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**THE EUROPEAN ELECTRIC VEHICLE MARKET: AN ANALYSIS OF
CONSUMER PERCEPTIONS AND PREFERENCES:
GREEN MOBILITY AND CONSUMER BEHAVIOUR**

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Summary

This study 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. The group bonus part delves into BMW's challenges and strategies in the electric vehicle (EV) market amidst the European Union's "Fit for 55" climate package. BMW faces pressure to transition to EVs, aligning with global sustainability goals. Despite plans to increase EV sales, BMW's market position remains modest compared to competitors like Tesla. Analyzing BMW's financial performance and EV sales, it's clear that BMW is striving to adapt to market demands while maintaining profitability. The discussion highlights BMW's efforts to introduce more affordable EV options and enhance features like driving range and safety. Proposals for advertising campaigns emphasize BMW's commitment to sustainability, innovation, contemporary branding, and gender inclusivity. These strategies

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aim to enhance BMW's brand image, market competitiveness, and appeal to diverse consumer segments in the evolving automotive landscape.

In conclusion of the group part, findings underscore that consumers prioritize electric vehicles (EVs) that integrate environmental, economic, and social sustainability. Brand perception, notably Tesla's strong sustainability image, influences consumer choices. Price sensitivity remains a barrier, with a preference for affordable EVs. Environmental concerns, like ecological footprint and battery range, shape purchasing decisions. Perceptual mapping reveals brand positioning based on practicality, reliability, and luxury, with Tesla and BMW leading in sustainability and performance. Recommendations include focusing on affordability, extending battery range, prioritizing safety, and investing in sustainable production. However, the study acknowledges limitations such as sample biases and geographical imbalances. Future research should address these limitations, expand attribute selection, and explore hybrid vehicles to better understand consumer preferences and drive EV adoption. The individual part examines the intersection of green mobility and consumer behavior, focusing on electric vehicles (EVs). Green transportation initiatives aim to minimize environmental impacts, with EVs representing a key solution. However, challenges such as infrastructure development and consumer adoption persist. Understanding consumer preferences for EVs is crucial, influenced by factors like perceived value, attitudes, and social influences. Green purchase intentions reflect consumers' willingness to engage with environmentally friendly products, driven by perceived value, advertising, and personal norms. Effective green marketing strategies play a vital role in promoting EV adoption, leveraging factors like brand trust and consumer engagement. Brand trust is essential for consumer decision-making in the electric car market, influenced by factors such as brand identity, safety, and perceived value. Overall, this research underscores the importance of aligning consumer preferences, marketing strategies, and policy interventions to foster sustainable transportation practices and advance environmental goals.

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
NGOs	Non-Governmental Organizations
CSR	Corporate Social Responsibility
ESG	Environmental, Social, Governance
O2O	Online 2 Offline
TCO	Total Cost of Ownership
BPS	Brand Personality Scale
IoT	Internet of Things
CAVs	Connected and Automated Vehicles
SPSS	Statistical Package for the Social Sciences
PCA	Principal Component Analysis
ETS	Emissions Trading System
ICE	Internal Combustion Engine

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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 (Carlier 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

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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 higher level of dispreference 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.

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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.

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.

Introduction

As mentioned in Chapter 1.2, 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).

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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 Bloomberg and Nicola (2023), sales of Tesla in the first half of 2023 exceeded

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the combined sales of Mercedes-Benz Group AG, Volkswagen AG, BMW AG, Porsche AG and BMW AG. However, Bloomberg and Nicola (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.

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 C.16) 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 2023b), 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 2023g), 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.

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Beyond the pricing aspect, evaluating the feasibility of other features highlighted in our top-ranked conceptual EV (see Appendix C.16) 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 2023b), 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 2023h).

Regarding the ecological footprint of battery production, according to the BMW Group (2022b), 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 C.9) 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 2023i).

