Brand Equity in the Future of EU Supercars: Strategies for Navigating the 2035 Zero-Emission Targets

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Dissertation written under the supervision of professor Peter V. Rajsingh PhD

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Abstract

This dissertation investigates how European supercar manufacturers can comply with the EU's 2035 zero-emission targets while preserving brand equity. As the automotive industry transitions to battery electric vehicles (BEVs), luxury carmakers face unique challenges in maintaining core brand elements such as sound, exclusivity, and craftsmanship. While technological feasibility is no longer a key barrier, this shift raises questions about emotional engagement, symbolic value, and consumer acceptance.

Using a mixed-methods approach, the study combines quantitative data from an online survey of 223 participants with qualitative insights from 13 expert interviews across the supercar, energy, and policymaking sectors. The results indicate that younger consumers are significantly more receptive to BEVs and futuristic innovations, while older segments remain attached to traditional internal combustion engine (ICE) characteristics. Experts emphasise the necessity for brand reinvention, including the creation of distinctive electric soundscapes and enhanced lifestyle branding, to preserve emotional appeal and maintain brand equity.

The research emphasises the importance of innovation, targeted branding strategies, and regulatory flexibility to facilitate a successful transition. It provides strategic guidance for manufacturers and policymakers on navigating the intersection of environmental mandates, technological change, and luxury brand management.

Keywords: Supercars, Brand Equity, Battery Electric Vehicles, Consumer Acceptance, Innovation, EU 2035 Zero-Emission Targets

Title: Brand Equity in the Future of EU Supercars

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Resumo

Esta dissertação investiga como os fabricantes europeus de supercarros podem cumprir as metas de zero emissões da UE para 2035, preservando ao mesmo tempo o capital de marca (brand equity). À medida que a indústria automóvel transita para veículos elétricos a bateria (BEVs), os fabricantes de luxo enfrentam desafios únicos para manter elementos centrais da marca, como o som, a exclusividade e o artesanato. Embora a viabilidade tecnológica já não seja uma barreira principal, esta mudança levanta questões sobre o envolvimento emocional, o valor simbólico e a aceitação do consumidor.

Utilizando uma abordagem de métodos mistos, o estudo combina dados quantitativos de um questionário online com 223 participantes e percepções qualitativas obtidas em 13 entrevistas com especialistas dos setores de supercarros, energia e formulação de políticas. Os resultados mostram que os consumidores mais jovens estão significativamente mais abertos aos BEVs e às inovações futuristas, enquanto os segmentos mais velhos permanecem apegados às características tradicionais dos motores de combustão interna (ICE). Os especialistas destacam a necessidade de reinventar as marcas, incluindo o desenvolvimento de paisagens sonoras elétricas distintas e a ampliação do branding para o estilo de vida, a fim de salvaguardar o apelo emocional e sustentar o capital de marca.

A pesquisa destaca a importância da inovação, de estratégias de marca direcionadas e da flexibilidade regulatória para apoiar uma transição bem-sucedida. Oferece orientações estratégicas para fabricantes e formuladores de políticas sobre como navegar na interseção entre mandatos ambientais, mudanças tecnológicas e gestão de marcas de luxo.

Palavras-chave: Supercarros, Capital de Marca, Veículos Elétricos a Bateria, Aceitação do Consumidor, Inovação, Metas de Zero Emissões da UE 2035

Título: Capital de Marca no Futuro dos Supercarros da UE

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Philip

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List of Abbreviations

ACEA	European Automobile Manufacturers' Association
AFIR	Alternative Fuels Infrastructure Regulation
BEV	Battery Electric Vehicle
EBIT	Earnings Before Interest and Taxes
EMEA	Europe, Middle East, and Africa
ESA	European Space Agency
EU	European Union
EV	Electric Vehicle
F1	Formula 1
FCEV	Fuel Cell Electric Vehicle
HEV	Hybrid Electric Vehicle
ICE	Internal Combustion Engine
IDT	Innovation Diffusion Theory
OI	Open Innovation
PHEV	Plug-in Hybrid Electric Vehicle
PU	Perceived Usefulness
PEOU	Perceived Ease of Use
R&D	Research and Development
TAM	Technology Acceptance Model
WEIRD	European Automobile Manufacturers' Association

1 Introduction

In 2021, the European Union (EU) set an ambitious goal: to phase out internal combustion engine (ICE) vehicles by 2035 as part of its Green Deal, aiming for carbon neutrality by 2050 (European Commission, 2022). This transformation has already reshaped the European car market, with battery electric vehicles (BEV) registrations reaching 4.5 million in 2023, a 48.5% increase from the previous year (European Commission, 2024).

However, while mass-market adoption accelerates, the supercar segment faces a unique dilemma. Brands like Ferrari, Lamborghini, and McLaren are not only defined by performance but also by an emotional connection built over decades, the roar of a V12 engine, the thrill of acceleration, and a sense of exclusivity (Carneiro, 2024; Dupré et al., 2023). For these brands, electrification is not merely a technical challenge; it strikes at the heart of their brand identity and consumer appeal.

Alternative solutions, such as carbon-neutral e-fuels, offer a potential path; however, they remain costly, underdeveloped, and uncertain in their long-term viability (Zerrahn, Schill & Pietzcker, 2021). Meanwhile, the EU's regulatory clock is ticking, forcing manufacturers to navigate a delicate balance between compliance and the preservation of brand heritage.

Despite the abundant research on the broader zero-emission transition, little attention has been paid to how it affects luxury and niche segments, such as supercars. This thesis addresses that gap by exploring the technological, economic, and consumer challenges facing EU supercar manufacturers, with a strong emphasis on brand identity and consumer perception. Accordingly, the research was guided by the following research question:

RQ: How can EU supercar manufacturers adhere to the 2035 zero-emission target while maintaining brand identity and consumer appeal?

This research provides insights for multiple stakeholders: automotive leaders aiming to balance innovation with heritage, investors evaluating luxury brand resilience, and policymakers assessing the relevance of current regulations. The study incorporates expert interviews and consumer survey data to present both qualitative and quantitative insights, ultimately delivering strategic recommendations for navigating this critical industry shift.

2 Literature Review

This chapter begins by outlining the supercar industry as a distinct niche, focusing on its market characteristics, challenges, and emerging trends to frame the discussion on electrification and regulatory change.

2.1 Supercar Manufacturers as a Niche Segment

A supercar is a street-legal sports car characterized by race-track-level performance in power, speed, and handling (Ramirez-Portilla et al., 2017; Lovins et al., 1993). Some of the most well-known manufacturers in this segment include Ferrari, Lamborghini, McLaren, Bugatti, Pagani, and Koenigsegg. Additionally, luxury brands such as Porsche have also entered the supercar market with models like the 911 Turbo S and Carrera GT. While the term is somewhat subjective, supercars are typically significantly more expensive, with prices often exceeding €500,000, more striking in appearance, and known for their exclusivity and prestigious image (MacMillan, 2017; Ferrari, 2022). This thesis will focus specifically on this category of cars, paying particular attention to the most prominent supercar brands, such as Ferrari and Lamborghini.

2.1.1 Current Market and Performance

Despite the rapid growth of BEVs in the European automotive sector, supercar manufacturers face distinct challenges in electrification. They still remain in the early stages of electrification, lagging behind mass-market automakers. For instance, Ferrari does not yet have any fully BEV models but plans to release its first fully electric car in late 2025, while McLaren has announced that its EV models will not arrive until 2029 and 2030 (Ferrari, 2023; Financial Times, 2020). The industry remains a highly specialized, low-volume market, with Europe leading in production due to its strong automotive heritage and engineering capabilities (Transparency Market Research, 2023). In contrast to the 10.6 million new vehicle registrations projected for 2024, supercars accounted for merely 0.1% of total sales (ACEA, 2025). These manufacturers focus on high-performance premium vehicles that heavily rely on ICE technology, with Ferrari and Lamborghini leading the market with global shares of 18% and 15%, respectively (Global Growth Insights, 2025). Their annual retail figures are described in more detail below.

In 2024, Ferrari reported global sales of 13,752 units, representing a modest increase of 0.7% compared to the previous year. Of these, 49% were powered by ICE, while 51% were hybrid

models. Although the company does not disclose sales figures specifically for the European Union, its EMEA region accounted for 6,204 units. Based on historical trends indicating that approximately 70% of EMEA sales occur within Europe, it is estimated that Ferrari sold around 4,300 units in the EU in 2024 (Ferrari, 2024). Looking ahead, Ferrari has outlined plans for 60% of its lineup to consist of hybrid or fully electric models by 2026 (Ferrari, 2023).

Similarly, Lamborghini reported global sales of 10,687 units in 2024, reflecting a 6% increase from 2023. Within EMEA, the company delivered 4,227 units, with an estimated 3,000 units sold in Europe (Automobili Lamborghini, 2024). Notably, the newly introduced Urus plug-in hybrid SUV accounted for approximately 50% of total sales, while the Revuelto, Lamborghini's first V12 HPEV hybrid supercar, represented about 15%. The launch of the Urus SUV signifies a strategic response to market trends, as research indicates that by 2031, sales of SUV supercars are projected to increase by 50%, whereas sales of sedans and sports cars are expected to decline (McKinsey & Company, 2022).

Despite low production volumes, supercar manufacturers generate significantly higher profit margins than mass-market automakers. The average EBIT margin exceeds 35%, compared to approximately 8% for mainstream car manufacturers (Guan et al., 2022). Key markets for supercars include Germany, the UK, Italy, and France (Transparency Market Research, 2023).

2.1.2 Future Trends

According to McKinsey & Company (2022), BEVs will dominate the luxury car market by 2031. More than 70% of ICE vehicle owners globally are expected to switch to EV for their next purchase. However, the transition is occurring at a slower pace for supercars compared to luxury cars priced below €500,000, particularly for sedans in relation to SUVs. In an accelerated scenario, by 2026, EV penetration in the €500,000+ supercar segment is expected to reach only 35–40%, while around 50% is projected for 2031. In contrast, luxury cars in the $300,000–$500,000 price range will likely experience a significant 90% penetration.

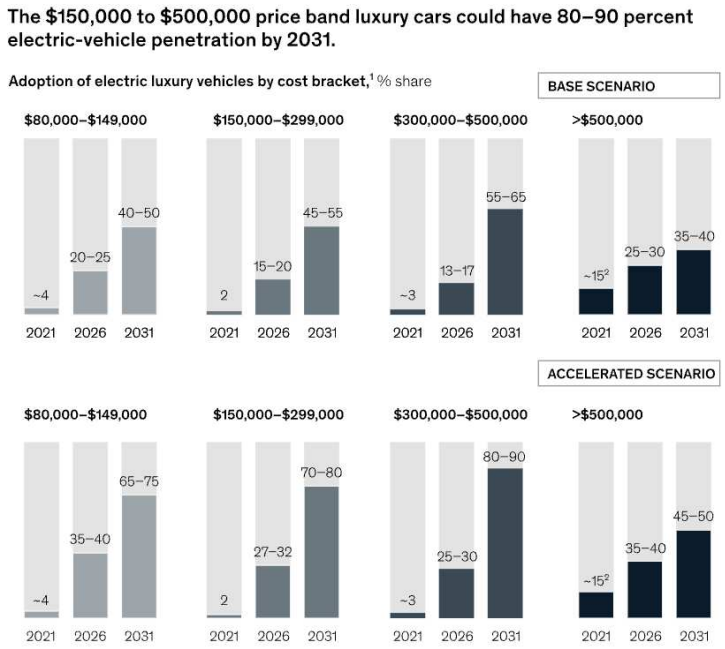

Figure 1: Projected EV adoption rates in luxury vehicle segments (McKinsey & Company, 2022).

2.2 Regulatory Landscape: The EU's 2035 Zero-Emission Target

The European Union aims for climate neutrality by 2050 and has mandated that all new cars be zero-emission by 2035, effectively phasing out ICE vehicles (European Commission, 2022). Exceeding specific emissions targets results in severe financial penalties (Council of the European Union, 2023). As part of the Fit for 55 package, the EU has set a phased transition with the following milestone targets compared to 2021 levels (European Commission, 2024):

- 15% reduction by 2025
- 37.5% reduction for passenger cars by 2030
- 100% reduction by 2035, eliminating ICEs unless they utilize carbon-neutral fuels.

Importantly for supercars, a compromise reached in 2023 permits alternative fuels such as e-fuel-powered ICEs beyond 2035, provided they operate exclusively on carbon-neutral fuels (Council of the European Union, 2023).

Furthermore, recognizing the importance and low production volumes of niche segments, policymakers have introduced specific exemptions and derogations. Currently, manufacturers producing fewer than 1,000 units annually (e.g., Koenigsegg) are fully exempt, while larger

niche manufacturers producing between 10,000 and 300,000 units annually (e.g., Ferrari, Lamborghini) qualify for temporary derogations until 2028 (European Commission, 2024).

2.3 Key Challenges for Supercar Manufacturers

2.3.1 Infrastructure Needs

As of 2021, around 375,000 public charging points were operational across Europe. However, under the EU's Alternative Fuels Infrastructure Regulation (AFIR), part of the Fit for 55 legislative package, projections estimate that at least 3–4 million will be installed by 2030 to ensure widespread fast-charging availability (European Commission, 2023; McKinsey & Company, 2024).

While supercar owners often have access to private home chargers and are less dependent on long-distance travel, the lack of public ultra-fast charging infrastructure continues to pose a challenge (McKinsey & Company, 2022). These consumers still need the option to charge away from home; however, most public networks predominantly rely on 400v systems, which are inadequate for supercars designed with 800v and 1000v electrical architectures (Saadaoui, Ouassaid & Maaroufi, 2023; Faist Group, 2024). Supercars require ultra-fast charging solutions due to their high-performance batteries and significant energy demands (Diana et al., 2024). This mismatch limits the ability of high-performance vehicles to fully utilise ultra-fast charging capabilities. While technologies like Porsche's 800v platform and a recently developed prototype from Nyobolt show promise in reducing charging times from 18 minutes to 80% charge in under five minutes, the availability of compatible infrastructure remains limited (University of Cambridge, 2024).

Supercar owners expect a seamless and exclusive experience, and long waits or compatibility issues at public charging stations can significantly impact their satisfaction (McKinsey & Company, 2022). To address these concerns, some manufacturers are partnering with luxury hotels, resorts, and private charging networks to offer dedicated high-speed charging options (Porsche, n.d.). However, widespread solutions are still lacking.

2.3.2 Technological Feasibility

The transition to electric powertrains in high-performance supercars presents engineering challenges, particularly in balancing battery weight, energy efficiency, and performance (Horiba, 2014). Pardhi et al. (2022) argue that the weight issues arise because these

drivetrains generate significant heat, which necessitates advanced cooling systems. Nevertheless, lithium-ion batteries remain the most effective energy storage solution for BEVs due to their high energy density and efficiency (Rangarajan et al., 2022). Models like the Rimac Nevera (Rimac Automobili, n.d.) and the Pininfarina Battista (Automobili Pininfarina, n.d.) demonstrate that electric supercar performance is feasible, despite the persistence of technical barriers.

To address these issues, manufacturers increasingly rely on hybrid powertrains, lightweight materials such as carbon fiber and titanium, as well as innovations like high-nickel cathodes and next-generation cooling systems (Transparency Market Research, 2023; Rangarajan et al., 2022). Moreover, research suggests that hybrids currently offer the best balance between performance, efficiency, and thermal management, though battery improvements will gradually strengthen the case for full electrification (Martellucci & Capata, 2022).

Furthermore, research indicates that a high degree of Open Innovation (OI), such as external collaborations, can accelerate technological progress and achieve sustainability goals (Ramirez-Portilla et al., 2017; McKinsey & Company, 2022). Ferrari, for instance, has partnered with the European Space Agency (ESA) to enhance innovation and sustainability within its operations (Ferrari, 2023).

2.3.3 Economic Viability

The transition to BEV or alternative technologies is particularly costly for supercar manufacturers due to low production volumes, limited economies of scale, and the risk of stranded assets (Wiedmann & Hennigs, 2012). Unlike mass-market EV makers, they also face performance trade-offs and must navigate increasingly strict regulations, which further complicates electrification (McKinsey & Company, 2022). Developing new EV platforms thus raises R&D costs and can extend production timelines (Global Growth Insights, 2025).

Consumer demand presents another challenge. Studies show that buyers without EV experience are less willing to pay a premium, while EV-experienced consumers demonstrate a greater willingness to pay (Larson et al., 2014). As BEVs become more mainstream, this acceptance is expected to grow, enhancing the market outlook for electric supercars (PNAS, 2023). However, the shift to BEVs also carries brand risks. Supercar makers, long associated with ICE heritage, may face a loss of market share during the transition (Altenburg, 2014). Ferrari, for instance, plans to maintain its low-volume production model to protect its image

of exclusivity and scarcity (Ferrari, 2022). The implications of this shift for brand identity are explored in the next chapter.

