing the vehicle. I would be interested to see if this observation can be confirmed. And for electric vehicle owners: What were their biggest concerns before buying, and were these concerns realized or not?

Interviewer: Alright, excellent. I'd say, Ms. Beilfuss, thank you very much for your time and your answers. All the best to you.

Interviewee: You're welcome, goodbye.

Appendix A.11: Interview with Expert Michael Kreutel (Partner at Detecon International – Automotive Industry)

Interviewer: Greetings, Michael. Thank you first and foremost for participating. Give us a brief impression. Who are you? Where are you from? What's your expertise? Where? How did you come to the... the... the Automotive Market Industry?

Interviewee: My name is Michael Kreutel. I've been in the automotive environment for over 15 years. I'm a partner in the Automotive Manufacturing sector at Detecon International. I'm responsible for automotive clients. I live in Munich and have worked for various OEMs (Original Equipment Manufacturers). This includes both customer and consulting mandates. Furthermore, I've been involved in the import business and contributed to its establishment. I've overseen global sales transformations and introduced new products. So, I've been active in many areas.

Interviewer: That's very good. Excellent. Let's move directly to the first question then. How significant is 'range anxiety' for consumers, and what advances might address these concerns in the future?

Interviewee: The range is tremendously important for consumers. Maybe I should add that I drive a hybrid service car myself. This makes the issue a bit less pressing since one is more flexible with a hybrid vehicle. However, a new engine is due soon, and for me, the range is a central decision criterion. There are basically infrastructures on the highways, but charging still represents a time loss of 15 to 30 minutes. Day trips of up to 600 to 700 kilometers are more the rule than the exception for me. Hence, range, even when discussing this topic with my peers, is a very central decision criterion.

Interviewer: Do you think that for the average consumer, who drives their car daily for about 35 kilometers, range anxiety might be more a matter of convenience?

Interviewee: My answer is a clear no. Even in cities and among property owners, the charging infrastructure is often insufficient. Many homeowners aren't allowed to install wall chargers in

their basements and therefore depend on external charging infrastructures. Thus, range remains a central issue. Even if they only need to charge their vehicle once every two weeks, compared to combustion engines, this represents a "convenience trade-off". This limitation, combined with rising prices, negatively affects the willingness to buy.

Interviewer: Great, then let's move directly to the second question: Can you provide an assessment of the current state of EV charging infrastructure and its impact on consumer decisions?

Interviewee: Yes. So, maybe you could clarify the core of the question so I don't stray too far from the topic.

Interviewer: How crucial is the charging infrastructure in general in cities, in the countryside, in Europe for a consumer's purchasing decision? From your expert view.

Interviewee: In Europe, I consider this a central criterion. For instance, when you look at countries like Italy, the charging infrastructure there is disastrous. Certainly, in tourist regions like Lake Garda or cities like Florence and Rome, there are some charging opportunities. However, when you actually go on vacation and depend on charging, the infrastructure is often lacking, even in hotels and cities. Such concerns factor into people's purchasing decisions. They wonder what compromises they must accept for it to work — and that's in the context of higher vehicle prices. It is paradoxical: one has to make compromises and pay more, all from an ideological perspective. Although it is largely smooth in the Nordic countries of Europe, even in Germany, there are frequent bottlenecks. And these obstacles influence people's positive views on electric mobility

Interviewer: Okay, okay, I understand. Great. You've just mentioned the price. How significant do you believe the price factor is in a customer's decision to buy an electric vehicle?

Interviewee: I also rate this issue as very important. Currently, there's often a feeling that you have to make concessions compared to combustion engines, which increases price sensitivity.

A positive aspect is the growing awareness of sustainability and the desire to contribute to environmental friendliness. This becomes an important decision criterion for many people. For example, we privately installed a photovoltaic system on our roof. This produces a surplus of electricity that we could use for our mobility by feeding it into our vehicles. With two vehicles, one might view the range issue differently than with just one primary vehicle that you rely on. But even with government subsidies, we're talking about additional costs of several thousand euros for consumers who have to make a decision and are not actually willing to pay more. It only makes sense when people can produce so much energy at home that they can offset their fuel costs. However, with the high acquisition costs of several thousand euros, this is questionable for the average driver.

Interviewer: Absolutely. But would you agree with me if I claim that, despite the awareness of wanting to drive more ecologically, the price factor still plays a very, very significant role in the purchasing decision?

Interviewee: Definitely. However, we'd need to differentiate very precisely by target groups. For people who act out of deep conviction, for instance, wanting to be completely self-sufficient or deliberately distancing themselves from certain trends, there might be less price sensitivity. But when we talk about the average consumer, it is primarily a matter of considering the total cost of ownership. People think economically: What does this mean for me? How complex is it? As we've recently seen, energy prices can suddenly change without any predictability. This can significantly affect the business case for electric mobility. And people who, as you mentioned, drive on average 30 to 40 kilometers a day, will find that electric mobility in daily use is not necessarily cheaper.

Interviewer: "Do you believe that the majority of consumers are aware of the Total Cost of Ownership (TCO) in the way you've described?"

Interviewee: I don't think most people truly understand the costs associated with charging on the go. This might also be the reason why OEMs, like BMW for example, offer a fixed-price Ionity membership for the first year, to alleviate these concerns. I believe that especially for those not in the automotive industry making a purchasing decision, the upfront cost compared to the price per kilowatt-hour weighs heavily.

Interviewer: Yes, yes, exactly. That matches what we've gathered from another interview. Let's continue. To what extent does the ecological footprint of EVs influence consumer decisions?

Interviewee: Well, it really depends on the specific target group. For me personally, it plays a significant role. However, I also have to consider consequences, like having to stop and charge the car on a long day just to get home. I know from experience how often I've driven to the next gas station with almost an empty tank. At the same time, I'm aware of how frequently charging stations are occupied even when shown as available. This happens because maybe someone parked incorrectly or the charging station is faulty. To return to the question: I am convinced that there's a group ready to pay higher costs to be aware of their reduced CO2 footprint. On the other hand, I find it odd - and I work in the auto industry - that consumers are led to believe that hybrid cars consume only one liter per 100 kilometers and emit almost no emissions. That's simply not correct. Power generation can also produce emissions, but many have the impression that it doesn't. That bothers me. Depending on the individual and their engagement with the issue, I still believe that people who own an electric vehicle tend to act more sustainably. I definitely see that.

Interviewer: Great, let's move on. To what extent have government incentives and policies promoted the adoption of EVs?