Range

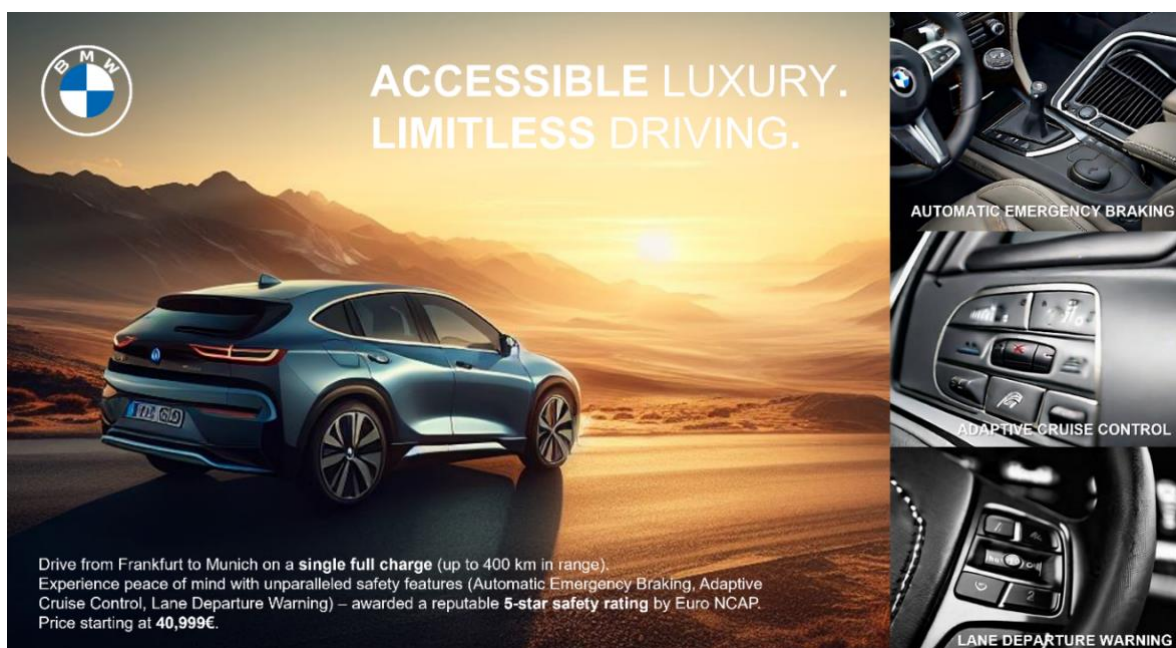
Regarding range, it is unequivocal that range anxiety is still a prominent concern for many drivers, constituting a barrier to EV mass adoption (Mildner 2023). As such, it is pivotal that BMW effectively informs its potential customers and eases their concerns by building an EV that has a driving range 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.

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,

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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 2022b). 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,

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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.

Conclusion

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

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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).

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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.

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.

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.

Sample Limitations and Recommendations

As mentioned previously (specifically in chapter 5), 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.

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.

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 C.3), 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.

B) Individual Part

Green Mobility and Consumer Behavior

Green Transportation

Green transportation, a critical aspect of environmental sustainability, encompasses a range of initiatives aimed at minimizing the environmental impact of transport systems. This approach is fundamental in order to strike a balance between environmental responsibility and economic growth. By significantly lowering greenhouse gas emissions, air pollution, noise pollution, and space usage, green transportation enhances mobility, accessibility, safety, and connection. Moreover, it offers numerous economic and social benefits, including promoting efficient resource use, recycling, and adopting a life cycle perspective, crucial for sustainable development (Banister, Crist and Perkins 2015).

Technological advancements play a crucial role in green transportation. The integration of technologies like electric and hydrogen vehicles significantly contributes to reducing CO₂ emissions, thereby fostering sustainable mobility strategies (Novegil-González-Anleo 2019). For the remainder of this thesis, EV refers to Electric Vehicles, which operate solely on electric power, derived from externally recharged batteries (Un-Noor et al. 2017). This contrasts with hybrid electric vehicles (HEVs), which combine the traditional internal combustion engine with an electric motor. Hybrids utilize both fuel and a rechargeable battery, offering a balance of conventional and electric driving for improved fuel efficiency and lower emissions. Meanwhile, hydrogen fuel cell vehicles (FCEVs) represent a distinct category, generating electricity on-board through hydrogen fuel cells. This technology converts the chemical energy of hydrogen into electrical energy, providing power to the vehicle's motor (Alavi et al. 2017).