2.3.4 Consumer Adoption and Brand Identity

Electric vehicles are known for their quietness, which is valued in conventional cars but seen as a drawback in supercars, where the roar of the engine is integral to the driving experience (Cocron et al., 2011; Ferrari, 2024). Supercars symbolize luxury and exclusivity; owners often form deep emotional connections tied to brand identity (Transparency Market Research, 2024). A crucial aspect of this identity is the distinctive acoustics of high-performance engines, such as V8s and V12s, which are integral to their brand's image and cultural heritage (Lamborghini, 2020).

Balancing this legacy with evolving regulations presents a critical challenge. Research shows that luxury buyers prioritise innovation and performance, but a rapid shift to BEVs could disrupt the core identity of supercar brands long associated with high-revving engines (Bertoncello et al., 2022; Ferrari, 2022). Millman (2012) refers to this core identity as the "brand bible," noting that inconsistency can weaken consumers' emotional connection to a brand.

Sonic branding, as defined by Gustafsson (2015), involves using sound and music to create a unique identity, enhance brand recognition, and evoke emotional responses. Just as the familiar "ta-dum" sound identifies Netflix, engine sounds have long been a defining element of supercar brands. Consumers associate these sounds with specific models and manufacturers, helping to distinguish brands (Financial Times, 2024).

The absence of engine sound in BEVs, therefore eliminates a central feature, compelling manufacturers to innovate in sound engineering. For instance, Ferrari has patented a V8-inspired sound generator for its future electric models, while Porsche has developed artificial sounds for the Taycan (Ferrari Lake Forest, n.d.; Porsche, 2022).

Although artificial sound design has improved, it raises concerns about authenticity (Dupré et al., 2023). Research shows that many consumers find artificial engine sounds unsatisfying, as they lack the raw emotional engagement of traditional ICE noise (Swart et al., 2018). Techniques like granular synthesis show promise in creating engaging, futuristic EV sound profiles, but replicating the complexity of ICE acoustics remains challenging. As a result, rather than merely mimicking ICE sounds, Lazaro et al. (2022) encourage manufacturers to develop synthetic audio signatures that reflect the unique characteristics of electric vehicles.

2.4 Alternative Solutions: The Future of ICE Technology

The role of alternative solutions in achieving net-zero for supercars is complex and uncertain. Much depends on technological advancements, and some of the most relevant solutions are outlined below.

2.4.1 E-Fuel

E-fuels, or synthetic hydrocarbons, are produced by combining hydrogen (from water electrolysis using renewable energy) with captured CO_2 from the air or industry (Ueckerdt et al., 2021). While they offer a renewable alternative to fossil fuels, they require significant energy to produce, and are nearly five times less efficient than directly charging BEVs, with electrification achieving 77% efficiency compared to just 16% for e-fuel-powered cars (Transport & Environment, 2023).

E-fuels also face high production costs, with current CO_2 reduction costs estimated at €800–€1,200 per ton. Although improvements could lower this to €20–€270 per ton by 2050, they are unlikely to become cost-competitive before 2030, especially given current carbon pricing levels (Ueckerdt et al., 2021). This reflects what Gates (2021) calls the "Green Premium," meaning the extra cost of clean alternatives over fossil fuels. To illustrate how low the cost of conventional gasoline remains, as of February 2025, gasoline in the EU costs about €1.80 per liter, whereas one liter of orange juice costs around €3.00 (Wamucii, 2025), and a liter of premium Evian bottled water ranges between €1.50 and €3.00 (European Commission, 2025; Wamucii, 2025; Sheridan, 2025).

Despite these challenges, high-performance brands such as Porsche and Ferrari view e-fuels as a means of maintaining ICE models without the weight penalties associated with large EV batteries. For instance, Porsche partnered with Siemens Energy to launch a commercial e-fuel plant in Chile, with plans to scale from 130,000 liters in 2022 to 550 million liters by 2030 (Porsche, 2022; InvestChile, 2024; Porsche Racing, 2024).

Although e-fuels remain underdeveloped and are not yet widely used, consumer research shows that many buyers would reconsider EVs if sustainable synthetic fuels became available for ICE vehicles. This shift is driven by concerns about price, charging time, and range (Deloitte, 2023).

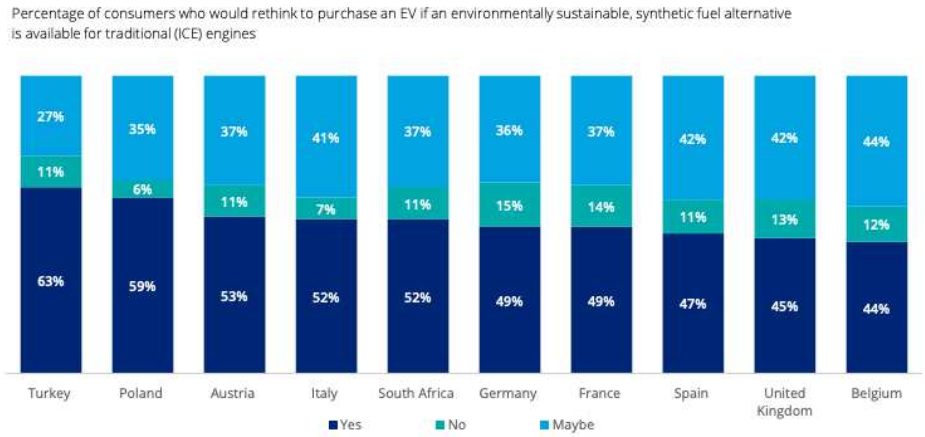

Figure 2: Consumers who would reconsider EVs if ICEs ran on synthetic fuels (Deloitte, 2023).

On the other hand, McKinsey predicts that BEVs will still dominate the automotive sector, while e-fuels will primarily serve sectors where electrification is less feasible, such as aviation, maritime transport, and heavy-duty trucking (McKinsey & Company, 2023).

2.4.2 FCEV

Hydrogen offers two major advantages over fossil fuels: it produces only water as a byproduct and is infinitely renewable as long as solar energy powers its production (Luo et al., 2021). This makes hydrogen promising for Fuel Cell Electric Vehicles (FCEVs), which generate electricity on demand and eliminate the long charging times associated with BEVs (Pramuanjaroenkij & Kakaç, 2023). Despite being commercialised since 2015, FCEVs still represent a niche market (Tanç et al., 2019), with 88,000 global sales in 2023 and projected growth to 500,000 units by 2030 (IEA, 2024; Deloitte, 2024). Examples like the Pininfarina H2 Speed highlight their potential in the supercar segment(Pininfarina, n.d.). However, others argue that FCEVs are unlikely to become a mainstream solution for supercars due to high production costs, the need for specialised components, and heavy systems that negatively affect performance (Vielstich et al., 2003; Propfe et al., 2013).

2.5 Management Theory

2.5.1 Brand Identity & Equity

David Aaker (1995) introduced the Brand Identity Model, which is used to understand the strategic value of a brand from a multidimensional perspective. The model illustrates that a brand is not just about logos or products, but about how consumers perceive it. Aaker describes four dimensions: product (features and benefits), organisation (values like

innovation and credibility), person (personality traits), and symbol (logo and imagery). By tailoring these identity elements, successful brand management can be achieved, resulting in a strong and cohesive brand image (Mohan & Sequeira, 2009; Aaker, 1996).

Delving deeper into the "brand as person" dimension, Jennifer Aaker (1997) elaborates on five key brand personality traits: sincerity, excitement, competence, sophistication, and ruggedness. These traits are directly associated with consumer perceptions; for example, being daring, dynamic, or imaginative can evoke excitement, while reliability, intelligence, and success build associations of competence. Similarly, portraying an upper-class image conveys sophistication, while toughness reflects ruggedness. Based on empirical research, Jennifer Aaker argues that these dimensions shape consumer perceptions and thus affect brand equity.

Keller (1993) defines brand equity as the added value a brand brings by shaping consumer responses to marketing efforts. Essentially, when consumers respond more favorably to a product from a specific brand compared to similar competitors, that brand has stronger equity. Keller's concept of brand knowledge aligns with Aaker's model by showing that effective brand management should not be measured solely by metrics like sales or margins, but should also prioritise intangible elements like credibility and emotional connection (Aaker, 1996). According to Keller, these aspects are largely based on brand awareness and image. Brands with strong equity can therefore command higher prices, achieve customer loyalty, and resist competition more effectively (Keller, 1993).

Together, these models emphasise that brand management extends beyond financial metrics, positioning brand identity as a critical source of long-term advantage. Managing the Brand Identity Model offers clear meaning to brands, creates a compelling value proposition, and justifies investments in brand-building activities while establishing brand equity as a primary source of competitive advantage.

2.5.2 Dynamic Capabilities

Dynamic capabilities refer to a firm's ability to integrate, build, and reconfigure internal and external competencies in rapidly changing environments (Teece et al., 1997). This concept has become central to strategic management, highlighting that merely possessing resources is not enough; firms must continuously adapt, learn, and evolve to sustain a competitive advantage (Barreto, 2010).

However, research shows that the duration of competitive advantage has declined, making long-term success more challenging (Wiggins & Ruefli, 2005). Barreto (2010) also notes that empirical evidence on the impact of dynamic capabilities remains mixed. He suggests they should be viewed not as a single advantage but rather as a combination of factors that assist firms in building successive advantages.

Eisenhardt and Martin (2000) argue that dynamic capabilities evolve from stable routines into more adaptive processes as market conditions accelerate. Strategic activities such as product development, decision-making, and alliances are key in reconfiguring resources. In international markets, where firms must navigate diverse conditions, continuous learning is essential to maintain a competitive edge (Samsudin & Ismail, 2019).

Nevertheless, solely possessing dynamic capabilities does not guarantee long-term success. Collis and Anand (2019) point out that these capabilities are not always unique or difficult to imitate, as competitors can catch up. For instance, Netflix, a pioneer in streaming, now faces rivals like HBO Max and Amazon Prime. Additionally, implementing dynamic capabilities often requires time and investment and may not be suitable for all industries. Some firms must balance flexibility with efficiency, as seen with Danaher Corporation, which focuses on continuous improvement, a model less suited to industries with rigid processes. Therefore, firms must balance dynamic and operational capabilities, including manufacturing, marketing, and customer service, to navigate uncertainty effectively (Collis & Anand, 2019).

2.5.3 Diffusion of Innovation and Consumer Acceptance

Lastly, it is important to analyze the adoption and acceptance of new technologies using the Innovation Diffusion Theory (IDT) and the Technology Acceptance Model (TAM).

The Innovation Diffusion Theory (IDT), developed by Rogers (2003), explains how innovations spread through societies and organisations over time. Individuals adopt innovations at different stages, which are grouped into categories like early and late adopters. Early adopters, in particular, play a critical role in shaping market dynamics. Understanding these adopter profiles helps businesses and policymakers design targeted strategies to accelerate acceptance.

Diffusion relies on communication channels such as mass media, marketing, or word-of-mouth. However, it also involves uncertainty and perceived risk. Individuals vary in how they handle this uncertainty, with some seeking more information before adopting. Rogers (2003) identifies five key innovation attributes that influence adoption rates:

relative advantage, compatibility, complexity, trialability, and observability**.** In other words, these attributes shape how innovations are received and integrated into different social systems.

The Technology Acceptance Model (TAM), developed by Davis (1989), explains adoption based on two main perceptions: perceived usefulness (PU), which is the belief that the technology will improve performance, and perceived ease of use (PEOU), referring to how easy it is to learn and operate. Acknowledging these two criteria increases the likelihood of consumer adoption (Davis, 1993; Davis et al., 1989).

Recent work by Lou and Li (2017) integrates TAM and IDT in the context of technology adoption, combining TAM's focus on individual attitudes and behaviors with IDT's emphasis on social influences. Together, these frameworks offer a more robust approach to predicting technology adoption across industries.

3 Methodology

3.1 Research Design

This research was conducted to examine how supercars navigate the transition toward net-zero emissions and how the BEV shift may impact their brand identity. Both primary and secondary data were employed, as illustrated in **Figure 3**.

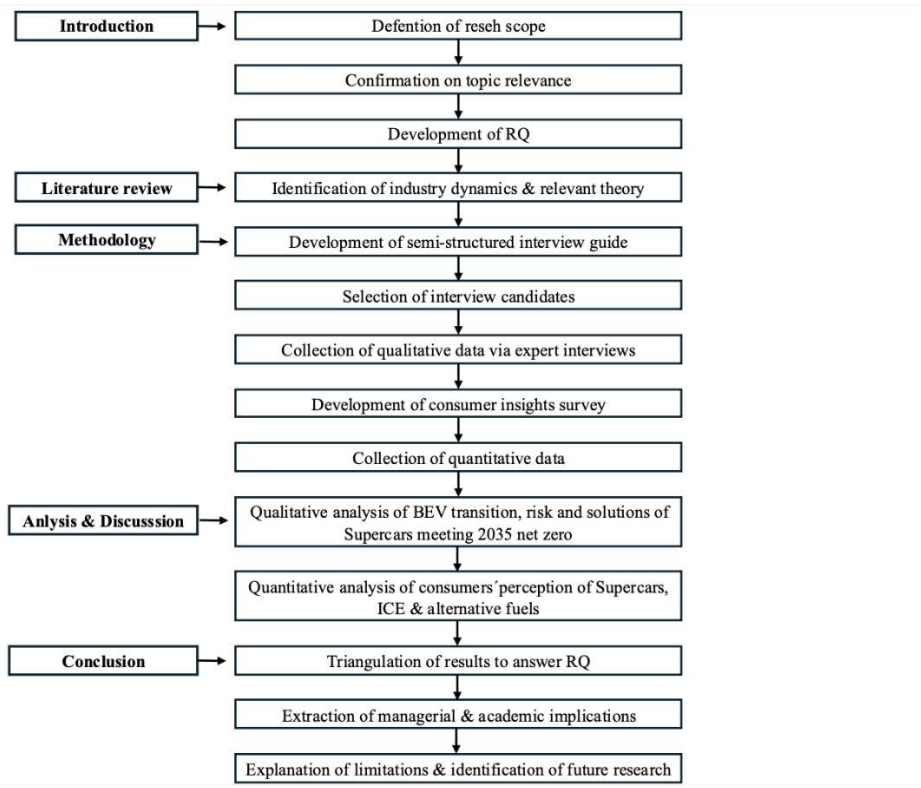

Figure 3: Research Design

The study employed a mixed-methods approach, integrating quantitative and qualitative data with triangulation (Jack & Raturi, 2006). This allowed for both deductive, inductive, and abductive reasoning.

Qualitative insights were gathered through semi-structured interviews, a common research approach (Rowley, 2012), with experts such as supercar brand representatives, BEV specialists, EU policymakers, and industry analysts. Quantitative data came from an online survey that explored consumer perceptions of ICE supercars and acceptance of the BEV transition.

Finally, qualitative, quantitative, and secondary data from the literature review were triangulated to refine and validate the research question. The thesis was entirely written by

the author; Perplexity and ChatGPT were used solely for grammatical and structural improvements.

3.2 Data Collection

The following two sections outline the data collection methods used for analysis in Chapter 4.

3.2.1 Primary Data Collection - Expert interviews

Semi-structured interviews are a flexible yet focused method widely used in business research to collect rich qualitative data, particularly suited for exploring motivations, beliefs, and attitudes (Adams, 2010; Barriball & While, 1994).

The interview process involved careful planning, including scheduling, selecting open-ended questions, and aligning them with research objectives. Following Rowley's (2012) recommendation, the guide included three versions for different types of experts and 10 main questions, along with optional sub-questions to explore key themes (see Appendix B). This structured yet flexible approach generated reliable and comparable qualitative data (Cohen & Crabtree, 2006).

Guest et al. (2006) note that data adequacy typically occurs within 12 interviews; this benchmark guided the sample size and we achieved data saturation with 13 interviewees. Additionally, experts were selected to merge objective knowledge with subjective insights (McIntosh & Morse, 2015).

The interviews were designed to achieve three primary objectives. First, we sought to engage with supercar manufacturers regarding strategy, BEV transition feasibility, future outlook, and key barriers. Second, we assessed the potential of ICE technology improvements and alternative mobility solutions. Lastly, we examined the principles and adaptability of EU policies.

Based on these objectives, the interview experts were divided into three distinct groups. To capture diverse opinions, the experts were also organised into three thematic categories, followed by both deductive and inductive extraction of key themes from transcripts (Mayring, 2000): **G** = general industry experts, **E** = EU policymakers, **S** = supercar manufacturer employees. An anonymous overview of the 13 experts is provided in **Table 1**.