Interviewee: I believe this is particularly crucial as it compensates, at least in part, for the initial barriers, hurdles, and additional costs. It gives the impression that you might get a better price now than potentially next year if you consider switching. At the same time, investments and

incentives for infrastructure development are essential. There were already KfW support programs, especially for single-family homes. However, many problems remain unsolved, especially in cities where the proliferation of e-mobility should be promoted. This includes, for example, the possibility for residents to install charging infrastructures in underground garages. Subsidies play a central role here. Often, additional facilities like transformers or high-voltage systems need to be built for charging station construction. These projects incur costs that an individual would hardly be able to bear. Therefore, financial incentives are needed for both vehicles and infrastructure, making it more attractive until a critical mass is reached that allows for widespread e-mobility.

Interviewer: I understand, yes, thank you for that. One more question: How do intangible aspects such as brand reputation and social influence factor into consumer preferences?

Interviewee: From a user perspective, I believe that practical components like range and comfort remain very important. However, I also think that loyalty to certain brands is dwindling. The decades-long trust in the experience with combustion engines and their efficiency suddenly doesn't play as significant a role. This offers entirely new opportunities for Chinese manufacturers and Tesla, an American provider, that they might not have had if it had continued to be only about combustion engines. As a result, the barrier to market entry has become lower.

Interviewer: Absolutely. In short, features like range, comfort, connectivity, etc., are probably more important to the consumer than the actual brand.

Interviewee: Yes.

Interviewer: So, based on your expertise, which factors do consumers prioritize most when considering buying an electric vehicle? Please identify and rank the top 5 factors from the following: Price, range, brand, charging infrastructure, ecological footprint, autonomous driving, infotainment systems, connectivity, safety features.

Interviewee: I would place safety features at the very top. Then probably comes the price, followed by range, which is closely linked to charging infrastructure. Next, I would rank the ecological footprint, followed by infotainment, and finally connectivity. I would place the brand attribute last.

Interviewer: Great. Thank you for that. We've pretty much covered the content-related questions. A supplementary question from me: Which additional, previously undiscussed factors might be crucial in influencing customer decisions?

Interviewee: Yes, the availability of features and potential additional costs for subscriptions, for instance, to view the charging infrastructure while driving, are, I think, crucial. Another point that still unsettles many today is the durability of the batteries. When will it be necessary to replace them, especially if you buy the vehicle and don't lease it? The lifespan of these components certainly plays a significant role in the purchasing decision.

Interviewer: Perfect, I've noted everything. Excellent, thank you. I have two more questions about the overall situation. How do you estimate that emerging trends in the EV sector will shape consumer preferences over the next five to ten years?

Interviewee: Hyper Charging – everyone calls it something different. It is about the speed at which vehicles can be charged. There are now tests with gigawatt charging. A challenge is that the cables are so heavy that users find it difficult to plug them in. Inductive charging has also been discussed for a long time, but no one has found a proper solution to address infrastructure problems yet. Another interesting concept is swapping batteries to bypass charging times and implement deposit systems. A particularly exciting topic that also has a significant impact on the entire infrastructure is the so-called Vehicle-to-Grid and bidirectional charging at home. Here, the vehicle can also be used as an extended battery. This could offset the additional costs associated with buying an electric vehicle compared to a home storage solution, which can quickly cost 5 to 10 thousand euros.

Interviewer: Are you referring to the connection to the Smart Home network?

Interviewee: This will surely trigger a massive trend. Who will realize it, and whether, for example, a swapping infrastructure will still be necessary when we have faster charging cycles with, say, 1000 KW remains to be seen. This will also be particularly relevant for truck infrastructure. It is equally suitable for the B2B sector.

Interviewer: That's really fascinating. The Smart Home connection was new to me, but it kept coming up in my research. Now, let's pose the final content question: Which companies in the EV sector stand out as main competitors, and on what basis (e.g., price, features)?

Interviewee: I think that Tesla, even though I'm not a fan myself, stands out due to its strong marketing and communication impact. Then I see the Chinese, like BYD for example, who are very relevant because of their extensive experience and expertise in the battery world. There are certainly other Chinese companies now pushing hard into the European market. Regarding European, especially German brands, I've been hesitant so far. They undoubtedly currently play a leading role in experience concepts, especially in the infotainment area, but lag in technical components. So I would say: Tesla from a marketing perspective, BYD from a battery perspective, and the core brands from Europe from an experience perspective compete against each other. Moreover, there's a large mass market, with players just beginning to transform.

Interviewer: Do you mean VW, Mercedes etc.?

Interviewee: Exactly, BMW, VW, Audi, Porsche, and Mercedes.

Interviewer: Alright, great. Michael, thank you. One final question then. Are there specific methods or types of questions you would recommend for our consumer survey?

Interviewee: I believe there are already numerous studies on this topic that deal with the main concerns of consumers regarding infrastructure. However, what has always interested me is the question of when consumers have enough trust in the external charging infrastructure that they no longer feel the need to own a private charging infrastructure. When is this point reached?

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Perhaps one should ask how often in a year consumers are willing to charge externally and be dependent on a foreign infrastructure compared to their own. After all, not everyone has and will have the opportunity to own a charging infrastructure.

Interviewer: Perfect, great. Let's include that, and I'd say, Michael, a thousand thanks for taking the time, even on a Friday afternoon, to answer these questions for me.

Interviewee: You're welcome. I always find it fascinating because there are always different perspectives. And as I said, I'm currently at a purchasing decision and I'm dealing with this very topic, this discussion, this tedious one between range, affordable leasing rate, and infrastructure. Also, because, as I said, I believe for many it is interesting if, for example, they can charge for free at their employer's. That's a whole different argument than if they have to pay everything themselves.

Interviewer: Great! Then I'd say, Michael, have a nice weekend and a well-deserved end to the workday. Hopefully soon.

Interviewee: Yes, that would be nice. Now I have to continue working here.

Interviewer: Alright. Thank you. Take care, Michael. All the best.

Interviewee: Yes. Thank you. Goodbye. Ciao.

Appendix A.12: Interview with Expert Ronny Blochwitz (Founder of eauto.de - Germany's Leading Second-hand EV Marketplace)

Interviewer: My name is Paul Gärtner. I am writing my master's thesis on electric vehicles and consumer preferences. Ronny, it would be great if you could briefly tell us about yourself, your career, and your experience in the industry.