Additionally, the enhancement of public transport systems through environmentally friendly buses and other initiatives is vital in transitioning to sustainable urban mobility as observed by Aldenius et al. (2021). Intermodal transport solutions, involving different modes of transport,

also offer increased accessibility, transparency, and environmental friendliness, promoting sustainable transport solutions (Haider et al. 2014). Among various forms of green transportation, EV's stand out for their lower emissions compared to traditional fuel-based vehicles, highlighting their importance in a sustainable transport system (Carlucci, Cirà, and Lanza 2018). Electric vehicles represent a transformative approach to green transportation, offering solutions to the energy crisis by reducing emissions and increasing air quality (Habib et al. 2018), which emphasizes the role of EV's in resolving energy issues and improving environmental conditions. Additionally, Ogidan et al. (2022) highlights the safety and efficiency of EV's as key benefits.

However, EV's face challenges, particularly in infrastructure and charging, Habib et al. (2018) identify the development of adequate infrastructure and managing charging power levels as major challenges. Ogidan et al. (2022) also discuss the hindrances to EV adoption, including high costs and the lack of supportive government policies. Another significant issue is battery management, where operational management and demand forecasting are complicated by the limited range and battery management issues, as Machedon-Pisu and Borza (2019) note.

In summary, green transportation, with its diverse environmentally friendly options, is instrumental in achieving environmental sustainability. Its impact is far-reaching, spanning emission reduction, economic growth, and social equity, making it a cornerstone in the journey towards a more sustainable future (Ahmed and El Monem 2020).

While electric vehicles are pivotal in advancing green transportation and offer benefits in emissions reduction, integration with smart grids, and energy efficiency, they also face challenges in infrastructure development, costs, and battery management that need addressing for their full potential in sustainable transportation systems to be realized.

Despite electric cars being a significant stride in green transportation, their impact still hinges on consumer adoption (Yang et al. 2020).

Analysis of Consumer Preferences for Electric Vehicles

In recent years, there has been a notable surge in interest surrounding electric vehicles due to their capacity to mitigate greenhouse gas emissions and reduce reliance on fossil fuels. The acceptance and success of EV's in the market are significantly influenced by consumer preferences. Numerous research endeavors have been undertaken to comprehensively understand the inclinations of consumers and the determinants that influence their inclination to procure EV's.

Consumer preferences in electric vehicles are shaped by a diverse range of factors. Demographic, situational, contextual, and psychological aspects play a significant role, as noted by Singh et al. (2020). This is complemented by Wang et al. (2021) who emphasize the satisfaction with charging facilities, destination activity, travel information, and drivers' risk attitudes. Adding to these are socio-economic determinants, psychological factors, mobility condition, and social influence, as highlighted in studies by Liao et al. (2017). The study conducted by Zhou et al. (2020) demonstrated that the inclination of individuals towards EV's can be influenced by their social networks, particularly by their friends or neighbors. This finding underscores the influence of social factors on consumer decision-making processes.

Additionally, the likelihood to purchase an EV increases if an individual has a propensity to acquire a small or medium-sized car and/or is anticipated to be shopping for a hybrid car eventually (Hamzah 2021). Interestingly, the importance of income and ownership of several vehicles was shown to be negligible. Xiong et al. (2023) findings indicate that individuals were primarily motivated by anticipated fuel savings rather than a pro-environmental inclination or a desire to contribute to environmental preservation. They further mention that consumers' primary concerns with EV's are still range anxiety, lengthy charging times, and high purchasing

prices, hence, the driving range and willingness to pay were significant determinants that influenced consumers' selection of EV's (Xiong et al. 2023).