Code	Current position and expertise

G1	Strategy consultant at a top-tier global consulting firm with a background in mechanical engineering and experience in automotive, health tech, and energy. Former Formula 1 engineer, specializing in hybrid systems, batteries, and electric motors. MBA from LBS.
G2	Strategic consultant and investment professional with expertise in mobility innovation, supercar markets, and alternative assets. Background in finance, Web3, automotive retail, and luxury brand strategy. Has advised Lamborghini on consumer preferences and branding.
G3	Senior Technical Advisor with extensive experience in fuel production since 2009, specializing in methanol and green electrofuels, focusing on innovation and quality improvements for sustainable energy solutions.
G4	Senior branding and marketing advisor with extensive experience in both the private and public sectors. Lecturer and researcher with the Lund Brand Management Group. Known for launching the global Bluetooth brand and advising on innovation, brand strategy, and change management.
G5	Marketing futurist, author, and keynote speaker with expertise in neuromarketing, customer experience, and digital strategy. Contributor to the Forbes CMO Network, advising on emotional targeting, sensory marketing, and audience engagement.
G6	Strategic advisor at Siemens Energy with a background in industrial engineering. Experienced in downstream energy, electrification, hydrogen, and energy transition strategies.
E1	Policy Officer at the European Commission (DG Mobility and Transport), specializing in sustainable transport policies. Expertise includes vehicle emissions standards, alternative fuels, and corporate fleet decarbonization. Ph.D. in atomic physics and experimental physics.
E2	Policy Officer with 20+ years of experience at the European Commission, specializing in transport decarbonization, rail digitalization, TEN-T guidelines, and infrastructure financing. Expertise in EU climate goals and sustainable mobility strategies.

E3	Policy Officer at the European Commission with expertise in road transport policies, focusing on tolling, vignettes, and vehicle taxation. Background in economics and marketing.
S1	Senior E-Mobility Manager at a leading supercar manufacturer, with over 15+ years of experience, specializing in the transition to Battery Electric Vehicles (BEVs). Deep expertise in innovation management, and the integration of electric drivetrains in high-performance vehicles.
S2	Head of Product Marketing at a prominent Italian luxury supercar brand, with 15+ years of experience in product marketing, strategic pricing, and market intelligence. Expert in customer insights, global strategy, and leadership.
S3	Senior executive at a niche high-performance supercar manufacturer with 25+ years of experience in automotive design and engineering, specializing in lightweight electric mobility, carbon fiber applications, and the development of cutting-edge sustainable supercars.
S4	Senior Battery Systems Engineer at a renowned European supercar brand, with 15+ years of experience in electric powertrain development. Specialized in high-performance battery integration, hybridization strategies, and advancing fast-charging capabilities.

Table 1: Overview of industry experts

3.2.2 Primary Data Collection - Consumer Insights Survey

To explore consumer acceptance in the supercar context, a survey was designed to assess perceptions of the shift from ICE to BEV and alternative fuels.

Online surveys offer the benefit of rapidly reaching respondents in a cost-effective manner to gather consumer insights (Newcomer & Triplett, 2010). The survey provided additional value for understanding dynamic capabilities by focusing on scales that capture first-order competences, such as customer and technological capabilities (Danneels, 2016). It was conducted in English and distributed through personal networks, utilising the Qualtrics platform for its design and administration across multiple countries in Europe. It primarily consisted of mandatory multiple-choice questions, a 5-point Likert scale, matrix, and rating scale questions, followed by a single voluntary open-ended question at the end.

Given the importance of sample size, Bartlett et al. (2001) recommend approximately 384 responses for a 5% margin of error for categorical data in large populations. While the supercar market is rather niche, this benchmark was used to guide sampling. Furthermore, research shows that BEV adoption in automotive contexts is shaped by performance expectancy, effort expectancy, and social influence (Manutworakit & Choocharukul, 2022). Accordingly, the survey assessed hedonic motivation as an indicator of adoption.

The final survey collected n=223 responses between April 5 and 16, 2025, and took 5 to 7 minutes to complete. To overcome the challenge of reaching supercar owners, participants were asked to imagine a hypothetical scenario: receiving a free supercar worth over €500,000.

The questionnaire included eight sections: (1) consent/introduction, (2) background, (3) hypothetical ownership/drivetrain choice, (4) emotional and brand appeal, (5) technology/sustainability attitudes, (6) brand priorities for 2035, (7) demographics, and (8) open-ended reflections (Appendix B).

Although the sample might not have represented actual owners, the design captured aspirational preferences, a limitation that we acknowledge.

4 Analysis & Discussion

In Chapter 4.1, insights from expert interviews are analyzed, while Chapter 4.2 examines consumer survey outcomes. By triangulating both with the literature review, Chapter 5.1 evaluates how supercar manufacturers can preserve brand identity.

4.1 Expert interviews

4.1.1 Obstacles to Future Supercar Fleets

Semi-structured interviews were analyzed using Mayring's (2000) qualitative content analysis, which combines deductive (theoretical) and inductive (data-driven) coding.

The findings revealed various perceived obstacles regarding the future viability of BEV in the supercar segment. **Table 2** summarises the thematic categories of main risks identified by the different expert groups, ranked by frequency of mention.

Obstacles	**Mentioning Experts**
Customer Reluctance (preference for ICE)	G1, G2, G3 G4, G5, G6, E1, S1, S2, S3, S4
Hydrogen Skepticism (technical and economic barriers)	G1, G2, G3, G6, E1, E2, S1, S3, S4
Policy Skepticism (desire for flexibility; 2035 unrealistic)	G1, G2, G3, G6, S1, S2, S3, S4
Artificial Sound (fake or inauthentic)	G1, G2, G4, G5, S1, S2, S3
Brand Identity (harming image, values, heritage)	G1, G2, G4, S1, S2, S3

Table 2: Obstacles – Thematic Coding (G, E, S)

4.1.2 Brand Identity and Consumer Reluctance

Experts generally agreed on the technical feasibility of future high-performance BEVs. However, the main challenge lies in operational strategy and consumer acceptance. This reflected the TAM (Davis, 1989), which highlighted that perceived usefulness and ease of use are essential for adoption. In the case of supercars, however, emotional appeal and sensory experience weighed more heavily. For instance, G1 described that brands like Ferrari and Lamborghini are technologically fully capable of producing high-performing BEV fleets beyond 2035, but the root obstacles are consumer desire and the implications for brand

image, not capability. Experts G1, G2, and G3 emphasised that the transition will require a balance of innovation and emotional branding. This resonates with Aaker's (1996) model of brand identity, particularly the dimensions of "brand as person" and "brand as symbol." The loss of engine acoustics threatens the perceived excitement and uniqueness associated with V8 and V12 engines, which are core symbolic traits of supercar brands (Lamborghini, 2020; Ferrari, 2022).

Thus, experts emphasised that future success will depend on a combination of market demand, brand repositioning strategies, and the regulatory context. If the European Union strictly enforces BEV compliance, S2 predicted severe consequences not only for supercars but also for Europe's economy:

"*We are suiciding one of the most important industries in Europe. We are going to destroy the value we have in Europe, and we are not going to fix the environmental problem."* (S2)

Nonetheless, G2 pointed out that iconic brands such as Ferrari and Lamborghini are likely to endure due to their brand recognition, which supports the concept of a competitive edge and strong brand equity (Keller, 1993). However, smaller manufacturers like McLaren and Alfa Romeo may struggle, particularly given their weaker financial resources and lack of clear differentiation in a BEV landscape.

Supercars are luxury items, and their value is largely emotional and perceptual. Across all interview categories, there was a shared view that the key challenge is the emotional attachment and reluctance toward ICE characteristics. Experts G1 and G2 specified that this is closely linked to elements like engine noise, gear changes, and raw feel, which BEVs currently lack. To exemplify, G5 expressed:

"These cars are showpieces, meant to attract attention. A quiet humming sound isn't a substitute for a full-throated roar and even an occasional backfire." (G5)

The absence of these traditional sensations in BEVs poses a risk to brand authenticity and consumer satisfaction. G2 suggested that brands may experience a slow transition, with varying degrees of consumer resistance. As shown in the literature, the merger of TAM and IDT (Lou & Li, 2017) underscored the role of emotional factors in such technology adoption. The transition to BEV therefore poses a risk of undermining the distinctive qualities that define these brands. Consequently, the process was expected to be more gradual than rapid (G1, G2).

Furthermore, S3 emphasised that ICE characteristics have symbolic distinctiveness. Hence, brands must develop new ways to emotionally engage consumers to mitigate brand dilution. G1 and G2 also raised concerns about homogenization, arguing that BEV powertrains feel less differentiated due to their similar driving characteristics, which risk being perceived as commoditised. The majority of experts also mentioned that older generations are particularly resistant to change, while attempts to replicate ICE-like experiences through artificial sound were generally viewed as counterproductive. Consistent with the literature on reproducing sounds (Gustafsson, 2015; Swart et al. 2018), S2 stressed the importance of authenticity and the lack of emotional engagement:

"Consumers want authentic, analog experiences, not simulation."(S2)

On the contrary, five experts encouraged natural electric sound to create a more meaningful BEV experience. Five experts further discussed how unique and futuristic BEV sounds can be both appealing and attract new demographics. Drawing on examples such as Porsche's Taycan, G1 and G4 expressed that rather than replicating the past, the Taycan succeeded in creating a new sensory identity by embracing the futuristic, "sci-fi" feel of electric mobility:

"Some electric cars… sound better than others… the Taycan sounds like a spaceship, and that's also cool in its own way." (G1)

Despite these innovations, G2 and S1 also pointed out that Taycan sales have not met expectations due to market hesitation and a lack of residual value for BEVs**.** This aligned with Rogers' (2003) IDT regarding time-lagged adoption processes, as well as the role of perceived value and risk in consumer decisions.

4.1.3 EU Policy Targets and Uncertainty

A key concern raised by 8 out of 13 experts (excluding policy officers) was scepticism regarding the EU's current targets for phasing out ICE vehicles. Industry experts expressed fears about the vulnerability of niche luxury brands and urged for additional exemptions or greater regulatory flexibility.

While EU policy experts did not explicitly express scepticism, they acknowledged the potential for regulatory revisions planned for the end of 2026. E1 noted that low-volume supercars contribute minimally to overall emissions and highlighted their economic importance to the EU. Meanwhile, E2 and E3 emphasised that any potential softening of targets will likely depend on broader geopolitical and macroeconomic developments.

EU Policy	Mentioning Experts
Possibility of Policy Flexibility (2026 review of further derogations, exemptions)	E1, E2, E3

Table 3: EU Policymakers – Thematic Coding (E1, E2, E3)

4.1.4 Technological Maturity and Drivetrain Alternatives

Consistent with the literature, experts largely dismissed hydrogen as a near-term option for supercars because of its high energy demands and economic inefficiency. Similarly, G6 noted that while e-fuels show theoretical promise, their current cost and limited scalability render them impractical for widespread use. However, e-fuels were seen as a valuable future niche solution, particularly for motorsports, heritage vehicles, or hybrid applications (S2, S3, S4). As G6 emphasised, large-scale deployment would require significant investment from oil companies and strong regulatory backing.

Two experts highlighted that the success of alternative fuels will depend on Open Innovation (Ramirez-Portilla et al., 2017), requiring collaboration among car manufacturers, engineers, SMEs, and governments. G4 pointed to Porsche's pilot project in Chile as a positive, yet ultimately insufficient step, describing it more as greenwashing.

Hybrid systems were widely seen as a short- to medium-term bridge strategy. For the long term, G3 suggested that e-fuels may be used in plug-in hybrids to provide high-performance bursts while daily driving remains electric.

4.1.5 Strategic Pathways and Future Drivers

Table 4 lists the primary strategies and drivers for the future of supercars according to expert mentions.

Strategy & Driver	Mentioning Experts
BEV Strategy (technologically possible)	G1, G2, G6, E1, E2, E3, S1, S2, S3, S4
Short-Term Focus on Hybrids (transitional solution)	G1, G2, G3, G6, E1, S1, S2, S3, S4
E-Fuels as Long-Term Niche	G1, G2, G3, G6, S1, S2
Brand reinvention (new branding, symbolism, myths)	G1, G2, G4, E1, S2
Distinctive Electric Soundscapes (Sonic Branding)	G1, G2, G4, S1, S2

Collaboration needed (Open Innovation)	G3, E1

Table 4: Strategy & Drivers – Thematic Coding Table (G, E, S)

The consensus among expert opinions was that while future BEV technology is technically viable for high-performance supercars, its success will depend on strategic adaptability. A central theme was brand reinvention beyond the combustion engine, aligning with the Dynamic Capabilities Framework (Teece, Pisano & Shuen, 1997), which emphasises reconfiguring internal resources to meet evolving environments. Five experts suggested leveraging luxury signals such as exclusivity, design, and sensory innovation. G1 and G2 drew comparisons to high-end watch brands, emphasising symbolic value over functional performance:

"A BEV can feel like a toaster. We need to make it feel like a Rolex." (G2)

This aligned with David Aaker's (1996) Brand Identity Model and Keller's (1993) concept of brand equity, where strong associations drive loyalty and pricing power. Expert G4 reinforced this citation by stating that having a luxury watch is not merely about telling time but rather an object that communicates heritage, craftsmanship, and status. Therefore, experts emphasised that supercars could reposition themselves more as tech-luxury brands, making BEV supercars a product of desire through design, exclusivity, innovation, and futuristic identity, rather than just focusing on keeping the engine noise.

For instance, Porsche successfully positioned the Taycan by embracing electrification without denying its heritage, stating, "*It's still a soul, now electrified*, " which maintains brand continuity while signalling innovation (G4). However, S1 highlighted that regional differences matter, noting that in Southern Europe, BEVs may be perceived as lacking prestige. This underscored the importance of flexible strategies that align with diverse cultural contexts (Eisenhardt & Martin, 2000).

Experts also proposed integrating lifestyle, fashion, and experiential offerings:

"In the future, we'll see brands like Lamborghini evolve into curators of lifestyle, fashion, experiences and events. The car will be just one part of the brand." (G2)

As a branding expert, G4 suggested that supercar brands must emotionally reconnect with consumers through redefined identities. This included (1) reconstructing myths without ICE dependence, (2) creating new sensory experiences, such as futuristic artificial sounds that

enhance the BEV experience, and (3) preserving craftsmanship by emphasising precision, hand-built quality, and artistic design.

Furthermore, several experts emphasised the importance of targeting younger demographics, who may be less attached to ICE traditions and more interested in lifestyle and sustainability (G1, G4, S2). This shift was consonant with Rogers' IDT (2003), as early adopters from Gen Z may prioritise BEV over ICE.

Regarding adoption speed, S1 noted that leasing could help overcome consumer hesitation and improve residual value. While S4 pointed out that luxury car buyers expect BEV to match ICE value without higher costs, other experts stressed that exclusivity, not price, drives demand. G4 even suggested that limited availability at a premium price could strengthen brand desirability, similar to Ferrari's low-volume production strategy (Ferrari, 2022).

Ultimately, the conclusion of the six experts advocating for brand reinvention was to create greater uniqueness and exclusivity as a long-term strategy by redefining symbolic and emotional values. Therefore, supercars could generate new residual value and avoid becoming just another BEV commodity.

4.2 Online Survey – Consumer Perceptions

Following data cleaning and validation, the final sample included $n = 223$ respondents, providing the foundation for all subsequent analyses of consumer perceptions, preferences, and attitudes toward supercars and emerging technologies.

4.2.1 Demographics and Background

To contextualize perceptions and behaviors, demographic data were collected regarding participants' age, gender, net worth, and country of residence. These questions were placed at the end of the survey to reduce item nonresponse due to their sensitive nature.

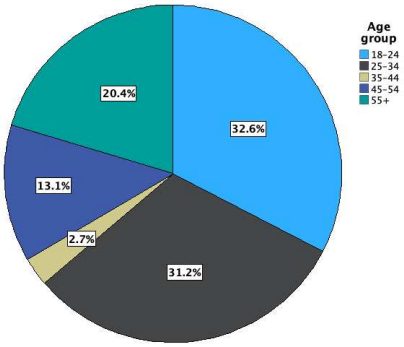

Figure 4: Answer distribution of question 24

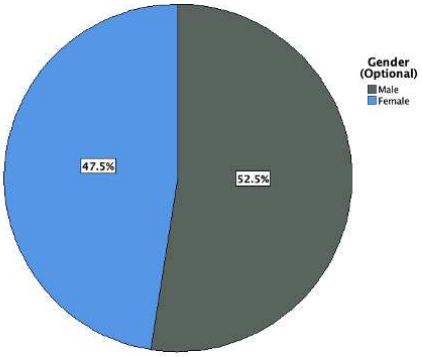

Figure 5: Answer distribution of question 25

The age distribution was relatively balanced, with the largest share (32.6%) in the 18–24 category, followed by the 25–34 group (31.2%). Respondents aged 55 and older accounted for 20.4%, while the 35–44 group was underrepresented at 2.7%. This youth dominance is particularly relevant given the study's focus on future market trends. Gender representation was nearly balanced, with 52.5% male *(n* = 115) and 47.5% female *(n* = 104).

As supercars represent a high-luxury market segment, often inaccessible to the average consumer, the survey also captured respondents' net worth**.** Given the predominance of younger respondents, net worth levels were skewed towards the lower end. A substantial portion (38.4%) reported a net worth of less than €10,000, followed by 27.9% in the €10,000–€49,999 bracket. Notably, the sample also included high-net-worth individuals, with 21.6% reporting assets of €1 million or more. Thus, the resulting distribution revealed a sample skewed toward lower and higher extremes as seen in **Figure 6** below.