Interviewee: Well, I am Ronny Blochwitz, and I have been deeply involved with electric mobility for the past eight years. My entry into this field was through micromobility and last-mile delivery. For two years, I was involved in a project where postal and newspaper delivery personnel used fully electric micro-vehicles for the so-called "last mile." These were quads, trikes, and scooters – two-wheelers – to deliver mail and newspapers to mailboxes. Through this experience, I came upon my later startup idea: to establish a trading platform for used electric vehicles. This eventually led to the foundation of eAutos.de Deutschland GmbH. The eAutos.de portal still exists today. I built it up for just over five years and finally sold it in 2022.

Interviewer: Let's dive straight into the general key features and attributes of e-cars. How significant is "range anxiety" for consumers, and what advancements might address these concerns in the future?

Interviewee: Since I started dealing with this topic, "range anxiety" has always been a prominent buzzword. I believe it is still a significant issue. This is actually misleading because if you look at the usage of cars more closely, they are more "standing vehicles." They are parked about 98% of the time, and on average, a German only travels 35 kilometers a day with their car. When you consider this scenario, almost all currently available all-electric vehicles easily exceed this average daily mileage with their range. Therefore, the issue of "range anxiety" should not actually be a problem. But then convenience comes into play. And that's also the reason why the switch to fully electric mobility has been so sluggish among consumers. For one-off trips on vacation or spontaneous trips over 300 to 400 kilometers, the electric car is not

unsuitable, it just requires that the driver doesn't decide when to take a break. Instead, after about three hours, the car dictates a stop on the highway. Many can't get used to this idea, which in my opinion is more a convenience issue than a technical challenge or a matter of range anxiety. But it seems this idea is deeply ingrained in people's minds. We have used combustion engine technology for over 100 years and learned that with a full tank, you can drive 800 kilometers in one go. Many don't want to give up this comfort.

Interviewer: All right. Very interesting. So would you say that convenience is generally the main focus, based on your experience?

Interviewee: Yes, we have gotten used to it, and breaking habits is always difficult.

Interviewer: Then I would say, let's move on to the next question. Can you assess the current state of the charging infrastructure for EVs and its impact on consumer decisions?

Interviewee: Of course, charging infrastructure is key for operating numerous electric cars on the roads. In Germany, it is currently the case that for every electric car, there are about ten charging points – no, excuse me, the other way around. One electric car comes to one charging point. This ratio seems balanced at the moment. In fact, in theory, even more electric cars could be operated per charging point as the charging points are not currently fully utilized economically. For those providing charging infrastructure, it is not profitable right now. My hypothesis on this subject is that we should try to maintain this ratio. At the moment, just over 1 million all-electric cars are registered in Germany. If we assume 2 million vehicles, there should be accordingly 200,000 charging points available. With 10 million vehicles, of course, we need a correspondingly higher number of charging points. I believe if we take this into account and continuously invest in infrastructure – even on a European level, which was the focus of your question – then the transition can be smooth. Regarding other countries, I am unfortunately not fully informed, but at least in Germany, that's the situation.

Interviewer: All right. Understand. But would you then say, accordingly, for the consumer, especially when it comes to the purchase decision, the charging infrastructure isn't considered that important because the prevailing narrative is "it will be fine, I will be able to charge my car somewhere"?

Interviewee: I believe you have to differentiate here. First, there's someone, an electric car driver, who lives in a city and most likely resides in a rental apartment or a condominium in a multi-family building. For them, I think public charging infrastructure will be important. Meaning, there has to be a reliable and accessible charging point nearby. Then, there's the second group, from my point of view, urban or rural citizens who probably own property, maybe a single-family home, or at least have the option to make changes. They can just set up their wallbox and charge at home.

Interviewer: Great, then I'd say let's move on to the next question. We are now coming to the topic of price. I'd like to know from you, how significant do you think the price factor is in the customer's decision to buy an electric vehicle?

Interviewee: Yes, it is of course extremely important and certainly a barrier because the purchase prices for all-electric cars are still higher than comparable combustion engine models. What has always bothered me is that end consumers unfortunately don't do the full math. When deciding whether to drive an electric car or stick with a combustion engine, or even buy a new combustion engine car, people often forget to calculate the Total Cost of Ownership (TCO) and not just the purchase price or lease rate. It is not just about the initial cost, but also the ongoing costs of operating the car. We're talking about insurance, taxes (which e-cars don't have), fuel consumption, as well as maintenance, upkeep, and wear and tear. When you do this full calculation, electric cars have certain advantages over the next four to five years that reach a break-even point, where even with a higher purchase price, you end up saving money in the long run. Unfortunately, this is rarely considered.

Interviewer: Do you think it is because most consumers are not aware of it?

Interviewee: I believe most aren't aware, and people tend not to want to think about ongoing costs, and often they're somewhat hypothetical. Like, how many repairs will I have, etc. But things like regular service intervals and oil changes for combustion engines can be predicted quite well. Electric cars are more expensive to purchase because they have a component that typically makes the car 20% more expensive: the battery. This means that the battery can pose a future cost risk. If it breaks, you have a several thousand euro damage. But car manufacturers have reacted to this. Now, they usually offer special warranties on batteries, typically between five to eight years and usually between 120,000 to 200,000 kilometers. This ensures that you can use the battery without incurring any repair costs. And I think this is something that is not yet clear to the broad masses. Plus, traditional OEMs (car manufacturers) are doing everything they can to prevent this from being common knowledge because they still want to sell combustion engine cars. It is a bit of a marketing game.

Interviewer: Let's move on. To what extent do you believe the ecological footprint of electric cars influences consumer decisions?

Interviewee: From my experience, it varies significantly from individual to individual. Some aren't interested in it; they have the cost aspect in mind and want to save or are just rational about their routes and car usage, and therefore opt for electric. Then, logically, there are the environmentally conscious ones who say, "Yes, I want to drive emission-free in my city and in my surroundings avoids the topic of CO2 emissions, at least for the local environment. And then there's a third, in my view, exciting variant. Nowadays, there are companies that are adding vehicles with electric drives to their fleets because otherwise, they wouldn't get certain contracts. This reminds me of the time when I was involved in the logistics sector, assisting with the electrification of fleet topics. So there are tenders for transport or delivery services that are only awarded if certain environmental standards are met. Electrification of the fleet is

naturally part of this. This means that companies are indirectly forced by their customers and their business model to gradually implement more climate-neutral forms of propulsion.

Interviewer: Okay, a very interesting perspective. I wasn't aware of that. That's cool. Thanks for that. Now, to what extent have governmental incentives and policies promoted the adoption of EVs?