Tu and Yang (2019) examined the primary determinants impacting consumers' decisions to acquire EV's. Their study suggests that individuals' attitudes toward behavior, subjective norms, and perceived behavioral control have a favorable influence on their behavioral intentions regarding EV's. Similarly, the findings of the study by Yang et al. (2020) concluded that customer attitudes play an essential part in shaping their decision towards acquiring electric vehicles. further identified several aspects as influential in shaping these attitudes, namely perceived advantage, brand trust, perceived risk, new product knowledge, as well vehicle attributes and market penetration. Consumer attitudes toward electric vehicles are shaped by economic factors and practical considerations. The initial high cost of EV's is a concern, though balanced by potential savings on fuel. Range anxiety is significant, with doubts about whether a 100-mile range (roughly equivalent to 160km) is adequate. The convenience of home charging is a positive aspect, pointing to a preference for self-sufficiency. Performance and safety perceptions are mixed, reflecting a need for increased awareness and trust in EV technology. The ease of finding charging stations and concerns about the reliability and user-friendliness of EV's highlight the need for improved infrastructure and clearer communication about the benefits and operations of electric vehicles, as pointed by Morton et al. (2016).

This indicates that the brand has the power to improve consumers' perceptions of the advantages of EV's, boost their attraction to them, and affect their decision to make a final purchase. The primary barriers impacting consumer attitudes towards EV's, and their purchasing intentions are the anxiety surrounding their usage and the increased demands associated with them. (Pramajaya and Haryanto 2021). Furthermore, the level of customer awareness regarding EV's is likely to have an indirect beneficial impact on their attitude and intention to purchase, because

as consumers gain more knowledge about EV's, their comprehension of the product's relevance to their needs becomes more evident (Le, Fauzia and Gabriele 2023).

Lin and Shen (2022) investigated the impact of marketing techniques on the preferences of consumers for EV's. They used the evaluation grid approach to construct a semantic hierarchical map of preferences for EV's by analyzing consumers' emotions. The results emphasized the importance of incorporating emotional appeal into the design of online to offline (O2O) marketing strategies for EV's.

Additional research has also examined the impact of governmental regulations and environmental consciousness on consumers' preferences for electric vehicles. Qing et al. (2023) observed that consumers held a positive opinion towards the government's newly implemented energization policy, suggesting that policy measures can impact consumer preferences.

In summary, the primary outcomes of research on EV's and consumer preferences suggest that various factors, including driving range, willingness to pay, perceived value, attitude, subjective norms, outcome awareness, marketing strategies, government policies, environmental consciousness, and social influences, exert substantial influence on shaping consumer preferences for EV's. Understanding these characteristics is pivotal for policymakers and industry stakeholders to formulate effective policies aimed at fostering the widespread adoption of EV's. Understanding consumer preferences in electric vehicles is, therefore, essential as it directly impacts market trends, design considerations, and policy formulations. It sheds light on the motivations and barriers in consumer decision-making, essential for fostering a sustainable transportation future. The following chapter will delve into the broader context of environmentally friendly purchasing behaviors, emphasizing the general willingness of consumers to engage in such practices. This exploration is crucial as it encompasses more than just consumer preferences, extending our understanding to include green purchase intentions as a key component of this narrative.

Consumer Green Purchase Intentions

Green purchase intention reflects the growing consumer willingness to engage with environmentally friendly products, including electric vehicles. Green purchase intention, which reflects the willingness of consumers to buy environmentally friendly products, is a subject of increasing interest in the field of sustainable consumption.

Central to this discussion is the role of perceived value, attitudes, and trust in green products. Zhuang, Luo, and Riaz (2021) highlight the fact that these factors have a significant impact on consumers' propensity to make environmentally conscious purchases. This suggests that the perceived benefits and trustworthiness of environmentally friendly products are among the most important factors in determining consumer behavior. Complementing this perspective, Chekima et al. (2015; 2016) delve into the influence of environmental advertising and cultural values. They underscore that environmental attitudes, eco-labels, and long-term cultural orientations significantly sway green purchase intentions. Further they found out, that environmental advertising serves as a moderating factor, highlighting the power of targeted messaging in altering consumer perceptions and behaviors.