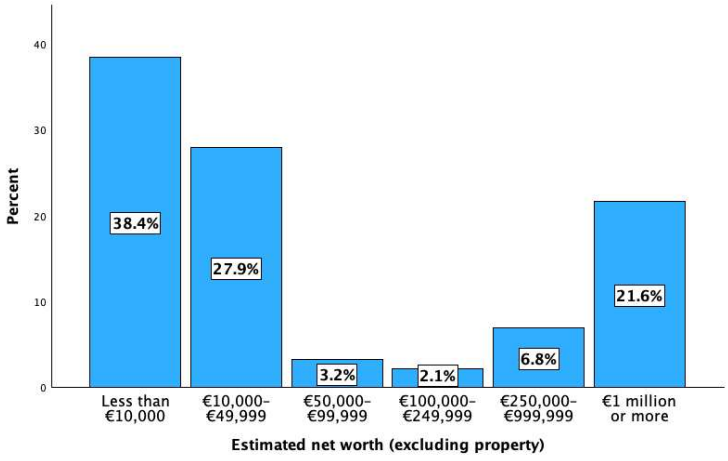

Figure 6: Answer distribution of question 27

Geographically, the sample was diverse, with the majority of respondents from Sweden (22.8%), Portugal (21%), and Germany (19.6%), along with smaller proportions from Switzerland, Denmark, Norway, Italy, Luxembourg, and others.

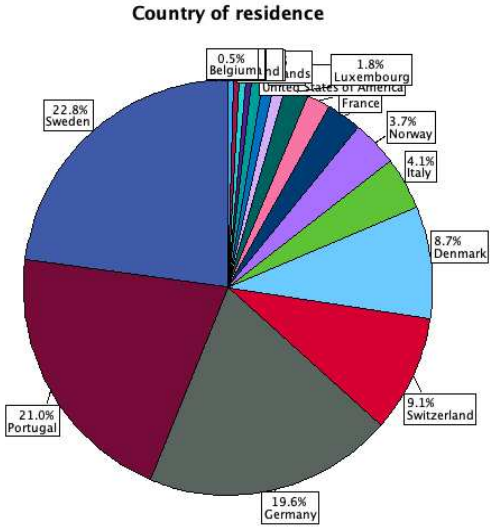

Figure 7: Answer distribution of question 26

Analyzing this demographic composition through the lens of Dynamic Capabilities (Teece et al., 1997; Barreto, 2010) and IDT (Rogers, 2003) offers insights into how diverse age groups and financial backgrounds may influence the adoption of emerging technologies such as BEVs or soundscape-related features. Understanding and aligning with these external demographic and economic patterns enables firms to tailor product strategies and marketing efforts more effectively, thereby strengthening their competitive positioning.

4.2.2 Supercar Engagement

The first survey section assessed participants' interest and engagement with supercars, which included motorsport interest, emotional responses, lifestyle associations, and drivetrain preferences.

When asked about their interest in supercars, on a scale from 1 (not at all) to 5 (extremely interested), the majority of respondents selected "very interested" (40.1%). Meanwhile, 14.4% expressed no interest, and 12.2% reported only slight interest. Additionally, 21.6% were moderately interested, and 11.7% identified as extremely interested.

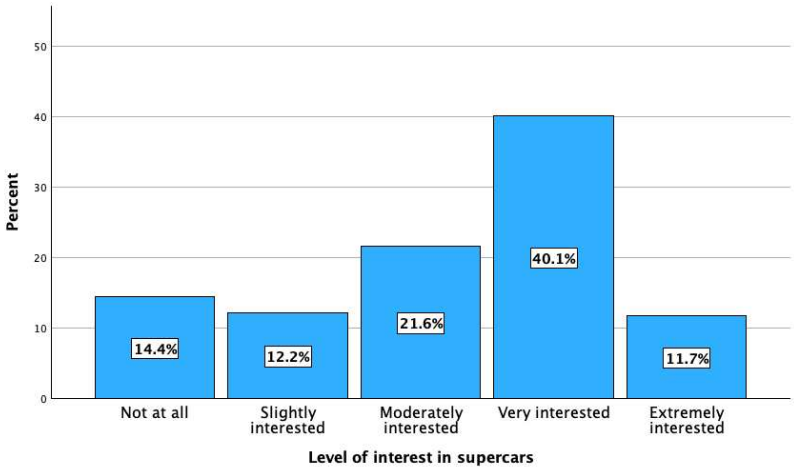

Figure 8: Answer distribution of question 2

The mean score of 3.23 (see Appendix 1) indicated that, on average, participants leaned slightly above "moderately interested" in supercars.

As Formula 1 (F1) is a motorsport closely associated with high-performance automotive brands, participants were asked whether they follow F1. The responses were relatively evenly distributed among three categories: 32.9% stated that they regularly follow F1, 36.9% reported doing so occasionally, and 30.2% indicated no engagement with the sport at all.

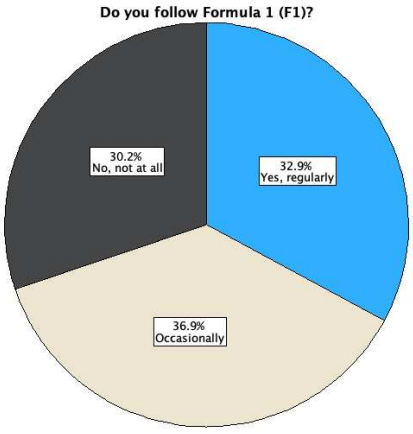

Figure 9: Answer distribution of question 3

Concerning emotional responses, participants were asked to report their feelings when encountering a supercar. As illustrated in **Figure 10**, the most frequently reported emotion was excitement, indicated by 56.8% of respondents, followed by curiosity (23%) and admiration (12.6%). A smaller proportion of participants reported feelings of indifference (5%) or envy (0.9%). These findings suggested that supercars predominantly evoke excitement, particularly among younger cohorts, thereby strengthening their position as emotionally salient and aspirational products (Transparency Market Research, 2024).

Furthermore, this pattern was consistent with Aaker's (1997) conceptualisation of brand personality, highlighting the strong emotional bond consumers develop with products characterised by distinct personality attributes.

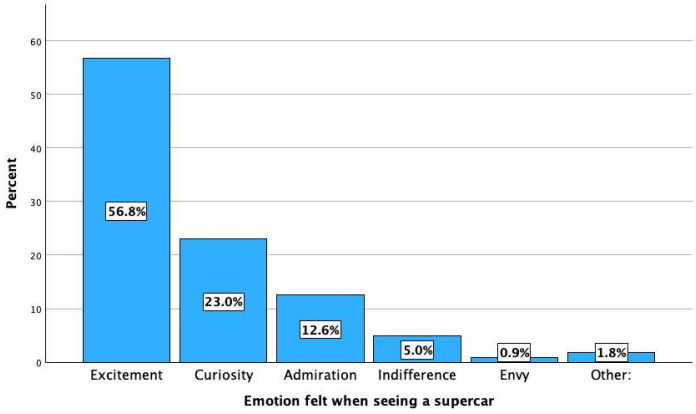

Figure 10: Answer distribution of question 5

Derived from expert interviews, both G1 and G2 compared supercars to luxury watches, emphasizing their symbolic value over functional performance. Participants were also asked what they associate with the supercar lifestyle**.**

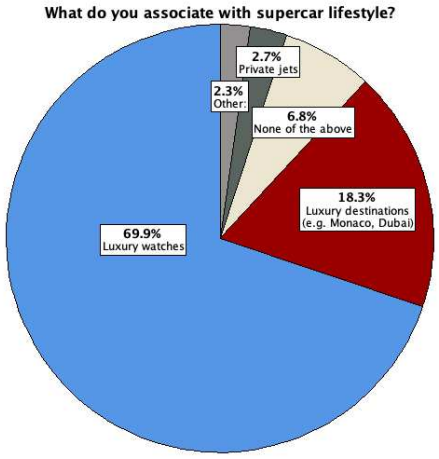

Figure 11: Answer distribution of question 6

The vast majority (69.9%) selected luxury vacations, reinforcing the widespread perception of supercars as symbols of wealth and craftsmanship. An additional 18.3% associated them with luxury destinations such as Monaco or Dubai. Fewer respondents mentioned private jets (2.7%) or the ownership of multiple homes (6.8%). These findings align with lifestyle branding strategies. Understanding what consumers actually associate supercars with can help brands explore new product strategies and further strengthen their brand identity (Aaker, 1996), thereby fostering more resilient brand equity (Keller, 1993).

Notably, when asked about their preferred drivetrains in a hypothetical “free supercar” scenario, over half (51.1%) selected a fully electric BEV, slightly surpassing the 41.2% who preferred a traditional ICE.

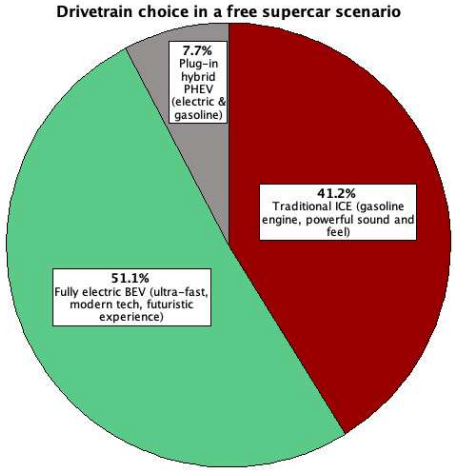

Figure 12: Answer distribution of question 7

4.2.3 Soundscape Attitudes

Both current literature and expert interviews emphasised the significance of sound and how it shapes drivers’ perceptions of performance and emotion. To gain a better understanding of how consumers related to this element, participants were asked to evaluate both the importance of engine sound and their openness to artificial or futuristic soundscapes**.**

The strong consensus about the significance of engine sound was evident: the majority rated it as either very (41.7%) or extremely important (36.2%)**.** Only a small minority viewed it as less critical, with 9.2% selecting “moderately,” 7.3% “slightly,” and just 5.5% “not at all.”

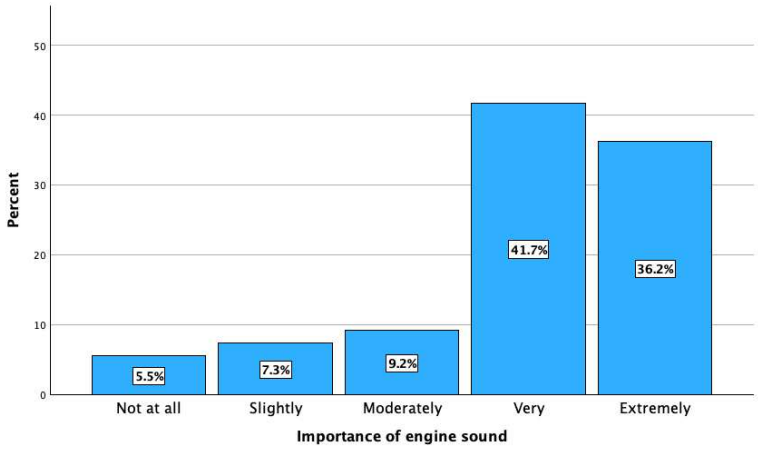

Figure 13: Answer distribution of question 14

These results suggested that sound is one of the most central elements of the supercar experience, reinforcing prior research indicating that the absence of engine sound in BEVs diminishes key cues for performance appraisal (Dupré et al., 2023).

One could therefore argue that sound plays a central role in the supercar experience**,** reinforcing prior research indicating that the absence of engine sound in BEVs diminishes essential cues for performance perception (Dupré et al., 2023). For instance, Expert S2 called for authenticity in supercar branding, strongly opposing artificial ICE sounds**,** while several experts advocated for distinctive electric soundscapes, emphasising futuristic uniqueness**.** These perspectives were also tested with survey participants. See **Figure 14** below.

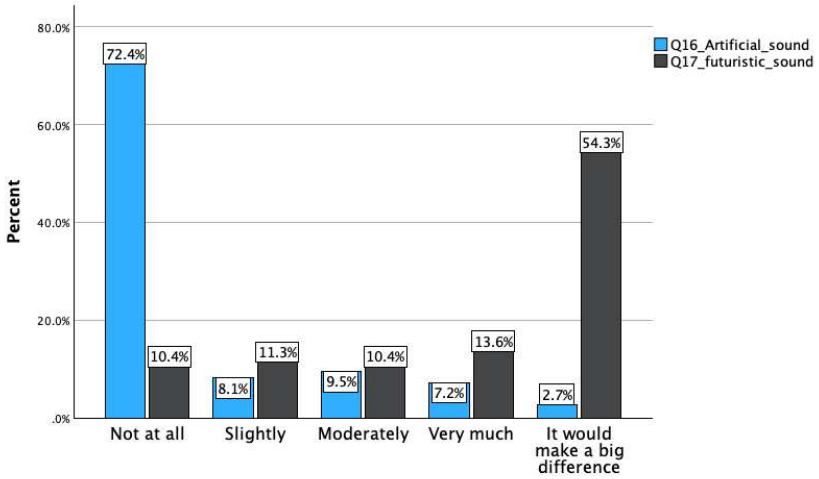

Figure 14: Answer distribution of question 16 & 17

The results diverged significantly. A total of 72.4% of respondents stated that artificial engine sounds would not make a difference to their experience, which could be because such sounds often feel unnatural and lack emotional impact (Swart, Bekker & Bienert, 2018). In contrast, 54.3% believed that futuristic, unique sounds would make a big difference, indicating openness to innovation in sound design. As five experts highlighted the potential of natural electric sounds to enhance the BEV experience, these findings further support that sound could become a key branding strategy for the electric supercar segment.

4.2.4 Sustainability and Future Trends

The last section of questions addressed opinions on future pathways regarding sustainability and what participants believe supercar manufacturers should focus on. **Table 5** illustrates the distribution of participants' attitudes toward e-fuels, BEVs, and whether supercars can remain iconic without an ICE drivetrain.

Variable	N	%
Q18_brand_iconic_without_ICE		
Yes	137	62.0
Maybe	54	24.4
No	21	9.5
Not sure	9	4.1
Q21_prefer_e-fuel		
Yes	180	81.4
Maybe	22	10.0
No	8	3.6
Not sure	11	5.0
Q22_WTP_more_sustainablity		
Yes	136	61.5
Maybe	33	14.9
No	40	18.1
Not sure	12	5.4

Table 5: Distribution of Single Answer Questions (Q18, Q21, Q22)

According to the results, there was notable openness to change among participants. A majority (62%) believed that supercar brands can remain iconic without ICE, which is also reflected in the positive attitudes toward e-fuels and BEVs. If e-fuels allowed traditional engines to become carbon-neutral, a significant portion of respondents (81.4%) expressed a preference for them. These findings reflected consumer readiness to embrace technological innovation, particularly in terms of perceived usefulness (Davis, 1989). Furthermore, the belief in the continued relevance of supercar brands resonated with Expert G2's view that iconic brands such as Ferrari and Lamborghini are likely to endure due to their strong brand recognition. This underscored the importance of brand as a symbolic asset (Aaker, 1996), as consumers exhibited high levels of top-of-mind awareness and attachment to brand heritage.

It was also notable that 61.5% of participants reported being willing to pay more for a sustainable supercar, as long as performance and emotional appeal are maintained.

After defining the multi-response questions as multiple variables, the overall distribution of responses further contextualised these attitudes, as seen in **Table 6**.

Variable	N	%
Q19_future_powertrain_support		
BEV	122	30.7
Hybrid	42	10.6
E-fuels	161	40.5
FCEV	21	5.3
ICE	52	13.1
Q20_preference_influencers		
Sustainability	53	12.6
Performance	104	24.6
Engine sound	37	8.8
Charging/refuelling	17	4.0
Brand reputation	109	25.8
Design	44	10.4
Innovation/technology	58	13.7
Q23_brand_priorities_2035		
Maintaining sound and emotion	171	27.9
Meeting climate goals	105	17.1
Charging/refuelling innovation	40	6.5
Lightweight design / performance	112	18.3
Brand heritage and exclusivity	175	28.5
Affordability and accessibility	10	1.6

Table 6: Distribution of Dichotomous Grouped Questions (Q19, Q20, Q23)

When asked about preferred future powertrains, respondents favored e-fuels (40.5%) and BEVs (30.7%). Participants prioritized brand reputation (25.8%) and performance (24.6%) as the main factors shaping these preferences, followed by innovation (13.7%) and sustainability (12.6%). These findings partially aligned with the literature, which suggests that luxury vehicle buyers value innovation and sustainability, though driving performance remains the most critical determinant (Bertoncello et al., 2022).

Importantly, the strong association between supercars and performance, as highlighted by MacMillan (2017), underscored the importance of this attribute to brand identity. This suggested that performance should remain essential in supercar branding strategies, particularly within the "product" dimension of brand personality (Aaker, 1995). Moreover, the significant emphasis on innovation supported the relevance of the "brand as organisation" dimension, which highlighted innovation and credibility as key drivers of consumer trust. This dimension may become increasingly important if younger demographics, who tended to show a preference for BEV technologies, emerge as a critical consumer segment. Finally, the high proportion of respondents favoring e-fuels aligned with Deloitte's (2023) research on consumer attitudes toward synthetic fuels.

Looking beyond 2035, respondents emphasised maintaining sound and emotion (27.9%) and brand heritage and exclusivity (28.5%) as key brand priorities.