Interviewee: It is a very tricky topic, especially in the current situation. State interventions can certainly promote a market. I'm definitely in favor of that because otherwise, such a transformation will be too slow. But what we're seeing now, which can also happen, is when such funding, based on legislative periods, changes constantly. This can also completely break a market. And our automobile market isn't completely broken, but we've seen what happens when such funding is suddenly reduced. And now, as of the first of September - we're talking now on the fifth of October - the funding for electric vehicles for companies has been withdrawn. This is absolute nonsense because 90% of new electric vehicles are in company fleets, either leased or financed. The private end customer isn't going to buy a brand new electric car. That's not going to happen. That's why I founded eCars more as a second-hand platform, so the private customer has a chance to buy a used electric car, where the initial price has already depreciated, making it affordable. So, reducing the funding for companies for new cars is the wrong way to get electric cars to the masses. And that's what we're seeing right now. I think this approach hasn't been well thought out and will lead to the opposite of what we actually want.

Interviewer: So am I understanding this correctly that you see this as a crucial lever to promote the market and make the product more accessible to consumers if it is well thought out?

Interviewee: Exactly. What I find sensible, for example, is the car tax exemption. That just makes sense. What I also find sensible is that the company car rule, the so-called 1% rule for cars, can be reduced to 0.5 or even 0.25 if it is an affordable electric car. I think that's a very

good incentive, which doesn't cost the state much money but keeps the incentive for fully electric vehicles very high. In terms of purchase premiums, etc., I find it chaotic and not particularly well done.

Interviewer: Alright, great, thanks for that. Let's move on to the next question. What do you think about how intangible aspects like brands, reputation, or social influence play into consumer preferences and purchasing decisions?

Interviewee: Well, first of all, a car has always been an emotional topic, especially for Germans. I believe that remains the case. But what I've noticed in recent years, with my focus on electric cars, is that there's an increasing group – still a minority – that's moving away from traditional brand loyalty. With combustion-engine vehicles, we associated brands like Mercedes with elegance, comfort, and sportiness. Audi with pure sport, BMW with sport as well, and VW as an all-rounder. These brand associations are gradually disappearing with electric cars. For a long time, VW lagged behind, producing inferior cars. People were looking at brands like Tesla or even some Chinese brands, thinking that although the brand might be new or unfamiliar, the product was superior. People started to prioritize product features over brand loyalty. This is shifting again, as the product range is broadening, and brands like VW and Audi are improving. But this highlights why Chinese automakers can be successful here. For someone who sees the brand as secondary, they might drive a Byd if the car is good. Do you see this as a temporary shift, and can you imagine, once electric vehicles are as integrated as combustion-engine cars, that people will return to having strong emotional attachments to brands? However, I believe that even a brand like Byd can become a household name if the products consistently perform well. Look at Tesla, for example. I've just read Elon Musk's new biography – the company was founded in 2004-2005. We're talking about 20 years of company history. Today, Tesla is super sexy. No one needs to be embarrassed to say they drive a Tesla because the products – not initially, as they started off being considered overpriced and of poor

quality – are now good mass-market vehicles with excellent software. Now, Tesla is a recognized brand. I think Byd can achieve the same. Established brands, not necessarily the premium ones I just mentioned, but ones like Mazda and Hyundai, face serious competition when it comes to brand reputation.

Interviewer: Okay, great. Very insightful. Thanks. Let's move on to a rating. Based on your expertise, which factors do you believe consumers prioritize the most when considering the purchase of an electric vehicle? Please identify and rank the top 5 factors from the following: price, range, brand, charging infrastructure, environmental impact, autonomous driving, infotainment systems, connectivity, safety feature.

Interviewee: Yes. Firstly, price. As we discussed earlier, there's often a mental barrier where people focus only on the initial cost, without considering the ongoing costs, and whether the initial purchase is attractive or not. Second, I think, is the brand. I've often heard people say they can't switch because there isn't an electric version of the Mercedes v.Class yet. And I always think there are ten other family-friendly electric cars available, so why not move away from the Mercedes star? But that brand loyalty is deeply rooted in many. Then, range. We talked about this earlier as well, this mental barrier where people think they can't spontaneously drive to the Baltic Sea, which is nonsense because that rarely happens. In my opinion, the next is the topic of equipment, both interior and exterior. And fifth, software and connectivity. This is how I perceive the market currently. I would prioritize it differently personally, but that's how I think it is.

Interviewer: Let me quickly ask a follow-up question. The ecological footprint, specifically CO2 savings, hasn't appeared in the top five. You mentioned this earlier, but in your experience, do you consciously not see it as a top five relevant point in purchasing decisions?

Interviewee: Right. When considering the mainstream, the masses, I'd say it doesn't count among the top reasons.

Interviewer: Yes, very interesting. Great. Perfect. Thank you. Then an additional question about features: What additional factors, not discussed here, could be crucial in your opinion when buying an electric vehicle?

Interviewee: Well, we met because I briefly participated in a project with Nepal as a freelancer. And the answer to this question is quite simple: the integration of the electric car into the smart home.

Interviewer: Okay. So, connectivity?

Interviewee: Yes, connectivity often revolves around topics like over-the-air updates and being able to constantly maintain the car's software. What I'm really talking about is bidirectional charging in properties. We're discussing energy production, which involves solar panels or wind or water. Then there's the consumption of energy, ideally synchronized with when the power is generated. And if that's not possible, the energy needs to be stored. And often, the topic is stationary storage. But there are already a million mobile storages out there, cars carrying electricity, but they can't yet feed it back into the grid. This is, in my view, the most exciting development for the next 1 to 3 years. If I have an electric car and can plug it in at my house, whether it is a single-family home or an apartment building, and it can feed power back, it opens entirely new business models. Essentially, I could even make money with my car.

Interviewer: I see. Very interesting. Cool. Very cool. Let's pick that up quickly. Let's move on to your understanding of the overall situation. Perhaps you have something else in mind: How do you see emerging trends in the electric car sector shaping consumer preferences in the next 5 to 10 years? You just mentioned integration. Are there other trends?