Wang et al. (2022) found that green brand positioning, knowledge, and attitudes towards green brands are significant predictors of the desire to purchase green products. This indicates that well-positioned green brands with robust consumer knowledge can effectively drive environmentally conscious purchasing decisions. In a similar vein, Khandelwal and Bajpai (2011) explore how the dimensions of green advertising, including viewers' attitudes and perceived effectiveness, influence green purchase intention. Their study illustrates the nuanced ways in which advertising can shape consumer attitudes and, consequently, their purchasing decisions.

Besides that, the youth demographic also presents unique insights. Verma (2022) identifies environmental concern as a key factor in shaping young consumers' green purchase intentions,

alongside green trust and personal norms. This finding is crucial for marketers and policymakers aiming to target this demographic.

Findings from a study conducted by Li et al. (2021) showed that the intention to purchase green products was significantly positively impacted by altruistic and biospheric values, negatively by egoistic values; the relationship between environmental values and the intention to purchase green products was partially mediated by environmental concern; the relationship between environmental concern and the intention to purchase green products was positively mediated by green trust. Their research shows that these values positively impact green product purchase intention, while egoistic values have a negative impact. This suggests a value-based approach to understanding and promoting green purchase behaviors.

Lastly, Jaiswal and Kant (2018) highlight the importance of cognitive factors, such as attitude towards green products, in directly influencing green purchase intention and behavior.

In conclusion, green purchase intention is influenced by a complex interplay of factors including perceived value, advertising, social influence, environmental attitudes, brand knowledge, and personal norms. These findings provide valuable insights for businesses and policymakers seeking to promote sustainable consumption practices.

As such, analyzing green purchase intentions is relevant insofar as it reveals the underlying values and attitudes driving sustainable consumption and this understanding is vital for businesses and policymakers to develop strategies that align with consumer values and promote sustainable practices. The exploration of green purchase intentions naturally leads to the broader context of green marketing.

Green Marketing in The Electric Vehicle Sector

Green marketing plays an elemental role in shaping consumer attitudes and choices regarding electric cars and is a comprehensive marketing concept that focuses on producing, promoting, using, and disposing of goods and services in a manner that is less damaging to the environment.

This is in response to growing public awareness of the effects of pollutants, not biodegradable solid waste, and global warming, among other issues. There is a growing awareness among customers and marketers of the necessity of switching to environmentally friendly goods and services. The holistic marketing strategy promotes the idea that companies should create goods and marketing plans that safeguard the long-term interests of both consumers and society as a whole in addition to meeting customer needs (Barbarossa et al. 2015) Higuera-Castillo et al. (2019) found that green self-identity, alongside concern for environmental consequences and a sense of green moral obligation, significantly influences consumer attitudes toward electric car adoption. This, in turn, shapes their intention to adopt such vehicles. Additionally they find that the primary motivators for buying electric or hybrid cars are extrinsic incentives and the establishment of trust through green marketing campaigns. This is echoed in the work of Rahahleh et al. (2020), who find that green marketing of electric vehicles positively impacts consumer purchase decisions, indicating a significant shift in consumer attitudes and behaviors in response to green marketing initiatives. Delving deeper into consumer-brand dynamics, Leckie, Rayne and Johnson (2021) demonstrate that consumer engagement behaviors with green car brands are positively influenced by desired self-identity, perceived green value, and altruistic values. These behaviors then mediate the effect of customer engagement behavior on brand loyalty.

Narula and Desore (2016) highlight the gaps in green consumer behavior research, particularly in bridging consumer perceptions with green product design, identifying green market segments, and positioning green products effectively.

In terms of consumer segmentation, Dansirichaisawat (2014) suggests that grouping green consumers based on environmental attitudes and lifestyle can significantly aid in formulating targeted marketing strategies and understanding consumer behavior more deeply. Kim et al. (2023) add that factors such as sales price, fuel cost, maximum speed, air pollutants, fuel

economy, and the distance between fuel stations play a substantial role in influencing consumer choices for environment-friendly vehicles.

On the other hand, Kumar and Alok (2020) emphasize the significance of marketing plans, incentive programs, dealership experience, and the long-term reliability of the charging infrastructure in promoting the use of electric vehicles. Lastly, Chen and Chang (2013) discuss the impact of green perceived quality and risk on green satisfaction and trust, highlighting the critical role of consumer perceptions in green marketing. They further note that by offering reliable information, businesses can develop customer trust, enhance the perceived value of going green, and encourage consumers to make green product purchases by lowering the perceived risk.