4.2.5 Model Development

Before conducting the regression modeling, a Spearman correlation analysis (Appendix 2) was performed to explore potential independent variables and assess the risks of multicollinearity. Dependent variables were excluded from this analysis since all study variables were either nominal or ordinal. Spearman's correlation was specifically chosen because it is effective for examining associations between ordinal independent variables. This preliminary analysis bolstered the theoretical and empirical justification for selecting variables in the regression models.

Numerous significant correlations ($r \approx 0.7$) at the 0.01 level were observed:

- Age and Net Worth ($r = .765$, $p < .001$): A strong positive correlation suggested that older individuals tended to have a higher net worth.

- Net Worth and Emotional Connection to Loud Engines ($r = .654$, $p < .001$): A strong positive correlation indicated that individuals with higher net worth tended to feel more emotionally attached to loud engine sounds.
- Importance of Engine Sound and Emotional Connection to Loud Engines ($r = .475$, $p < .001$): A moderate positive correlation, as anticipated, indicated that individuals who regaredd engine sound as important also shared a greater emotional connection to engine noise.

These findings revealed underlying associations between predictor variables, which were carefully considered during the testing phase. However, to ensure clearer interpretation of the results and avoid multicollinearity, each independent variable was subsequently analysed separately in relation to the dependent variable in the regression analyses.

Based on the literature review, expert interviews, and preliminary correlation analysis, a conceptual model was developed to guide the quantitative analysis. This model identified the independent variables hypothesised to influence the key dependent variables in the study. **Table 7** provides a summary of the conceptual model.

Dependent Variable	Independent Variables
Drivetrain Preference →	Age, Net Worth , Importance of Engine Sound, Emotional Connection Loud Engines, Supercar Interest, F1 viewership
Openness to Futuristic Sounds →	Age, Net Worth, Importance of Engine Sound, Emotional Connection Loud Engines

Table 7: Conceptual Model for Independent and Dependent Variables

4.2.6 Multinomial Logistic Regression

This section examines how various factors, such as age, interest in supercars, the significance of engine sound, emotional ties to loud engines, and net worth, affect preferences regarding drivetrains using multinomial logistic regression.

4.2.6.1 Drivetrain Preference and Age

Building upon insights from expert interviews, a recurring theme emerged regarding the association between younger age cohorts and greater openness to technological innovation, including the adoption of BEVs. To empirically test this observation, a preliminary crosstab analysis (Appendix 3) was conducted to explore how drivetrain preferences vary across age

groups. This descriptive snapshot provides an initial indication of potential associations between age and drivetrain choice.

Age Group	ICE	BEV	PHEV
18–24	22.5%	**71.8%**	5.6%
25–34	26.1%	**71.0%**	2.9%
35–44	33.3%	33.3%	33.3%
45–54	**72.4%**	13.8%	13.8%
55+	**73.3%**	15.6%	11.1%

Table 8: Crosstabulation - Drivetrain Choice by Age Group

The crosstab results show that fully electric BEVS were most commonly preferred by participants aged 18 to 34, with over 70% in both age brackets. In contrast, traditional ICE vehicles were the dominant choice among participants aged 55 and older, where more than 70% expressed a preference for ICE vehicles.

While these descriptive results indicated a substantial gap in preferences among generations, further statistical testing was necessary to ascertain whether the observed associations were significant. Thus, a multinomial logistic regression analysis was conducted, leading to the following hypotheses:

***H_0* (Null Hypothesis):**

> ***H_0*:** There is no significant difference in drivetrain preference (ICE, BEV, or PHEV) among different age groups in a hypothetical “free supercar” scenario.

This suggested that age did not significantly impact drivetrain choice.

***H_1* (Alternative Hypothesis):**

> ***H_1*:** There is a significant difference in drivetrain preference among different age groups in the same scenario.

This suggested that age group affected drivetrain preference, with younger individuals likely showing a greater inclination toward BEVs than older demographics.

To evaluate these hypotheses, a multinomial logistic regression analysis was conducted. The dependent variable was drivetrain preference (Q7), while the independent variable was age group (Q24). The 55+ age group and ICE were designated as reference categories. The model yielded a statistically significant result ($p < 0.05$), indicating that age is a meaningful predictor of drivetrain preference (Appendix 4):

- Model Chi-Square = **71.059**, df = 8, **p < .001**

In fact, these findings supported the notion derived from expert interviews and suggested that younger demographics were more likely to prefer electric drivetrains in high-performance vehicles.

The detailed results are as follows:

Drivetrain Choice	Age Group	B (Coeff.)	p-value	Exp(B) (OR)	Result
BEV	18–24	2.710	**<0.001**	15.027	Extremely significant
	25–34	2.552	**<0.001**	12.833	Extremely significant
	35–44	1.551	**0.152**	4.714	Not significant
	45–54	-.108	**0.875**	0.898	Not significant
	55+	0.0			-
PHEV	18–24	-1.887	**0.497**	1.650	Not significant
	25–34	.501	**0.726**	0.733	Not significant
	35–44	-.310	**0.089**	6.600	Not significant
	45–54	.229	**0.753**	1.257	Not significant
	55+	0.0			-

Table 9: Multinomial Logistic Regression Results for Age by Drivetrain Choice

As can be observed, two p-values were below 0.001 (extremely significant). These findings demonstrated that respondents aged 18–24 were approximately 15 times more likely to choose a BEV over an ICE drivetrain, while those aged 25–34 were nearly 13 times more likely to do so. No other age group differences (35–44 or 45–54) were statistically significant in predicting BEV preference, nor were any differences significant for PHEV preference across all age groups.

Therefore, the null hypothesis was rejected for BEV preference among the 18–34 age group, indicating a significant relationship between younger age and BEV preference. For all other age groups and PHEV preferences, the null hypothesis was not rejected.

In other words, the results suggested that younger participants (ages 18–34) showed a strong and significant preference for fully electric supercars compared to older participants, particularly those aged 55 and above. Conversely, older age groups (55 and above) had a relatively stronger preference for traditional ICE drivetrains. This generational divide highlighted a broader shift toward electrification and technological openness among younger consumers within the luxury automotive market.

Within the framework of IDT (Rogers, 2003), these results may indicate that younger individuals had a lesser inclination for loss of ICE technology and stronger motivations to adopt BEVs at an early stage of market diffusion. By recognising younger demographics as potential early adopters, supercar brands thus have an opportunity to accelerate BEV acceptance through targeted strategies that capitalise on this group's influence on market dynamics.

4.2.6.2 Drivetrain Preference and Supercar Interest

Considering the prior crosstabulation and regression analysis on age and drivetrain preference, we understood that individuals opting for BEVs were primarily from younger demographics, with over 70% of respondents aged 18–34 favouring BEVs. Consequently, when analysing the relationship between drivetrain preference and interest in supercars, it was essential to recognise that the age distribution of BEV adopters might affect the results.

Nonetheless, the multinomial logistic regression examining the level of interest in supercars and drivetrain preference revealed statistical significance:

- Model Chi-Square = 19.631, df = 8, p = .012

The detailed results are as follows:

Drivetrain Choice	Level of Interest in Supercars	B (Coeff.)	p-value	Exp(B) (OR)	Result
BEV	Not at all	2.347	<0.001	10.450	Extremely significant
	Slightly interested	1.846	0.005	6.333	Significant
	Moderately interested	1.335	0.022	3.800	Significant

Very interested	1.740	0.002	5.700	Significant
Extremely interested (ref.)	0.000	—	—	Reference

Table 10: Multinomial Logistic Regression Results for Supercar Interest Level by Drivetrain Choice

Specifically, the results indicated that the less interested individuals were in supercars, the more likely they were to prefer an electric drivetrain over a traditional ICE. For instance, respondents who reported no interest in supercars were significantly more likely to prefer BEVs. Other levels of interest also showed significant associations, although with lower odds ratios (Appendix 5).

4.2.6.3 Importance of Engine Sound and Drivetrain Preference

A similar regression procedure was conducted using the importance of engine sound as the independent variable, which also yielded a statistically significant model (see Appendix 6).

- Model Chi-Square = 24.011, df = 8, p = .002;

The detailed results are as follows:

Drivetrain Choice	**Importance of Engine Sound**	**B (Coeff.)**	**p-value**	**Exp(B) (OR)**	**Result**
BEV	Not at all important	2.043	0.012	7.714	Significant
	Slightly important	1.232	0.039	3.429	Significant
	Moderately important	1.232	0.026	3.429	Significant
	Very important	1.213	<0.001	3.365	Extremely Significant
	Extremely important (ref.)	0.000	—	—	Reference
PHEV	Very important	1.875	0.007	6.519	Significant

Table 11: Multinomial Logistic Regression Results for Importance of Engine Sound by Drivetrain Choice

The result showed a clear trend: as the perceived importance of engine sound decreases, the likelihood of preferring BEV over ICE increases. Moreover, while only a small percentage of respondents rated engine sound as "not at all important" (5.5%), this group displayed the least

attachment to ICE drivetrains. In the PHEV category, respondents who rated engine sound as "very important" were significantly more likely to prefer PHEVs over ICE (p = .007).

4.2.6.4 Formula 1 Interest and Drivetrain Preference

Another hypothesis tested was whether individuals who watch Formula 1 (F1) are more likely to prefer ICE over BEV supercars. However, the null hypothesis, which stated that there is no significant relationship between F1 viewership and drivetrain preference, could not be rejected because the model was not statistically significant (Model Chi-Square = 1.780, df = 4, p = .776; see Appendix 7).

4.2.6.5 Net Worth Drivetrain Preference

With net worth as the independent variable, the multinomial logistic regression model demonstrated statistical significance (Appendix 8):

- Model Chi-Square = 128.912, df = 10, p < .001

The detailed results are presented below:

Drivetrain Choice	**Net Worth Category**	**B (Coeff.)**	**p-value**	**Exp(B) (OR)**	**Result**
BEV	Less than €10,000	6.431	<0.001	621.000	Extremely significant
	€10,000–€49,999	2.930	<0.001	18.720	Extremely significant
	€50,000–€99,999	1.281	0.330	3.600	Not significant
	€100,000–€249,999	1.792	0.189	6.000	Not significant
	€250,000–€999,999	2.043	0.041	7.714	Significant
	€1 million or more (ref.)	—	—	—	Reference

Table 12: Multinomial Logistic Regression Results for Net Worth by Drivetrain Choice

The results revealed that respondents with an estimated net worth of €1 million or more were significantly less likely to choose BEVs compared to those with a net worth below €10,000. This suggested that higher net worth individuals might exhibit a stronger preference for traditional ICE vehicles, potentially indicating a lower influence of sustainability or innovation considerations when selecting a supercar. However, as identified earlier, older individuals also tended to possess greater net worth and demonstrated a stronger attachment to ICE drivetrains. Thus, given the strong positive correlation between age and net worth (r =

.765), it is plausible that the observed relationship between higher net worth and ICE preference might be partially mediated by age. Furthermore, although statistically significant relationships were observed for certain net worth categories, it is important to note that the small number of respondents in middle-range net worth groups might limit the robustness of these specific estimates.

4.2.6.6 Emotional connection to V8/V12 and Drivetrain Preference

The final independent variable examined in relation to drivetrain preference was the emotional connection to loud engine sounds (V8 and V12). This regression model demonstrated the strongest explanatory power among all tested models, as indicated by the Nagelkerke R^2 value of 0.588 (Appendix 9). This suggested that up to 58.8% of the variance in drivetrain preference could be explained by respondents' emotional connection to loud engine sounds. The overall model was statistically significant ($p < .001$).

- Model Chi-Square = 149.539, df = 8, $p < .001$

The detailed results are presented below:

Drivetrain Choice	**Emotional Connection to Loud Engine**	**B (Coeff.)**	**p-value**	**Exp(B) (OR)**	**Result**
BEV	Not at all	5.519	<0.001	249.417	Extremely significant
	Slightly	4.210	<0.001	67.357	Extremely significant
	Moderately	2.887	0.001	17.937	Significant
	Very	1.733	0.036	5.655	Significant
	Extremely (ref.)	0.000	—	—	Reference

Table 13: Multinomial Logistic Regression Results for emotional connection to V8-12 by Drivetrain Choice

These results revealed a strong inverse relationship: as emotional connection to loud engine sounds decreased, the likelihood of preferring a BEV over an ICE increased drastically. Respondents who reported no emotional connection to loud engines were approximately 249 times more likely to choose a BEV than those with an extreme connection. Similar to the previous model analysing the importance of engine sound, this finding again highlighted the central role of auditory experience and the significance of sound design in future BEV strategy, a topic we will further explore in the next chapter.

4.2.7 Ordinal Logistic Regression

The study examined whether participants' interest in unique futuristic BEV sounds (Q17) could be predicted by factors such as age (Q24), net worth (Q27), the importance of engine sound (Q14), and emotional connection to loud V8/V12 engine sounds (Q15).

4.2.7.1 Futuristic BEV Sound

An ordinal logistic regression was conducted because the dependent variable Q17 is ordinal, as are the independent variables Q24, Q27, Q14, and Q15. The overall model was statistically significant:

- Model Chi-Square = 123.765, df = 18, $p < .001$
- Nagelkerke $R^2 = 0.531$

As shown in Appendix 10, the results indicated that younger participants (particularly those aged 18–34), individuals placing less importance on traditional ICE sound, those less emotionally attached to loud engines, and participants with lower net worth (especially under €250,000) were significantly more likely to favor futuristic BEV sounds ($p < .001$). Gender was not a significant predictor ($p = .127$).

These findings aligned with interview insights, particularly from Expert G4, emphasising that younger, less traditionally attached, and less affluent consumers were more receptive to innovative sonic branding strategies. Moreover, from a brand personality perspective (Aaker, 1997), if a company failed to develop distinct and futuristic BEV sounds and instead replicated ICE sounds, which the clear majority of respondents disliked (see **Figure 21**), it risks undermining the brand's *sincerity* by appearing inauthentic. Furthermore, shifting from traditional ICE engine sounds to futuristic BEV sounds might influence other personality dimensions, potentially reducing *ruggedness* and *excitement* while enhancing *competence* traits such as intelligence, innovation, and adaptability. Therefore, changing the sound features of supercars could be beneficial depending on the target audience, the brand's long-term vision, and the careful balance of personality traits that shape brand identity and equity.

It is important to notice that due to some response options having very few respondents, statistical significance could be challenged (further discussed in Chapter 5.2). As a result, the findings should be viewed as general trends rather than precise estimates.

5 Conclusion

5.1 Main Findings

This thesis explored how European supercar manufacturers can comply with the EU's 2035 zero-emission target while preserving brand identity and consumer appeal. By triangulating insights from the literature, expert interviews, and consumer survey data, several key findings emerged.

A consistent theme across all sources was that the technological feasibility of BEVs in the supercar segment is no longer in question. Instead, the primary challenges lay in the emotional and symbolic dimensions of these vehicles. Experts emphasised that the sensory experience, particularly engine sound, remains central to supercar brand identity. Survey results reinforced this view, showing that a majority of respondents rated engine sound as very or extremely important, while younger consumers (18–34) displayed significantly greater openness to BEVs and futuristic soundscapes. In contrast, older consumers (55 and above) expressed a stronger attachment to traditional ICE characteristics, especially engine sound.

Underlying these challenges is the imperative to preserve brand equity. The study showed that protecting brand identity elements such as sound, exclusivity, and craftsmanship while further exploring aspects like innovation, lifestyle, and sonic branding is critical not only for consumer appeal but also for sustaining brand equity in the face of technological change.

The literature emphasised that while e-fuels have emerged as a promising long-term niche solution, their high costs, limited availability, and energy inefficiency raise serious concerns about scalability, especially given the "green premium" they currently command. Notably, the survey revealed strong consumer interest in e-fuels, highlighting the importance of closing the cost gap to support future adoption. Meanwhile, experts further underscored that hybrid systems are an essential transitional technology, helping preserve brand heritage and manage consumer expectations over the next decade.

Finally, regulatory uncertainty has emerged as a key concern. While EU policymakers acknowledged the importance of niche exemptions, industry experts have called for greater flexibility to safeguard the economic and cultural value of the supercar segment. Much will depend on the policy review planned for the end of 2026.

5.1.1 Theoretical Implications

This research enhances the literature on technology adoption, brand management, and strategic management by applying established theories in a niche luxury context. The findings reinforced the relevance of the Technology Acceptance Model (TAM) in explaining consumer openness to BEVs, demonstrating that perceived usefulness and emotional compatibility are decisive factors (Davis, 1993).

While younger consumers (18–34) in this study showed significantly greater openness to BEVs and innovation, it is important to distinguish between general openness and the specific 'early adopter' category described in Rogers' Diffusion of Innovation Theory, which typically comprises a smaller segment (Rogers, 1962). Nevertheless, this younger demographic likely included a significant share of early adopters whose preferences could accelerate the diffusion of BEVs within the supercar segment. Provided that supercar brands can effectively address branding and product challenges as technology matures, the presence of these early adopters signaled that the adoption of sustainable supercars was likely to continue and expand.