Interviewee: Right. Bidirectional charging is one keyword. The next thing I see on the horizon for 5 to 10 years is solid-state batteries. As of now, it seems to be moving towards sodium,

replacing lithium-ion batteries with sodium solid-state batteries. This offers advantages in terms of longevity and fast charging capabilities. Plus, it is lighter and cheaper to produce. Sodium chloride is table salt, which we have in abundance in seawater. This could potentially sweep away concerns about rare earths, cobalt, nickel, which are often rightly criticized. I believe this could be a game-changer. And then, maybe as a third and final point, charging infrastructure. But from a consumer's perspective, given that we've somewhat sidelined the ecological aspect, it basically brings more convenience in terms of faster charging, longer-lasting batteries, etc. From a consumer standpoint, it is really about convenience. And in this case, you have both: convenience in terms of faster charging, lower cost, lighter weight, and the added benefit of being more environmentally friendly. Research is ongoing in various directions for solid-state batteries with sodium, silicon, etc. I'm not a scientist, but I believe this issue will be resolved in the next five years. We'll see a new generation of solid-state batteries.

Interviewer: Okay, great. Clear. Now, the last substantive question. I'd like your assessment in the sector regarding current main competitors and why. Can you list your top three or even five OEMs (manufacturers) or from a consumer's point of view, based on price, features, software, etc. The idea here is to understand if there are brands that experts frequently mention or that stand out, which aren't necessarily on the radar for laypeople.

Interviewee: Ah, I see. Yes, I'd still pick Tesla, not because I'm a fanboy, but in my view, it is simply the best product, from production to the second-hand market. Tesla is currently the best. In second place, I'd say BYD. This isn't a groundbreaking insight because BYD is currently competing with Tesla for the crown in the electric car market. I believe BYD trailed Tesla by 3,456 cars in the last quarter, which I read this morning. So, it is a neck-and-neck race. For the premium segment, I think Mercedes now has a good chance. Can you still hear me? I think the video might have frozen. But if it is just the video, that's fine. The EQS from Mercedes combines the best of both worlds: German historical automobile engineering, exquisite interior

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craftsmanship, class, extravagance, excellent materials, etc., blended with good electric mobility aspects like software, charging infrastructure, and the build of the car itself.

Interviewer: Let's take those three. Let's go with Tesla and Mercedes. That's more than enough. That's great. Also, I don't want to take up any more of your time. We're already at the end. Ronny, I have one last question. We speak with experts like you, we'll also talk to customers, and in the end, we'll conduct surveys on specific attributes and features. Do you have any advice for me? Something like, "You should ask this, it could be interesting." Or, "It is good to inquire about this", something that's not typical.

Interviewee: What I always liked doing when I gave presentations on this topic, whether on ey cars.de or on some automotive panels where I was invited, is I was often the start-up guy who was invited as an ICEbreaker. And if you're polite, you ask beforehand. But if you want to deliberately provoke, you ask it during the discussion: "Who among you drives fully electric?" Most of those who pass judgments have at most ridden in one or taken a test drive. Personally, I always feel that one should only pass judgment after having driven an electric car daily for several months. That's point one. And for point two, if you really want to get into content, it is about asking whether they've ever actually calculated if an electric car would make sense for their specific driving profile. Often, there's this argument that it is too expensive or not refined enough, and all these typical objections. Honestly, I now just raise my hands and don't try to convince them anymore, but if they would take a blank sheet of paper and honestly compare the costs and environmental impacts, they would quickly realize that electric cars already make sense.

Interviewer: Great, perfect. I'd say we're now at the end of the interview. Thank you so much for the fascinating insights and for the pleasant conversation.

Interviewee: No problem, have a nice afternoon.

Interviewer: All right. Take care, Ronny. Thanks a lot. Bye. Bye. Bye.

Appendix A.13: Interview with Expert Stefano Borgonovo (Sales consultant for all brands of the Volkswagen Group at Bonaldi, Eurocar Italian Group)

Interviewer: Good morning, Stefano, I appreciate your willingness to participate in this interview. Could you kindly provide us with some insights about yourself, your occupation, and your professional background?"

Interviewee: Hey Agnese, yes of course. I hold the position of sales consultant, primarily focusing on serving the needs of small and medium enterprises (SMEs) located within the province of Bergamo. In this capacity, I represent all brands under the esteemed Volkswagen (VW) Group umbrella, providing tailored solutions and expertise to meet the unique requirements of businesses in the region.

Furthermore, I assume the role of fleet manager specifically for the Seat and Cupra brands. This responsibility involves overseeing and optimizing the management of corporate vehicle fleets, ensuring that Seat and Cupra vehicles are not only efficiently acquired but also effectively maintained to meet the diverse needs of our valued clients in this locale.

Interviewer: Nice! Perfect! Now, since you work in the vehicle segment, you can help us and explain a little bit about what are for you the most important features of the electric vehicle. For example, talking about "autonomy anxiety", how important is it for consumers and what advances could solve this problem in the future?

Interviewee: Yeah, about the first question, autonomy anxiety is the main problem that customers face before making a purchase, beyond price, that comes later. I think that this problem should and could be solved by a massive installation of columns in the territory with a "fast" charging power i.e., above 22kw.

Interviewer: Yeah, okay now let's talk about the current market, can you provide an assessment of the current state of electric vehicle charging infrastructure and its impact on consumer choice?

Interviewee: Yes, I can talk about Italy because it is my market. Actually, the number of columns in Italy is higher than the number of gas stations, the problem is that 90 per cent are "slow charging" i.e., within 11 kW, while the cars now on the road transpose charging power above 22 kW. Italy is gearing up and quickly converting existing systems in addition to new installations, but it will still take a couple of years. This limits consumers who would have to take a long time to recharge their cars.

Interviewer: Okay, yes. You being a retailer have a close relationship with the consumer, how important do you think the price factor is in influencing a customer's decision to purchase an electric vehicle?

Interviewee: After the "range" issue is the price issue. Electric cars cost on average 30% more than thermals. We note that in Italy the Electric best-selling cars have the DACIA brand, which is a brand that covers the B and C segments of the market, so medium-small cars. In the other segments, there is still some difficulty, despite government incentives, which help but are not sufficient to bring prices within the customer's affordability.

Interviewer: And talking about the environmental footprint of electric vehicles, how do they influence consumer decisions?

Interviewee: It really depends, some consumers are very sensitive toward the environment and base their decision precisely on this. However, they are still limited in number. Fortunately, even some companies want to show a "green" footprint and include in their fleet cars some electric cars. There is still too much fake news about the pollution of electric vehicles, from construction to disposal. Few people know that they are mostly built with environmentally friendly materials and the batteries are recyclable 100%. (I am referring to the VW group).

Interviewer: And to what extent have government incentives and policies helped promote the adoption of electric vehicles?

Interviewee: Government policies have helped users in their decision to purchase an electric, but, as I mentioned earlier, they have not been decisive. In fact, there are other states such as Sweden and Norway where the increase in sales of electric cars has been by 80/90% In Italy by 15%.