To conclude, the synthesis of these studies presents a multi-dimensional view on green marketing concerning electric vehicles, underscoring the nuanced understanding required of consumer attitudes, motivations, and behavior to effectively market these vehicles within the larger green marketing framework.

The study of green marketing in the context of electric cars is essential as it uncovers the nuances of consumer engagement and the factors that drive sustainable product choices. It provides insights into how marketing can be used as a tool to advance environmental goals and consumer education.

While green marketing strategies are influential, the foundation of consumer trust in electric car brands is a critical aspect of marketing success.

Determinants of Brand Trust in Electric Vehicle Manufacturing

Brand trust is an essential component in consumer decision-making, especially in the emerging market of electric cars.

The influence of online consumer perceptions on brand trust has been thoroughly examined. Ha (2004) underscores the importance of factors such as information quality, online experience,

word-of-mouth, brand name, safety, privacy, and online interaction in shaping trust towards electric car brands. Similarly, Pauwels-Delassus and Mogos Descotes (2013) explore the role of consumers' acceptance of brand name changes. Their findings point to five important influencing variables that marketing managers should be aware of in order to slow down the erosion of loyalty and trust. In particular, these factors include: the degree to which customers accept the brand name change; the degree to which they believe the old and new brands are comparable; the level of loyalty to the original brand; the existence of an umbrella brand and the degree to which customers are aware of the brand substitution. Every one of these five crucial factors influences the transfer of perceived quality and trust to the new, replacement brand, either directly or indirectly.

Jiang et al. (2021) established a theoretical model of the variables that affect brand trust. They found that brand identity, brand image as well as brand awareness play a significant role, in the trust building process. This is complemented by Buhmann and Criado (2023) work, which identifies safety, quality, value performance, design, technology, and environmental considerations as paramount in consumer choice behavior for cars.

Trivedi and Kishore (2020) discover that consumers' brand attitudes are significantly influenced by factors such as accessibility, online reviews, and vibrancy, which ultimately results in consumers trusting the brand and intending to make a purchase. In the broader scope of brand performance, Chaudhuri and Holbrook (2001) examined purchasing and attitude components of brand loyalty as connecting factors in the chain of events that links brand affect and brand trust to brand performance. Hedonic value and utilitarian value, which are category-related controls, as well as share of voice and brand distinction, are included in the model at the product level. The findings show that brand trust and brand affect together determine purchase loyalty and attitudinal loyalty when the product- and brand-level variables are taken into account.

Attitude loyalty results in a higher relative price for the brand, and purchase loyalty leads to a larger market share.

In examining consumers' buying intentions, Abu-Alkeir (2020) notes the impact of price, manufacturer reputation, fuel economy, brand image, and safety ratings on customer intentions. The complexity of the decision-making processes that consumers go through in the electric car industry is demonstrated by the variety of factors that are involved. Therefore, it is essential to have a solid understanding of brand trust in the context of electric cars because it has a direct impact on the purchasing decisions of consumers, their loyalty to brands, and the dynamics of the market. In this regard, it provides valuable insights into the ways in which electric car brands can establish and maintain trust in order to achieve market success and contribute to a future that is sustainable.

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Appendix C.3: 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

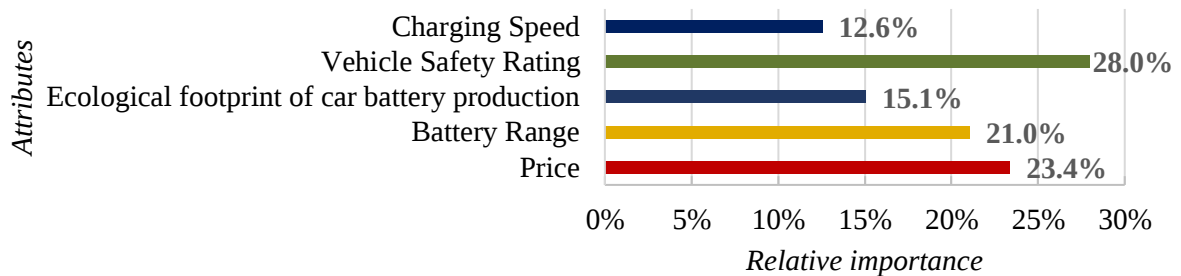
1 – Choosing the first two brands, Tesla and BMW, was straightforward given their highest number of mentions. However, selecting the remaining two was challenging due to several brands having the same five mentions, thus justifying the need for a tiebreaker. Nissan was chosen essentially because it was 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