Moreover, as BEVs become a necessity and technology advances, the study extended Aaker's (1996) Brand Identity Model and Keller's (1993) brand equity framework by emphasising the need for brand reinvention, particularly through sensory elements like sound, which strongly shape emotional attachment in the luxury automotive sector. In this context, a well-defined brand identity is essential for building brand equity and maintaining the competitive edge of supercar manufacturers. In other words, these findings expanded these frameworks by demonstrating that in luxury sectors like supercars, symbolic and emotional components are crucial for sustaining brand equity. Without effectively transferring exclusivity and sound elements to BEV models, manufacturers risk eroding the added value and customer loyalty that define brand equity.

The results also aligned with the Dynamic Capabilities framework, highlighting how firms must reconfigure both technological resources and symbolic assets to sustain competitive advantage in rapidly changing environments (Barreto, 2010; Teece et al., 1997).

5.1.2 Practical Implications

For practitioners, this study offers several actionable insights. Supercar manufacturers should prioritise creating authentic and distinctive electric soundscapes instead of merely replicating ICE acoustics, as consumers demonstrate openness to innovation when it feels genuine.

Careful brand reinvention should focus on preserving core symbolic elements such as exclusivity, craftsmanship, and design, while integrating sustainability and cutting-edge technology. Targeted strategies aimed at younger individuals may be crucial, as this demographic shows stronger preferences for BEVs and openness to futuristic experiences. Similar to high-end watches, supercar brands could shift their positioning toward tech-luxury or lifestyle branding, creating opportunities to expand into holistic brand experiences, including lifestyle, fashion, and experiential offerings.

Notably, the success of both BEVs and alternative fuels like e-fuels depends on technological maturity. Without significant investment and innovation, e-fuels are unlikely to become a viable large-scale solution in the near future. Therefore, open innovation (Ramirez-Portilla et al., 2017) will be crucial, as accelerating technological breakthroughs will require close collaboration among manufacturers, SMEs, engineers, and policymakers. Industry leaders should prioritise strategies that not only adapt product offerings but also actively reinforce brand equity. This includes investing in innovation that delivers emotionally resonant and distinctive experiences, ensuring that the brand's premium status and market power are preserved.

For policymakers, the findings underscored the necessity of balancing environmental targets with the economic and cultural importance of the supercar segment, particularly regarding niche exemptions and support for alternative technologies such as e-fuels.

5.2 Limitations

While this study offerred valuable insights, several limitations must be acknowledged, particularly regarding potential selection biases from relying on expert interviews and survey responses (Heckman, 1979). First, due to the niche nature of supercar ownership and resource constraints, the survey depended on hypothetical ownership scenarios rather than sampling actual supercar owners. While this approach still provided useful insights into brand identity, hedonic preferences, and innovation adoption, it might not fully reflect the views of high-net-worth individuals.

The self-reported online survey data might also contain response inconsistencies (Bryman, 2016). The sample was skewed toward younger respondents (63.8% aged 18–34, with 70% preferring BEVs), which limits the generalizability to older consumers and middle-income groups. This demographic skew may have influenced the regression results, amplifying some

coefficients—an issue common in studies on WEIRD (Western, Educated, Industrialised, Rich, Democratic) populations (Henrich et al., 2010).

Additionally, some participants chose not to disclose sensitive details such as net worth or gender; these were treated as missing to avoid biasing the models. Although many regressions yielded statistically significant results, some raised warnings due to sparse data or quasi-complete separation, limiting the precision of certain estimates. Therefore, these results should be interpreted cautiously.

On the qualitative side, the expert interviews reached data saturation with over 12 participants; however, their views might not fully capture the diversity of perspectives across all manufacturers and policymakers. Although the data sensitivity of internal strategies was a limiting factor, additional interviews with employees from supercar brands would have further strengthened the analysis, as small sample sizes can introduce distortions and limit representativeness (Lin, 2018).

5.3 Future research

Future research should build on these findings by examining actual purchasing behaviour and post-purchase satisfaction among BEV supercar owners. Longitudinal studies could track how perceptions and adoption patterns evolve over time, especially as new models and technologies enter the market.

Future researchers are encouraged to engage with larger and more diverse samples to better capture the drivers of BEV adoption and brand perception. As this study focused mainly on €500,000+ supercars from Ferrari and Lamborghini, future work could also explore specific brands or other types of high-performance vehicles.

Exploring cross-cultural differences would also provide valuable nuance, as consumer attitudes toward luxury, sustainability, and innovation vary significantly across regions. Finally, further investigation into the co-creation of brand meaning, such as through experiential marketing, lifestyle integration, and sonic branding, could deepen understanding of how supercar brands can navigate the post-ICE era while maintaining emotional resonance and cultural relevance.

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Appendices

Appendix A: Outline of survey questions

Block 1: Introduction & Consent

Welcome!

This survey explores how consumers perceive the future of high-performance luxury supercars, especially about electrification, emotional appeal, and brand identity.

Note: Even if you don't own a supercar, your views are important. All answers are anonymous and the survey takes about 5–7 minutes.

Do you agree to participate?

• Yes

• No → [End survey]

Block 2: Quick Background

1. **Do you currently own a car?**
   • Yes, electric (BEV)
   • Yes, hybrid (HEV, PHEV)
   • Yes, gasoline/diesel (ICE)
   • No
2. **How would you describe your level of interest in supercars?**
   • Not at all
   • Slightly interested
   • Moderately interested
   • Very interested
   • Extremely interested
3. **Do you follow Formula 1 (F1)?**
   • Yes, regularly
   • Occasionally
   • No, not at all
4. **Do you enjoy looking at supercars on the street or online?**
   • Yes, very much
   • Yes, somewhat
   • Neutral

- Not really
- Not at all

5. **When you see a supercar, what emotion do you feel most strongly?** *(Choose one)*
   - Excitement
   - Curiosity
   - Admiration
   - Indifference
   - Envy
   - Other: _____
6. **Which of the following do you most associate with the supercar lifestyle?** *(Choose one)*
   - Private jets
   - Luxury watches
   - Fine wines and spirits
   - Luxury destinations (e.g. Monaco, Dubai)
   - Luxury real estate
   - None of the above
   - Other: _____

Block 3: Hypothetical Scenario

Imagine the following:
You are given a free supercar worth over €500,000. You must choose only one of the following options:

7. **Which type of drivetrain would you choose?**
   - Traditional ICE (gasoline engine, powerful sound and feel)
   - Fully electric BEV (ultra-fast, modern tech, futuristic experience)
   - Plug-in hybrid PHEV
8. **What is your main reason for this choice?** *(Optional)*
   - [Open-ended]
9. **If a traditional ICE and a fully electric supercar had equal acceleration and design, which one would excite you more?**
   - The loud gasoline-powered version
   - The electric version with futuristic sound and performance

- Both equally
- Neither

10. **Assuming money is no object, which supercar would you most like to own?**
    (Please drag your top choice to the top. You may rank more if you wish.)
    [Ranking / Drag-and-drop]
    - Ferrari
    - Lamborghini
    - Porsche
    - McLaren
    - Bugatti
    - Koenigsegg
    - Aston Martin
    - Pagani
    - Rimac
    - Other: _____

11. **What would be the primary reason for that choice?**
    - Driving pleasure
    - Prestige
    - Technological innovation
    - Wealth signaling
    - Emotional connection to brand
    - Design/exclusivity
    - Self-indulgence
    - Other: _____

12. **Would you be satisfied with owning one supercar, or would you prefer a collection?**
    - One is enough
    - I would prefer a collection
    - Not sure

13. **What do you consider the most important quality of a supercar?** *(Choose one)*
    - Performance (speed, acceleration)
    - Engine sound and feel

- Design/aesthetics
- Technological innovation
- Exclusivity/rarity
- Driving experience
- Brand identity

Block 4: Emotional & Brand Appeal

14. How important is engine sound in a supercar?
    - Not at all
    - Slightly important
    - Moderately important
    - Very important
    - Extremely important
15. How emotionally connected do you feel to the idea of a loud engine (V8/V12)?
    - Not at all
    - Slightly
    - Moderately
    - Very
    - Extremely
16. If an electric supercar could simulate a traditional engine sound, would it increase your interest?
    - Not at all
    - Slightly
    - Moderately
    - Very much
    - It would make a big difference
17. If an electric supercar had a unique, futuristic sound experience (not replicating ICE), would that increase your interest?
    - Not at all
    - Slightly
    - Moderately
    - Very much
    - It would make a big difference

18. Do you believe brands like Ferrari or Lamborghini can remain iconic without traditional engines?
    • Yes
    • Maybe
    • No
    • Not sure

Block 5: Technology & Sustainability

19. Which of these would you most likely support in the future of supercars? *(Select up to 2)*
    • Full electrification (BEV)
    • Hybrid powertrains
    • E-fuels (synthetic, sustainable gasoline)
    • Hydrogen fuel cells (FCEV)
    • Keeping traditional ICE engines with no changes
20. What would influence your preference the most? *(Select up to 2)*
    • Sustainability
    • Performance (speed, acceleration)
    • Engine sound
    • Charging/refuelling convenience
    • Brand reputation
    • Design
    • Innovation/technology
21. If e-fuels allowed traditional engines to become carbon-neutral, would you prefer them over electric?
    • Yes
    • Maybe
    • No
    • Not sure
22. Would you be willing to pay more for a sustainable supercar that still delivers traditional performance and emotional appeal?
    • Yes
    • Maybe

- No
- Not sure

Block 6: Priorities

23. What should supercar brands prioritise by 2035? *(Select up to 3)*
    - Maintaining sound and emotion
    - Meeting climate goals
    - Charging/refuelling innovation
    - Lightweight design and top-tier performance
    - Brand heritage and exclusivity
    - Affordability and accessibility

Block 7: Demographics

24. Age
    - Under 18 → [End survey]
    - 18–24
    - 25–34
    - 35–44
    - 45–54
    - 55+
25. Gender *(Optional)*
    - Male
    - Female
    - Other
    - Prefer not to say
26. Country of residence
    - [Drop-down or short answer]
27. What is your estimated personal net worth (excluding property you live in)? *(Optional)*
    - Less than €10,000
    - €10,000–€49,999
    - €50,000–€99,999
    - €100,000–€249,999
    - €250,000–€999,999

• €1 million or more

• Prefer not to say

Block 8: Final Thoughts *(Optional)*

28. In your own words, what would make you truly excited about the future of supercars?

    • [Open-ended]

SPSS Output

Appendix 1: Mean score – (Q2)

(Level of interest in supercars)

Statistics

Level of interest in supercars

N	Valid	222
	Missing	1
Mean		3.23
Std. Deviation		1.234

Appendix 2: Spearman correlation analysis – (Q2), (Q3), (Q14), (Q15), (Q24), (Q25), (Q27)

Correlations

			Age group	Level of interest in supercars	Do you follow Formula 1?	Importance of engine sound	Emotional connection to loud engine	Estimated net worth (excluding property)	Gender (Optional)
Spearman's rho	Age group	Correlation Coefficient	1.000	.044	-.011	.069	.430**	.765**	-.362**
		Sig. (2-tailed)	.	.520	.867	.314	<.001	<.001	<.001
		N	221	221	221	218	221	190	219
	Level of interest in supercars	Correlation Coefficient	.044	1.000	-.549**	.253**	.412**	.164*	-.132
		Sig. (2-tailed)	.520	.	<.001	<.001	<.001	.024	.051
		N	221	222	222	218	222	190	219
	Do you follow Formula 1?	Correlation Coefficient	-.011	-.549**	1.000	-.096	-.157*	-.044	.031
		Sig. (2-tailed)	.867	<.001	.	.156	.019	.550	.645
		N	221	222	222	218	222	190	219
	Importance of engine sound	Correlation Coefficient	.069	.253**	-.096	1.000	.475**	.236**	.028
		Sig. (2-tailed)	.314	<.001	.156	.	<.001	.001	.687
		N	218	218	218	218	218	188	216
	Emotional connection to loud engine	Correlation Coefficient	.430**	.412**	-.157*	.475**	1.000	.654**	-.420**
		Sig. (2-tailed)	<.001	<.001	.019	<.001	.	<.001	<.001
		N	221	222	222	218	222	190	219
	Estimated net worth (excluding property)	Correlation Coefficient	.765**	.164*	-.044	.236**	.654**	1.000	-.432**
		Sig. (2-tailed)	<.001	.024	.550	.001	<.001	.	<.001
		N	190	190	190	188	190	190	190
	Gender (Optional)	Correlation Coefficient	-.362**	-.132	.031	.028	-.420**	-.432**	1.000
		Sig. (2-tailed)	<.001	.051	.645	.687	<.001	<.001	.
		N	219	219	219	216	219	190	219

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix 3: Crosstabulation – Q7 and G24

(Drivetrain Choice by Age Group)

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Drivetrain choice in a free supercar scenario * Age group	220	98.7%	3	1.3%	223	100.0%

Drivetrain choice in a free supercar scenario * Age group Crosstabulation

			Age group					
			18-24	25-34	35-44	45-54	55+	Total
Drivetrain choice in a free supercar scenario	Traditional ICE (gasoline engine, powerful sound and feel)	Count	16	18	2	21	33	90
		% within Age group	22.5%	26.1%	33.3%	72.4%	73.3%	40.9%
	Fully electric BEV (ultra-fast, modern tech, futuristic experience)	Count	51	49	2	4	7	113
		% within Age group	71.8%	71.0%	33.3%	13.8%	15.6%	51.4%
	Plug-in hybrid PHEV (electric & gasoline)	Count	4	2	2	4	5	17
		% within Age group	5.6%	2.9%	33.3%	13.8%	11.1%	7.7%
Total		Count	71	69	6	29	45	220
		% within Age group	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Appendix 4: Multinomial Logistic Regression Results – (Q7 and Q24)

(Drivetrain Choice by Age Group)

Model Fitting Information

	Model Fitting Criteria	Likelihood Ratio Tests		
Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	103.000			
Final	31.941	71.059	8	<.001

Parameter Estimates

								95% Confidence Interval for Exp(B)	
Drivetrain choice in a free supercar scenario[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	Lower Bound	Upper Bound
Fully electric BEV (ultra-fast, modern tech, futuristic experience)	Intercept	-1.551	.416	13.885	1	<.001			
	Age group [18-24]	2.710	.505	28.767	1	<.001	15.027	5.582	40.451
	Age group [25-34]	2.552	.499	26.143	1	<.001	12.833	4.825	34.135
	Age group [35-44]	1.551	1.083	2.049	1	.152	4.714	.564	39.389
	Age group [45-54]	-.108	.686	.025	1	.875	.898	.234	3.446
	Age group [55+]	0[b]	.	.	0	.	.	.	.
Plug-in hybrid PHEV (electric & gasoline)	Intercept	-1.887	.480	15.462	1	<.001			
	Age group [18-24]	.501	.737	.462	1	.497	1.650	.389	6.992
	Age group [25-34]	-.310	.886	.122	1	.726	.733	.129	4.168
	Age group [35-44]	1.887	1.109	2.894	1	.089	6.600	.751	58.035
	Age group [45-54]	.229	.727	.099	1	.753	1.257	.303	5.222
	Age group [55+]	0[b]	.	.	0	.	.	.	.

a. The reference category is: Traditional ICE (gasoline engine, powerful sound and feel).

b. This parameter is set to zero because it is redundant.

Appendix 5: Multinomial Logistic Regression Results – (Q7 and Q2)

(Drivetrain Choice by level of interest in supercars)

Likelihood Ratio Tests

Effect	Model Fitting Criteria: −2 Log Likelihood of Reduced Model	Likelihood Ratio Tests: Chi-Square	df	Sig.
Intercept	33.693[a]	.000	0	.
Level of interest in supercars	53.324	19.631	8	.012

The chi-square statistic is the difference in −2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

Parameter Estimates

Drivetrain choice in a free supercar scenario[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B): Lower Bound	Upper Bound
Fully electric BEV (ultra-fast, modern tech, futuristic experience)	Intercept	−1.335	.503	7.055	1	.008			
	[Level of interest in supercars=1]	2.347	.650	13.015	1	<.001	10.450	2.920	37.392
	[Level of interest in supercars=2]	1.846	.656	7.916	1	.005	6.333	1.751	22.912
	[Level of interest in supercars=3]	1.335	.583	5.248	1	.022	3.800	1.213	11.907
	[Level of interest in supercars=4]	1.740	.552	9.941	1	.002	5.700	1.932	16.817
	[Level of interest in supercars=5]	0[b]	.	.	0	.	.	.	.
Plug-in hybrid PHEV (electric & gasoline)	Intercept	−2.251	.743	9.171	1	.002			
	[Level of interest in supercars=1]	.865	1.085	.635	1	.425	2.375	.283	19.924
	[Level of interest in supercars=2]	.747	1.079	.480	1	.489	2.111	.255	17.489
	[Level of interest in supercars=3]	−.191	1.047	.033	1	.855	.826	.106	6.430
	[Level of interest in supercars=4]	.983	.834	1.390	1	.238	2.672	.521	13.691
	[Level of interest in supercars=5]	0[b]	.	.	0	.	.	.	.

a. The reference category is: Traditional ICE (gasoline engine, powerful sound and feel).

b. This parameter is set to zero because it is redundant.