Interviewer: What about intangibles such as brand reputation and social influence, how do you think they affect consumer preferences?

Interviewee: Let's say that Italy, especially, is the country where the automobile is highly coveted and creates status. It is clear that brand reputation, especially in a product that is rather new to the market, is very important. Some brands have made their history based on reliability which has been transformed over time into customer trust.

Interviewer: Based on your experience, what factors do you think are the highest priority for consumers when considering the purchase of an electric vehicle? Please identify and rank the top 5 factors from the following: price, range, brand, charging infrastructure, environmental impact, autonomous driving, connectivity, and safety features.

Interviewee: Okay, I would definitely say:

1. AUTONOMY: the customer demands a range of more than 500 km even though 90% of the users do not drive more than 100 km per day.

2. PRICE: Price remains one of the determining factors, also due to the economic moment, not favorable.

3. RECHARGE INFRASTRUCTURE: If users do not find convenience in recharging along their usual routes, he is not inclined to purchase.

4, 5, 6 BRAND, CONNECTIVITY, SAFETY FEATURES: I place these 3 factors on the same level at the time when in which the customer decides to buy.

7. AUTONOMY

8. ENVIRONMENTAL IMPACT

Interviewer: And what other factors, not discussed above, might be crucial in influencing customers' decisions?

Interviewee: In my opinion, information about the product, features, and ease of use, trying to clear minds of just the "range" issue, which honestly would not be a problem for 90 per cent of motorists. The customer must test the car in the routes and conditions he experiences daily. We are trying to do that.

Interviewer: Yeah, definitely. My next question is a little bit more about emerging trends. How do you expect emerging trends in electric vehicles to influence consumer preferences in the next five to ten years?

Interviewee: Models of major brands (VW) with selling prices not exceeding €25000 are expected. This in my opinion will make a difference and the trend will be reversed.

In addition, the media often reminds us of the end of the production of thermal engines. The high fuel is another factor that may influence decisions.

Interviewer: Okay thank you, now let's move to the last question, which EV companies stand out as main competitors and on what basis (e.g., price, features)

Interviewee: Certainly, the Volkswagen Group with the Audi and VW brands is working very well to expand the model range with an electric product in each segment. In these brands, the customer can find what they want, from the medium-small car to the premium product, with the best technology on the market. Other brands such as BMW and Mercedes are also working in that direction. Not to be underestimated are the brands from China that are coming to Europe, which certainly offer a product at a medium price with a good technological base. They have the advantage of a 'superior experience with the product (they have been producing electric vehicles for several years) and control of raw materials for battery construction, I am talking especially about BYD, which has already opened outlets in Italy and the rest of Europe.

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Interviewer: Sounds good. It was very interesting. Now I've got a lot of information to talk about. Do you want to share any final thoughts or things that you want to talk about regarding this topic?

Interviewee: No, I think we have covered all the most interesting aspects! But should you have any other questions or curiosities during your work, please do not hesitate to ask me. In the coming days, I will be attending several conferences around Europe where they will address the topic of electric mobility. Should I think of anything else, I will contact you immediately.

Interviewer: Okay, well thank you for your time, we will contact you for sure and have a good day!

Interviewee: Thank you too!!

Appendix A.14: Interview with Expert William Brasi (Marketing manager at SCAME S.p.a)

Interviewer: Good morning, William, my name is Agnese Borgonovo and I am writing my thesis about electric vehicles and customer preferences. Thank you for agreeing to answer my questions for this interview. Can you please tell us a little bit about yourself, your job, and your experience William?

Interviewee: Hey Agnese. Yes of course! I am a Marketing Manager of Scame. This company has been in the business of EV charging stations since 1999 when we developed the first electric connector specific for this application. I have been working for SCAME in this industry since 2004 and from 2017, as marketing manager of the group, I am part of the strategic board of Scame and responsible for defining the product development strategy. This requires constant observation of the market to try to intercept in advance new technological, regulatory and social trends.

Interviewer: Wow, that sounds interesting! And how do you feel about it, what do you think about this industry?

Interviewee: It is the first time I have been working in a transition process that will change so much our society, our mobility and our way of life. This makes the job very interesting, but at the same time complex and challenging, because the market is constantly evolving with very fast changes. The development of electric mobility still requires several years and important developments, both in technological and cultural terms, but the path seems clear to me. Automotive is one of the most important industries in the world and it is living a proper revolution that has to be managed carefully. Personally speaking, it is a privilege to work in such a challenging industry during these years.

Interviewer: You seem very passionate about what you do, so I can immediately start with the first question! What do you think about 'range anxiety', how significant is it to consumers, and what advancements might address this concern in the future?

Interviewee: I believe that one of the main factors limiting the adoption of passenger cars and/or all-electric commercial vehicles is the limited range and excessive charging times. They in fact, together with the fact that there is limited ubiquity of charging infrastructure, create the phenomenon of range anxiety. This is why The European Commission's Strategic Energy and Technology Plan (SET-Plan) has set a target of 2030 to achieve a charging time of 20 minutes. Currently, best-in-class stand between 20 and 30 minutes for 10-80% charging. However nowadays, talking about the Italian market, a substantial share of vehicles has a range greater than 350 km. Such vehicles are mainly concentrated in the C and larger segments.

Interviewer: Excuse me when you refer to category C, what do you mean?

Interviewee: Ah yes sorry I didn't specify that! When we talk about segments in the automotive field, we mainly refer to the size and characteristics of a vehicle. In Europe, car segments are found to be classified by the letters of the alphabet, with the letter A denoting the smallest sized cars and so on, growing. For example, the first A segment refers to mini cars and city cars, then B the larger ones until we get to the S segment, this category includes powerful and sporty cars, with coupe bodywork.

Interviewer: Okay now is clearer! Now, let's move to the second question, can you provide an assessment of the current state of EV charging infrastructure and its impact on consumer choices?