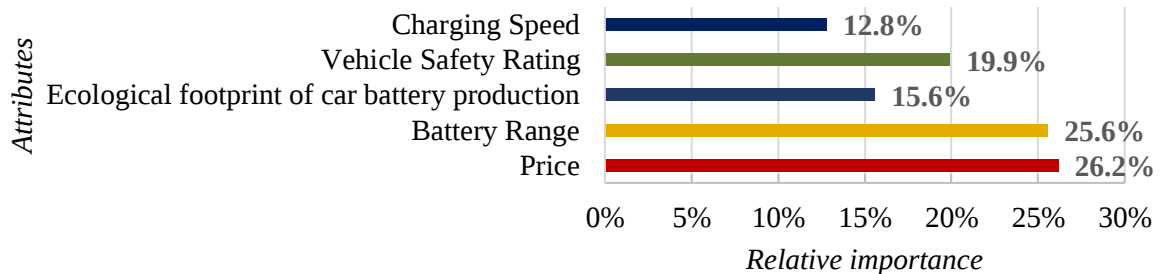
Group Part

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.

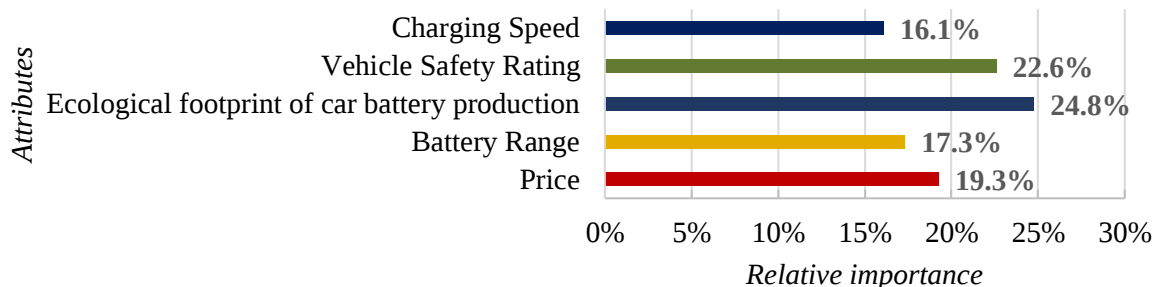
Appendix C.9: Conjoint Analysis – Relative Importance of Attributes Volkswagen - Relative importance of attributes



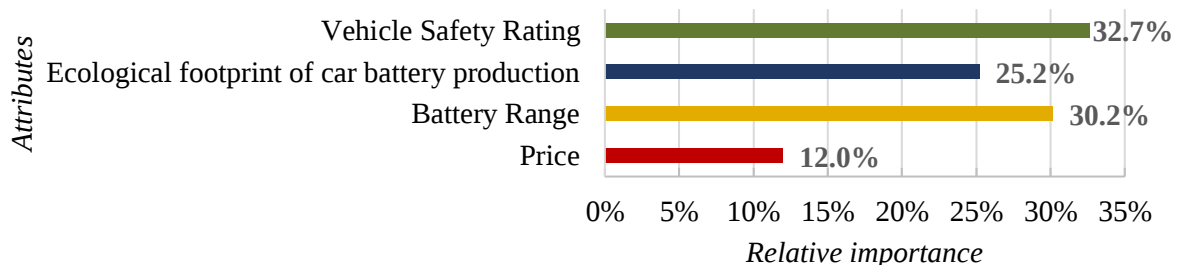
BMW - Relative importance of attributes



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 C.16: 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