Appendix 6: Multinomial Logistic Regression Results – (Q7 and Q14)

(Drivetrain Choice by Importance of engine sound)

Likelihood Ratio Tests

Effect	Model Fitting Criteria: −2 Log Likelihood of Reduced Model	Likelihood Ratio Tests: Chi-Square	df	Sig.
Intercept	31.073[a]	.000	0	.
Importance of engine sound	55.084	24.011	8	.002

Parameter Estimates

Drivetrain choice in a free supercar scenario[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B): Lower Bound	Upper Bound
Fully electric BEV (ultra-fast, modern tech, futuristic experience)	Intercept	−.539	.238	5.138	1	.023			
	[Importance of engine sound=1]	2.043	.817	6.252	1	.012	7.714	1.555	38.266
	[Importance of engine sound=2]	1.232	.597	4.258	1	.039	3.429	1.064	11.050
	[Importance of engine sound=3]	1.232	.554	4.953	1	.026	3.429	1.158	10.148
	[Importance of engine sound=4]	1.213	.335	13.094	1	<.001	3.365	1.744	6.493
	[Importance of engine sound=5]	0[b]	.	.	0	.	.	.	.
Plug-in hybrid PHEV (electric & gasoline)	Intercept	−2.773	.595	21.705	1	<.001			
	[Importance of engine sound=1]	2.079	1.362	2.332	1	.127	8.000	.555	115.386
	[Importance of engine sound=2]	1.163	1.247	.871	1	.351	3.200	.278	36.839
	[Importance of engine sound=3]	.981	1.233	.633	1	.426	2.667	.238	29.901
	[Importance of engine sound=4]	1.875	.694	7.289	1	.007	6.519	1.672	25.420
	[Importance of engine sound=5]	0[b]	.	.	0	.	.	.	.

a. The reference category is: Traditional ICE (gasoline engine, powerful sound and feel).

b. This parameter is set to zero because it is redundant.

Appendix 7: Multinomial Logistic Regression Results – (Q7 and Q3)

(Drivetrain Choice by F1 viewership)

Likelihood Ratio Tests

Effect	Model Fitting Criteria: −2 Log Likelihood of Reduced Model	Likelihood Ratio Tests: Chi-Square	df	Sig.
Intercept	24.513[a]	.000	0	.
Do you follow Formula 1?	26.293	1.780	4	.776

Parameter Estimates

Drivetrain choice in a free supercar scenario[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B): Lower Bound	Upper Bound
Fully electric BEV (ultra-fast, modern tech, futuristic experience)	Intercept	.405	.264	2.367	1	.124			
	[Do you follow Formula 1? =1]	−.135	.361	.140	1	.708	.874	.431	1.772
	[Do you follow Formula 1? =2]	−.379	.348	1.186	1	.276	.684	.346	1.354
	[Do you follow Formula 1? =3]	0[b]	.	.	0	.	.	.	.
Plug-in hybrid PHEV (electric & gasoline)	Intercept	−1.386	.456	9.225	1	.002			
	[Do you follow Formula 1? =1]	−.189	.640	.087	1	.767	.828	.236	2.901
	[Do you follow Formula 1? =2]	−.642	.659	.948	1	.330	.526	.145	1.916
	[Do you follow Formula 1? =3]	0[b]	.	.	0	.	.	.	.

a. The reference category is: Traditional ICE (gasoline engine, powerful sound and feel).

b. This parameter is set to zero because it is redundant.

Appendix 8: Multinomial Logistic Regression Results – (Q7 and Q27)

(Drivetrain Choice by Net Worth)

Pseudo R-Square

Cox and Snell	.494
Nagelkerke	.607
McFadden	.405

Likelihood Ratio Tests

Effect	Model Fitting Criteria: −2 Log Likelihood of Reduced Model	Likelihood Ratio Tests: Chi-Square	df	Sig.
Intercept	25.940[a]	.000	0	.
Estimated net worth (excluding property)	154.852	128.912	10	<.001

Parameter Estimates

Drivetrain choice in a free supercar scenario[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B) Lower Bound	Upper Bound
Fully electric BEV (ultra-fast, modern tech, futuristic experience)	Intercept	-2.890	.726	15.829	1	<.001			
	[Estimated net worth (excluding property)=1]	6.431	1.021	39.685	1	<.001	621.000	83.963	4593.009
	[Estimated net worth (excluding property)=4]	2.930	.779	14.157	1	<.001	18.720	4.070	86.112
	[Estimated net worth (excluding property)=5]	1.281	1.314	.950	1	.330	3.600	.274	47.333
	[Estimated net worth (excluding property)=6]	1.792	1.364	1.725	1	.189	6.000	.414	86.973
	[Estimated net worth (excluding property)=7]	2.043	1.002	4.158	1	.041	7.714	1.082	54.977
	[Estimated net worth (excluding property)=8]	0[b]	.	.	0	.	.	.	.
Plug-in hybrid PHEV (electric & gasoline)	Intercept	-2.485	.601	17.099	1	<.001			
	[Estimated net worth (excluding property)=1]	1.792	1.364	1.725	1	.189	6.000	.414	86.973
	[Estimated net worth (excluding property)=4]	-.041	.949	.002	1	.966	.960	.149	6.170
	[Estimated net worth (excluding property)=5]	-17.745	.000	.	1	.	1.965E-8	1.965E-8	1.965E-8
	[Estimated net worth (excluding property)=6]	-17.517	.000	.	1	.	2.468E-8	2.468E-8	2.468E-8
	[Estimated net worth (excluding property)=7]	1.638	.915	3.203	1	.074	5.143	.856	30.909
	[Estimated net worth (excluding property)=8]	0[b]	.	.	0	.	.	.	.

a. The reference category is: Traditional ICE (gasoline engine, powerful sound and feel).
b. This parameter is set to zero because it is redundant.

Appendix 9: Multinomial Logistic Regression Results – (Q7 and Q15)

(Drivetrain Choice by Connection to Loud Engine Sound V8 or V12)

Pseudo R-Square

Cox and Snell	.492
Nagelkerke	.588
McFadden	.374

Likelihood Ratio Tests

Effect	Model Fitting Criteria: -2 Log Likelihood of Reduced Model	Likelihood Ratio Tests: Chi-Square	df	Sig.
Intercept	28.598[a]	.000	0	.
Emotional connection to loud engine	178.138	149.539	8	<.001

Parameter Estimates

Drivetrain choice in a free supercar scenario[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B) Lower Bound	Upper Bound
Fully electric BEV (ultra-fast, modern tech, futuristic experience)	Intercept	-3.020	.724	17.397	1	<.001			
	[Emotional connection to loud engine=1]	5.519	.839	43.222	1	<.001	249.417	48.122	1292.727
	[Emotional connection to loud engine=2]	4.210	.843	24.938	1	<.001	67.357	12.906	351.549
	[Emotional connection to loud engine=3]	2.887	.890	10.520	1	.001	17.937	3.134	102.660
	[Emotional connection to loud engine=4]	1.733	.827	4.389	1	.036	5.655	1.118	28.600
	[Emotional connection to loud engine=5]	0[b]	.	.	0	.	.	.	.
Plug-in hybrid PHEV (electric & gasoline)	Intercept	-3.020	.724	17.397	1	<.001			
	[Emotional connection to loud engine=1]	1.922	1.091	3.101	1	.078	6.833	.805	58.022
	[Emotional connection to loud engine=2]	-18.233	.000	.	1	.	1.206E-8	1.206E-8	1.206E-8
	[Emotional connection to loud engine=3]	2.327	.948	6.022	1	.014	10.250	1.598	65.761
	[Emotional connection to loud engine=4]	1.850	.819	5.110	1	.024	6.362	1.279	31.647
	[Emotional connection to loud engine=5]	0[b]	.	.	0	.	.	.	.

a. The reference category is: Traditional ICE (gasoline engine, powerful sound and feel).
b. This parameter is set to zero because it is redundant.

Appendix 10: Ordinal Logistic Regression – Q17: Q14, Q15, Q24, Q27

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	400.240			
Final	276.475	123.765	18	<.001

Link function: Logit.

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	440.550	350	<.001
Deviance	239.686	350	1.000

Link function: Logit.

Pseudo R-Square

Cox and Snell	.482
Nagelkerke	.531
McFadden	.276

Link function: Logit.

Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Threshold	[Q17_futuristic_sound_interest = 1]	-3.015	.733	16.913	1	<.001	-4.452	-1.578
	[Q17_futuristic_sound_interest = 2]	-2.017	.693	8.469	1	.004	-3.375	-.658
	[Q17_futuristic_sound_interest = 3]	-1.070	.671	2.547	1	.111	-2.385	.244
	[Q17_futuristic_sound_interest = 4]	-.030	.662	.002	1	.964	-1.327	1.267
Location	Q25_gender	.666	.437	2.323	1	.127	-.190	1.523
	[Q14_engine_sound_importance=1]	-5.796	1.190	23.710	1	<.001	-8.129	-3.463
	[Q14_engine_sound_importance=2]	-3.158	.798	15.681	1	<.001	-4.721	-1.595
	[Q14_engine_sound_importance=3]	-1.798	.808	4.948	1	.026	-3.382	-.214
	[Q14_engine_sound_importance=4]	-.580	.508	1.301	1	.254	-1.576	.417
	[Q14_engine_sound_importance=5]	0[a]	.	.	0	.	.	.
	[Q15_emotional_engine_connection=1]	2.913	.791	13.572	1	<.001	1.363	4.463
	[Q15_emotional_engine_connection=2]	1.737	.811	4.587	1	.032	.147	3.327
	[Q15_emotional_engine_connection=3]	.009	.845	.000	1	.991	-1.648	1.666
	[Q15_emotional_engine_connection=4]	-.619	.502	1.520	1	.218	-1.602	.365
	[Q15_emotional_engine_connection=5]	0[a]	.	.	0	.	.	.
	[Q24_age=2]	2.461	1.122	4.811	1	.028	.262	4.659
	[Q24_age=3]	2.325	1.084	4.602	1	.032	.201	4.449
	[Q24_age=4]	21.297	.000	.	1	.	21.297	21.297
	[Q24_age=5]	.361	.609	.351	1	.554	-.833	1.554
	[Q24_age=6]	0[a]	.	.	0	.	.	.
	[Q27_net_worth=1]	-2.680	1.194	5.035	1	.025	-5.021	-.339
	[Q27_net_worth=4]	-3.845	1.130	11.578	1	<.001	-6.060	-1.630
	[Q27_net_worth=5]	-5.486	1.529	12.871	1	<.001	-8.484	-2.489
	[Q27_net_worth=6]	-3.731	1.429	6.821	1	.009	-6.531	-.931
	[Q27_net_worth=7]	-.896	.673	1.774	1	.183	-2.216	.423
	[Q27_net_worth=8]	0[a]	.	.	0	.	.	.

Link function: Logit.

a. This parameter is set to zero because it is redundant.

Appendix A: Expert interviews

Interview scripts

The questions below outline three distinct interview guides, each customised to the specific background of the experts. While the overall structure remains consistent, the script adapts based on each expert's depth of knowledge and area of specialisation to elicit the most relevant and insightful responses.

Interview script 1: Supercar Manufacturers

1. Electrification Strategy

- Could you outline your brand's current plans and approach to electrification? What factors drive these decisions?
- What are the biggest challenges your firm faces in transitioning to EU net zero targets?

2. Brand Identity & Emotional Appeal

- How important are factors like engine sound and mechanical feel to your brand's identity?
- How do customers perceive the shift towards electrification in the supercar segment?
- How is your firm developing artificial engine sounds?
- How do you think consumers will respond to an electric supercar that is quieter and relies on artificially generated sounds?

3. E-Fuels & Alternative Solutions

- What do you believe are the most significant technical challenges in transitioning high-performance supercars from ICE to BEV?
- Which emerging technologies are the most promising for meeting high-performance requirements while reducing emissions?
- Will it be feasible for companies to utilise E-fuels or hydrogen in the future?

4. Post-2035 Product Lineup

- How do you envision your supercar lineup after 2035?

Interview script 2: Automotive Experts

1. General Perspective

- In general, from your point of view, what are the most critical challenges in achieving the EU's 2035 zero-emission target?
- How do you envision the supercar segment evolving under these regulations?

2. Technology & Innovation

- What are the most critical technical challenges in transitioning high-performance supercars from internal combustion engines to battery electric vehicles?
- Which emerging technologies are the most promising?
- Will it be feasible for companies to utilise e-fuels or hydrogen in the future?
- What can supercar brands do to harness the potential of alternative fuels?

3. Brand & Consumer Behaviour

- In your experience, how do consumers perceive the shift toward electrified or alternative fuels in the supercar segment?
- How do you think consumers will respond to an electric supercar that is quieter and relies on artificially generated sounds?
- What role do brand heritage and emotional appeal play in adoption?
- How critical are elements such as engine sound and mechanical feel?

4. Future Outlook

- Looking toward 2035 and beyond, what significant developments or disruptions do you foresee in this segment?
- Is the future Green, yellow or red (BEV, PHEV or ICE)?
- If you could suggest a key policy or technological change, what would it be to enable a smoother transition?

Interview script 3: EU Policymakers

1. Policy Rationale for Supercars

- What core principles guide EU zero-emission policies, particularly in niche segments like supercars?

- Could you clarify the specific derogations or exemptions applicable to low-volume supercar brands?
- Do you anticipate further policy adjustments, or are these targets completely fixed?

2. **E-Fuels & Hydrogen**

- Which emerging technologies are the most promising for meeting high-performance requirements while reducing emissions?
- What kind of timelines and cost reductions might be necessary before these technologies become mainstream for supercars?
- Will it be feasible for companies to utilize E-fuels in the future instead of BEVS?
- What can supercar brands do to harness the potential of alternative fuels?
- How can the EU support R&D in alternative fuels or battery technology to meet the 2035 targets?

4. **Future Regulations & Global Competition**

- Is there a risk that overly strict regulations might drive automakers out of the EU?

Summary of interview G1

Profile G1:

The interviewee is a mechanical engineer with extensive experience in the automotive industry, particularly in the development of combustion and hybrid systems. With professional experience at major global automotive and consulting firms, the interviewee offers a strategic and technical perspective on the challenges faced by the supercar segment in navigating the transition to zero-emission mobility by 2035.

Technology & Innovation (G1)

The interviewee highlights that, from a purely technological standpoint, high-performance battery electric vehicles are already feasible. Leading supercar brands possess the technical capacity to deliver exceptional acceleration and performance through BEV platforms, as demonstrated by models such as the Lotus Evija. However, key challenges remain. First, battery mass and energy density still constrain sustained high-performance driving, differentiating BEVs from their internal combustion engine counterparts. Second, electric powertrains tend to feel less distinctive, potentially reducing brand differentiation and giving rise to a “commodity feel” across models.

Regarding alternative solutions, the interviewee expresses skepticism about the widespread use of e-fuels in the automotive sector, suggesting their more likely deployment in aviation. Although technically possible, e-fuels and hydrogen combustion engines are expected to remain less efficient than BEVs due to inherent thermodynamic limitations. While hydrogen fuel cells offer relatively higher efficiency, they are not viewed as a transformative solution for the supercar segment. Ultimately, the interviewee contends that alternative fuels will encounter significant challenges, and choosing them would necessitate sacrificing energy efficiency for other forms of value.

Regulatory Environment (G1)

The interviewee observes that regulatory frameworks play a decisive role in shaping industry trajectories. EU targets and the potential phase-out of ICE vehicles effectively create a "compliance boundary" within which automakers must operate. If ICE vehicles are banned, the interviewee suggests that brands will have no choice but to transition to BEVs. He also notes that regulatory exemptions for ultra-low-volume manufacturers (e.g., <1,000 vehicles/year) may allow some niche ICE production to continue, but such provisions are unlikely to affect mainstream supercar brands such as Ferrari and Lamborghini.

Brand & Consumer Behaviour (G1)

A central contribution of the interviewee is his emphasis on the emotional and perceptual dimensions of supercar ownership. He argues that while BEVs can technically match or surpass ICE vehicles in acceleration, they lack key emotional attributes traditionally associated with supercars, such as engine sound, mechanical feel, and manual gearboxes. These elements have historically played an oversized role in shaping consumer loyalty and brand identity.

He underscores that consumers, particularly older demographics, have developed affective attachments to the sensory and mechanical characteristics of ICE vehicles. Consequently, the shift toward BEVs necessitates either cultivating a younger demographic less attached to combustion-era attributes or "retraining" existing consumers to find emotional engagement in new domains. The interviewee is personally skeptical of artificial sound solutions (sonic branding) but acknowledges that some consumers may embrace new, futuristic soundscapes, such as those exemplified by the Porsche Taycan.

Future Outlook (G1)

Looking toward 2035 and beyond, the interviewee anticipates that supercar brands will need

to engage in a profound redefinition of their value propositions. While brands have the technological means to achieve full BEV lineups, their long-term success will depend on their ability to redefine luxury and performance in ways that resonate emotionally with consumers. This may involve emphasizing futuristic design, acceleration, and exclusivity rather than relying on traditional combustion-related cues. The interviewee also cautions that the sector's future will be shaped not only by technological capacity but also by consumer preferences, regulatory frameworks, and the broader geopolitical context.