Interviewee: Yeah, of course! I just worked on a project with all the data about it. I can share the screen with you and show you the data we got. As you can see here, during 2022, installations of public access charging infrastructure in the European context confirmed the growth trend seen in recent years, with reference to both "fast charge" and "normal charge" infrastructure. By the end of 2022, there will be an estimated 450,000 public access charging points installed in Europe. About 86 per cent of these are of the "normal charge" type, while the remaining points are of the "fast charge". Globally, by the end of 2022, there are estimated

to be more than 2.6 million public access charging points, of which 67% are "normal charge" type and the remaining are "fast charge" type. Globally, of course, as you can see here, China remains the leader in terms of the number of publicly accessible charging points: by the end of 2022, it cubes 83 per cent of fast charge type points and 57 per cent of normal charge type points. So I am saying that in terms of offering infrastructure to recharge electric vehicles, a home charging system has been developed and there is a high request. About the home charging system, I can definitely say that there are two different systems. Let's talk about the first one, this one is called Wallbox which is wall-mounted and uses the home power outlet to perform the charging service. On the other side, we have the classic charging stations which are devices aimed at both residential and private contexts with public access. If we have to talk about the main problem regarding the charging of electric cars I would say that is related to the «turbulence» in the energy markets in recent months that has inevitably also affected the rates of charging operators, which have increased compared to 2021 (considered as the reference year before the sharp price increase).

Interviewer: Okay, you were very clear and precise, thank you for this data, it will be valuable for our research. And now, talking about the increase in the price, how significant do you perceive the price factor to be in influencing a customer's decision to purchase an electric vehicle?

Interviewee: The price factor is a fundamental factor when the consumer decides to approach the world of electric cars. The real problem from here on out is that although 2022 the trend in the growth of the passenger car full-electric offers on the Italian market with models mainly focused on segment A and on the high gamma at the same time there is an improvement in the performance of cars, mainly due to the technological development of batteries with an increase in autonomy and a significant reduction in charging times. However, there is a reduction in the affordability of full-electric vehicles: the crisis that occurred on the supply of raw materials has

in fact affected vehicle prices, which on average show growth in almost all segments. Despite this, the trend to 2030 looks positive, with a decrease in vehicle prices driven mainly by better accessibility of lithium-ion batteries, whose unit price (\$/kWh) is estimated to halve in the coming years.

Interviewer: And how does the environmental footprint of EVs influence consumer decisions?

Interviewee: Having done a lot of research on this issue over the years I realized that, in Italy, it is mainly the awareness of a positive environmental impact that drives the purchase of a Full Electric (BEV) car. In the survey that has been made for my company, the answer is that over 50% of the possessors indicate it among the important aspects.

Interviewer: Now let me ask you another question, if I were to ask you which electric car brands are competing in the European market, which ones would you name?

Interviewee: First that comes to mind is Tesla, in fact, as has been reported, it was the best performing brand, capturing 2.63 percent of the market. Then I would mention the Volkswagen Group and finally consider Stellantis with its Fiat 500e. Then there are all the Chinese brands that are entering the European market that will turn the tables in the coming years, among them we can mention BYD.

Interviewer: To what extent have government incentives and policies been instrumental in boosting EV adoption?

Interviewee: Incentives are also considered factors that encourage the purchase of respondents, both economic at the time of purchase and related to use (e.g. free access to ZTL, free parking, etc.). When analyzing affordability, it emerges that the majority of electric car owners (76.4%) bought the car due to the support of incentives. Of these, 80 per cent took advantage of incentives ("Ecobonus"), while 28.6 per cent took advantage of regional incentives. Most of those, however, who did not take advantage of incentives, did not do so because they were not aware of them or because the latter were not available for purchase. The incentives are also

considered when you need to ascribe the charging point, my analysis showed that among those who have wall boxes/ columns at home (46.2% of BEV owners), 73.6% said they had received incentives to purchase and install the charging point. Of these, 63.8% claimed to have benefited from the 50% tax deduction and 29.2% from the 110% tax deduction. 26.4% say they did not use incentives.

Interviewer: Based on your expertise, which factors do you believe consumers prioritize the most when considering the purchase of an electric vehicle? Please identify and rank the top 5 factors from the following: price, range, brand, charging infrastructure, environmental impact, autonomous driving, infotainment systems, connectivity, safety features

Interviewee: Okay, leaning on your model I would put environmental impact as the priority one, then infotainment systems, safety features and connectivity in second place, in third place charging infrastructure and range and finally price and last brand.

Interviewer: What additional factors, not previously discussed, might be pivotal in influencing customers' decisions?

Interviewee: I would also consider incentives for the use and consumption of the electric car, the technical characteristics of the vehicle, the availability of a private charging point and public charging infrastructure, restrictions on urban traffic and a sense of belonging to a community

Interviewer: How do you anticipate emerging trends in the EV sector will shape consumer preferences over the next five to ten years?

Interviewee: Currently, the decrease in prices of full-electric vehicles is being held back by the high prices of raw materials, among which the materials afferent to battery packs stand out.

Despite this, the outlook for 2030 is confirmed as positive with the two main battery technologies expected to significantly reduce cell prices. LIBs will retain a cost advantage over SSBs, which for that reason will remain the preserve of high-end vehicles where the quest for performance is more pronounced.

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Both technologies, however, make extensive use of materials included by the EU in the Critical Raw Materials list and whose procurement will be subject to the rules of the Critical Raw Materials Act, unveiled in March 2023 by the European Commission. Technologies such as Lithium-Sulfur Batteries have lower use of critical materials, reducing procurement risks. The cost of the cells is in the range of \$60-90/kWh, confirming them to be a potential game changer in the field of automotive batteries.

Interviewer: Thank you, William, for giving me a lot of insight for the research, the data you provided helped me better understand what the numbers look like and the current situation around us. Good luck with your project! Thanks again.

Interviewee: You're welcome, Agnese, it was a pleasure, I will then send you the report with the market analysis we made regarding the topic of smart mobility with POLIMI in Milan. Thank you, if you have any questions or clarifications, please do not hesitate to contact me.

Interviewer: Okay, thanks!! Goodbye!

Appendix B.1: Consumer and Expert Interviews – Brands Ranking

Brands	Number of expert mentions	Number of consumer mentions	Total
Tesla	4	6	10
BMW	3	4	7
Nissan ¹	0	5	5
Volkswagen ²	3	2	5
Audi	3	2	5
Mercedes	4	1	5
BYD	5	0	5
Porsche	2	1	3
Hyundai	0	2	2
NIO	1	0	1
Toyota	0	1	1
Renault	0	1	1
Fiat	1	0	1
Lucid	0	1	1

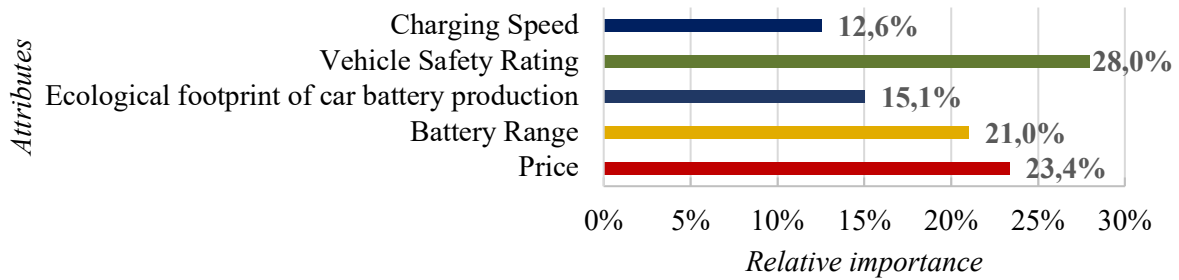
1 – Choosing the first two brands, Tesla and BMW, was straightforward given their highest number of mentions. However, selecting the remaining two was challenging due to several brands having the same five mentions, thus justifying the need for a tiebreaker. Nissan was chosen essentially because it was the 2nd most mentioned brand by consumers, which we thought was an important factor to take into account, since the survey would target consumers specifically.

2 – The process behind choosing Volkswagen took some more elements into consideration. First, we excluded Mercedes and BYD because they were mentioned primarily by experts, with only one consumer mentioning Mercedes. Given that the survey targets consumers, who might either: be unfamiliar with these brands (especially BYD, a new entrant in the European EV market), or might not readily associate them with EV's (potentially the case with Mercedes), it seemed unreasonable to prefer these brands over others that had garnered 5 mentions. This would leave us with either Volkswagen or Audi, as they had an identical distribution of mentions. However, it is unequivocal that each possesses a distinct brand image, catering to different market segments, despite Audi being part of the Volkswagen Group. With BMW

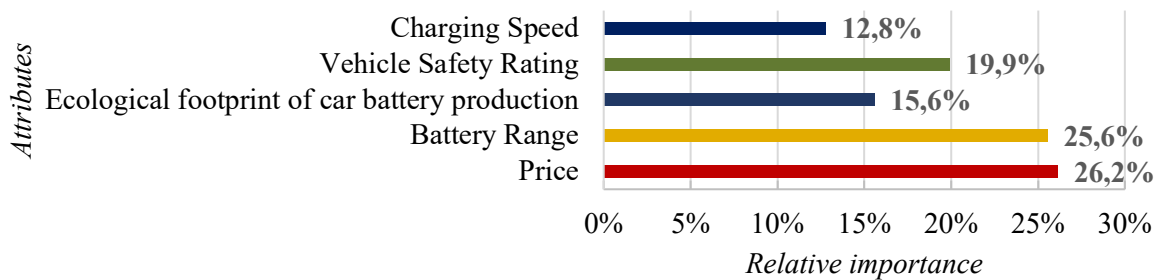
already included (similar to Audi in price/brand image/luxury segment), we decided to choose Volkswagen over Audi as it provided a more diverse brand assortment, better mirroring the choice variety consumers encounter when buying a car.

Appendix B.2: Conjoint Analysis – Relative Importance of Attributes

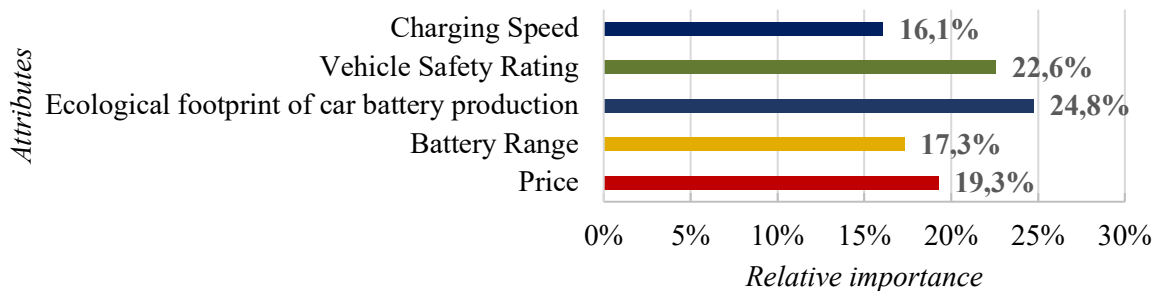
Volkswagen - Relative importance of attributes



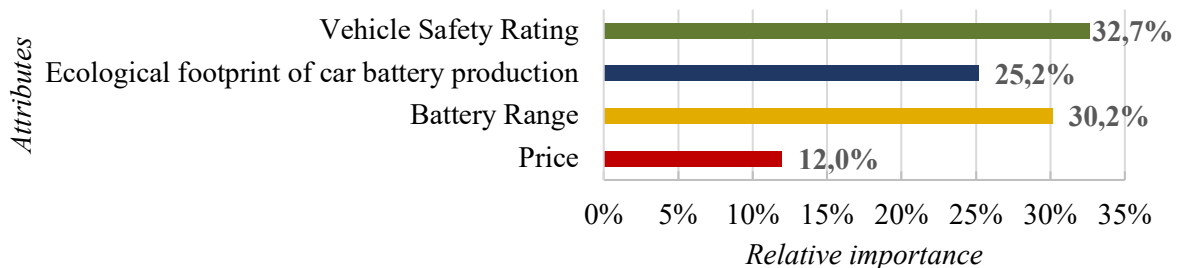
BMW - Relative importance of attributes



Tesla - Relative importance of attributes



Nissan - Relative importance of attributes¹



1 – Charging speed was excluded from the list of important attributes, as fast charging was deemed non-applicable to Nissan, leaving it with only one level for this attribute. With the benefit of hindsight, retaining fast charging for Nissan would have been beneficial, especially considering that we later found a model – Nissan Ariya – whose charging speeds surpass 50kW.

Appendix B.3: Conjoint Analysis – Ranked list of product concepts

Rank	Brand	Price	Battery Range	Ecological footprint of battery production	Safety	Charging Speed	Value to customers
1	BMW	25,000€ - 44,999€	Above 500 km	Low	High	Fast charging (50-350 kW)	59,53
2	BMW	25,000€ - 44,999€	201 - 500 km	Low	High	Fast charging (50-350 kW)	58,36
3	Volkswagen	Until 24,999€	201 - 500 km	Low	High	Fast charging (50-350 kW)	57,88
4	Volkswagen	Until 24,999€	201 - 500 km	Medium	High	Fast charging (50-350 kW)	54,80
5	BMW	25,000€ - 44,999€	Above 500 km	Medium	High	Fast charging (50-350 kW)	49,20