Summary of interview G2

Profile G2

The interviewee is a strategic consultant and investment professional with expertise in alternative assets, mobility innovation, automotive retail, luxury markets, and strategic brand positioning. He has worked closely with premium car manufacturers and offers deep insight into supercar consumer behavior, emerging propulsion technologies, and EU regulatory adaptation.

Technology & Innovation (G2)

The respondent identifies the key challenge as the loss of sensory and emotional elements—such as engine sound and mechanical feel, when transitioning supercars from ICE to BEV, which risks alienating core enthusiasts. While BEV technology is feasible, it is widely perceived as commoditized, lacking the exclusivity expected in the supercar segment. Synthetic e-fuels are seen as promising but likely to remain niche due to limited production and high costs. Hydrogen is considered more relevant for heavy-duty sectors, while PHEVs may serve as a temporary compromise. Supercar brands could explore alternative fuels in track programs or special editions, but broad application is unlikely without regulatory and industrial backing.

Regulatory Environment (G2)

The respondent anticipates that EU regulations may soften or include exemptions, particularly under political pressure from countries like Germany and Italy, given the symbolic and economic importance of supercar brands. He expects adjustments in the definition of "zero-emission" to potentially accommodate plug-in hybrids and synthetic fuels, especially as geopolitical and economic pressures grow.

Brand & Consumer Behaviour (G2)

According to the respondent, supercar brand identity is tightly linked to ICE-specific attributes, making electrification a threat to emotional appeal and consumer loyalty. While some consumers may accept BEVs, their association with mass-market products undermines the luxury image. The respondent is skeptical of artificial engine sounds, favoring an emphasis on the natural acoustic and performance qualities of BEVs. He warns that differentiation between BEV supercars will be challenging, risking homogenization across brands.

Future Outlook (G2)

The respondent predicts that Ferrari and Lamborghini will survive the transition by focusing on ultra-luxury, low-volume production, bespoke design, and brand experiences. Smaller brands like Lotus, McLaren, and Alfa Romeo may struggle without strong financial or technological backing. To remain competitive, supercar brands will need to redefine emotional appeal and distinctiveness beyond pure performance.

Summary of interview G3

Profile G3

The interviewee is a senior technical advisor in the electrofuel sector with extensive experience in fuel production, including methanol and synthetic fuels. His current role focuses on developing large-scale electrofuel production facilities, primarily for maritime and heavy transport applications, while exploring the broader potential of green methanol for other sectors, including the automotive industry.

Technology & Innovation (G3)

The respondent identifies e-fuels, particularly methanol and synthetic fuels, as promising technologies for reducing emissions in high-performance vehicles. While BEVs are gaining market share, he highlights that e-fuels may better address the performance and sensory demands of the supercar segment. However, he emphasizes that significant challenges remain: high production costs, low energy density, and the technological hurdles of scaling production.

He is skeptical about the viability of hydrogen for passenger vehicles due to its technical complexity, including issues of leakage, corrosion, and high-pressure storage. Instead, the respondent advocates for a hybrid approach, combining electric drivetrains with e-fuels as a

transitional solution. He views plug-in hybrids utilizing e-fuels as particularly promising, as they can reduce overall fuel demand, allow for partial electrification, and preserve key performance characteristics. This approach may offer supercar manufacturers a way to balance regulatory compliance, cost, and brand identity.

Regulatory Environment (G3)

The interviewee expresses concerns about the realism of the EU's 2035 zero-emission targets, warning that without flexibility or phased adjustments, these regulations may have severe socio-economic consequences, including job losses and market disruptions. He anticipates that political and industrial pressure will lead to adjustments, possibly through exemptions or the inclusion of low-carbon fuels within the regulatory framework.

Future Outlook (G3)

The respondent anticipates that by 2035, hybrid solutions using e-fuels will play a dominant role in the supercar segment. He does not see a fully electric or hydrogen-driven future as realistic in the near term. Instead, he envisions that partnerships between automakers, fuel producers, and energy companies will be essential to scaling production, reducing costs, and adapting vehicle platforms to alternative fuels. He stresses the importance of pragmatic, incremental progress over rigid adherence to long-term targets, predicting that a combination of electrification and green fuels will define the sector's pathway forward.

Summary of interview G4

Profile G4

The interviewee is a senior brand advisor at a globally renowned branding and communications agency and a lecturer in brand management at Lund university. With extensive experience in branding across both private and public sectors, including the global launch of the Bluetooth brand, the interviewee brings a unique perspective at the intersection of technology, innovation, and brand strategy. His expertise focuses on the emotional and symbolic dimensions of brands, including the role of identity, symbolism, and consumer behavior in shaping market success.

Brand & Consumer Behaviour (G4)

The interviewee offers an in-depth reflection on the importance of brand heritage, identity signaling, and consumer psychology in the supercar market. He argues that supercars are not

primarily purchased for functional performance but as symbols of status, success, and exclusivity. This identity-signaling function is deeply intertwined with sensory and emotional elements, such as engine sound, mechanical feel, and craftsmanship.

He notes a generational divide in consumer perception: while older consumers are emotionally attached to the traditional sensory experience of combustion engines, younger consumers (including Generation Z and younger Millennials) are more open to electrification, often viewing electric supercars as innovative, futuristic, and aligned with contemporary values. Consequently, brands must shift their focus from functional and emotional benefits to "self-expressive benefits", that is, what ownership communicates about the driver (e.g., being forward-looking, progressive, and technologically sophisticated).

Moreover, the interviewee emphasizes the continued importance of scarcity and exclusivity. He warns that over-democratizing access to electric supercars (e.g., through lower price points or mass-market availability) risks eroding their symbolic value. Maintaining high price points, limited editions, and selective customer programs is seen as critical for preserving the aura of exclusivity and desirability.

Future Outlook (G4)

Looking ahead to 2035, the interviewee predicts that full electrification will dominate the supercar segment, with alternative fuels playing at best a marginal role. He highlights that the strategic challenge is not merely to comply with regulatory requirements but to reinvent the supercar myth in a way that resonates with emerging consumer values and sensibilities. Brands that succeed will be those that elevate the narrative above the powertrain, focusing on what the brand symbolizes in the electrified era.

Summary of interview G5

Profile G5

The interviewee is a Marketing strategist, author, and lecturer with expertise in brand management, identity signaling, and consumer behavior. Experienced advisor to global brands, with a background in launching internationally recognized technologies and advancing the study of branding, emotional engagement, and innovation.

Brand & Consumer Behaviour (G5)

The interviewee stresses that supercar consumers value these vehicles as showpieces, objects meant to attract attention, in which sound plays a decisive role. They express concern that electrification, by muting or eliminating the iconic sounds associated with high-performance cars, may diminish the emotional connection between brand and consumer. This poses a significant challenge to brand equity, particularly if manufacturers resort to artificial sounds that fail to achieve authenticity.

They underscore that for luxury brands, the notion of authenticity is critical. Therefore, they advise against directly imitating combustion sounds through artificial means and instead recommend developing unique, future-oriented acoustic identities that align with the BEV platform. This approach would allow brands to maintain emotional appeal and distinctiveness without undermining consumer trust or diluting brand meaning.

Future Outlook (G5)

While the interviewee refrains from making concrete forecasts about the future, they suggest that several possible trajectories could shape the supercar segment post-2035. These include the continued refinement of BEV technology, the potential political contestation of emissions targets, and the possibility of regulatory carve-outs for niche or low-volume manufacturers. They also humorously note that entirely new technological paradigms, such as flying vehicles, may become relevant, underscoring the inherent unpredictability of long-term projections in this sector.

Summary of interview G6

Profile G6

The interviewee is a strategic advisor in the energy sector with a background in industrial engineering and expertise in electrification, hydrogen, and synthetic fuels. He provides insights on energy transition technologies, market feasibility, and automotive challenges.

Technology & Innovation (G6)

The interviewee emphasizes that no single technology will deliver net-zero targets; instead, a mix of solutions will be necessary. BEVs are currently the most advanced path but face major challenges, including battery life, resale value, and supply chain dependency on China, particularly for critical minerals. Hydrogen is promising in theory but currently limited by high production costs, inefficient energy conversion, and difficult storage and transport.

Synthetic fuels, though gaining attention (especially through companies like Porsche), remain costly and niche. Biofuels face sustainability concerns linked to agricultural impacts. The interviewee anticipates hybrid solutions (combustion plus electric) in the short term, with a gradual shift to BEVs as battery technologies and infrastructure improve.

Regulatory Environment (G6)

He expects that EU climate targets may be relaxed over time, influenced by geopolitical tensions, the rise of Chinese EV makers, and the need to protect the European automotive sector, especially high-end brands with deep combustion expertise.

Future Outlook (G6)

The interviewee anticipates continued refinement of existing technologies, particularly BEVs, rather than disruptive breakthroughs. He foresees a multi-technology future, with batteries currently best positioned for success.

Summary of interview E1

Profile E1

The interviewee is a European Commission policy officer specializing in sustainable transport, with a background in physics and extensive experience in vehicle emission standards and regulatory development. He has worked on pollutant emissions, CO_2 standards, and currently contributes to files on zero-emission mobility, including battery electric, hydrogen, and synthetic fuel technologies.

Policy Rationale for Supercars (E1)

EU zero-emission policies are underpinned by long-term climate goals, aiming for a 100% reduction in CO_2 emissions by 2035. While these targets are politically firm, the interviewee notes that a 2026 policy review may introduce some flexibility or technological openness, particularly for small-volume manufacturers. Exemptions and derogations are structured to reflect the minimal market share and climate impact of niche manufacturers like Ferrari and Lamborghini. The Commission recognizes that niche producers have a limited environmental footprint, which may justify future allowances for alternative solutions such as e-fuels, especially if certified as carbon-neutral.

E-Fuels & Hydrogen (E1)

The interviewee emphasizes that e-fuels are technically feasible for ultra-niche supercars but will remain highly limited due to infrastructure scarcity and production costs—currently four to six times higher than fossil fuels. While Porsche's Chilean e-fuel project is frequently cited, such initiatives remain rare, and broader market diffusion is unlikely. He notes that e-fuels may serve occasional driving by wealthy consumers but will not address mass mobility needs. Hydrogen and fuel-cell vehicles are unlikely to play a major role in the supercar segment due to energy density, storage challenges, and performance trade-offs, although hydrogen is crucial as a feedstock for synthetic fuels. Biofuels are currently excluded from the EU's carbon-neutral framework, though they may be reconsidered during the 2026 review. The EU has provided substantial R&D support for clean technologies, including batteries, hydrogen, and fuel cells, and continues to fund innovation partnerships.

Summary of interview E2

Profile E2

The interviewee is an environmental engineer with extensive experience in the transport sector, currently working at the European Commission's DG CLIMA. Since 2020, they have overseen road mobility and CO_2 emission standards, bringing both technical and policy expertise to the discussion.

Policy Rationale for Supercars (E2)

The interviewee underscores that the EU's zero-emission targets, including the 2035 phase-out of CO_2-emitting vehicles, are not only regulatory mandates but reflect an urgent market and technological necessity. They emphasize that the policy framework is designed to provide certainty to industry actors, encouraging timely technological transitions. Although the 2035 target is presented as fixed, the interviewee acknowledges that periodic revisions are possible to accommodate technological advances or market shifts. Importantly, some flexibility exists for low-volume manufacturers, with exemptions under 1,000 units per year and differentiated treatment for niche producers like Ferrari or Lamborghini. Nevertheless, the interviewee signals that even luxury and supercar brands must increasingly align with general emissions regulations. Moreover, the EU is considering potential future derogations for vehicles operating solely on carbon-neutral fuels, though these remain under discussion. Overall, the interviewee frames the regulatory architecture as a means of safeguarding Europe's global competitiveness, rather than as a constraint likely to endanger it.

E-Fuels & Hydrogen (E2)

The interviewee views hydrogen as technically feasible but constrained by infrastructure and efficiency limits, likely remaining niche. E-fuels are seen as costly and inefficient, with limited mass-market potential but possible ultra-luxury applications. Furhermore, he states EU research funding supports both battery-electric and hydrogen technologies, though battery innovation remains the main focus.

Summary of interview E3

Profile E3

The interviewee works at DG MOVE at the European Commission and has a professional background in economics and marketing, with prior experience in the automotive sector, including at Volkswagen. At DG MOVE, their work focuses on tolling,

Policy Rationale for Supercars (E3)

The interviewee confirms that the 2035 zero-emission target is currently fixed, as communicated by EU leadership, although formal revisions remain institutionally possible through the Council and Parliament. Exemptions exist for ultra-low-volume manufacturers (under 1,000 units per year), while niche manufacturers such as Ferrari have transitional flexibilities until 2028. However, these exemptions are limited, and the broader EU regulatory framework aims to drive fleet-wide decarbonization. The interviewee identifies major challenges in meeting targets across the sector, including raw material supply chains, charging infrastructure gaps—particularly in regional areas—vehicle affordability, and global competition, especially from China.

Summary of interview S1

Profile S1:

The interviewee is an E-Mobility Manager at a leading European luxury sports car manufacturer. With over a decade of experience at the company, he provides an insider's perspective on the challenges and strategies surrounding the firm's transition toward electrification in the context of the European Union's 2035 zero-emission target. His insights are particularly valuable for understanding how high-performance automotive brands

navigate technological shifts while maintaining their distinctive market positioning and consumer appeal.

Electrification strategy (S1)

The interviewee underscores that while electrification is an inevitable trajectory for the automotive sector, the pathway remains complex and non-linear for luxury manufacturers. He notes that although the company has set ambitious electrification goals, market realities have necessitated a more adaptive approach, including maintaining a mixed portfolio of battery electric vehicles (BEVs), hybrids, and internal combustion engine (ICE) models over the coming years. Specifically, despite technological achievements such as the successful rollout of high-performance BEVs, consumer adoption has lagged, particularly in Southern European markets, due to entrenched perceptions and infrastructural limitations. The interviewee emphasizes that the success of the electrification strategy will hinge not only on product excellence but also on addressing cost barriers, especially through more competitive leasing models and improved residual value management. He also highlights the critical role of long-term consumer education and experiential familiarity with BEVs to overcome skepticism and resistance.

Brand Identity & Emotional Appeal (S1)

Maintaining the brand's emotional resonance amid technological change is a central concern. The interviewee discusses efforts to integrate artificial and even combustion-like engine sounds into BEVs to preserve the multisensory driving experience traditionally associated with high-performance sports cars. He argues that while customers may initially resist these innovations, they are likely to acclimate over time, drawing a parallel to past consumer adaptations, such as the acceptance of diesel engines. This strategy of "emotionalization" is seen as key to ensuring that BEVs continue to embody the brand's legacy of performance, exclusivity, and driving pleasure.

E-Fuels & Alternative Solutions (S1)

The interviewee expresses measured skepticism regarding the scalability of e-fuels as a viable alternative to BEVs. While recognizing the technological promise and niche applications of e-fuels (such as in motorsports), he points to their high production costs, energy inefficiency, and uncertain environmental footprint as significant barriers to large-scale adoption. He contends that even under optimistic scenarios, e-fuels are unlikely to play more than a

marginal role over the next decade and would require substantial involvement from major energy firms and coordinated policy support to achieve meaningful scale.

Post-2035 Product Lineup (S1)

Looking beyond 2035, the interviewee anticipates a continued market for ICE models, particularly in iconic segments such as the brand's flagship sports car lineup. He suggests that while BEVs will increasingly dominate, hybrids and niche ICE vehicles will persist, reflecting both regulatory flexibilities and sustained consumer demand. Importantly, he also voices doubts about the political and practical feasibility of the EU's 2035 zero-emission deadline, forecasting that a longer transitional period, potentially extending toward 2050–2070, may be required to achieve a full shift across the market.

Summary of interview S2

Profile S2

The interviewee is a senior strategic marketing manager at a leading European supercar manufacturer. Since joining the company in 2009, he has held diverse roles across sales, product planning, operations, and marketing. Currently, he plays a key role in shaping long-term brand strategy and product development, with a particular focus on ensuring that all offerings are aligned with customer needs, use cases, and emotional expectations. His perspective integrates both market and brand considerations, making him well positioned to reflect on the challenges posed by the transition to zero-emission mobility.

Electrification Strategy (S2)

The interviewee expresses considerable skepticism regarding the feasibility of achieving a 100% Battery Electric Vehicle (BEV) lineup by 2035 under current technological and infrastructural conditions. He emphasizes that BEVs today fulfill only certain use cases and fall short in others, particularly in long-distance driving (e.g., routes such as Frankfurt–Bologna), where charging limitations and travel times remain prohibitive. He predicts that, unless there is a major technological breakthrough, full BEV adoption across the entire market is unlikely in the short-to-medium term. He also suggests that the European Union's regulatory framework may need to adjust to these market realities to avoid undermining the competitiveness of the European automotive sector.

Brand Identity & Emotional Appeal (S2)

A central theme in the interview is the critical importance of emotional engagement,

particularly the role of engine sound, mechanical responsiveness, and the visceral experience of driving a supercar. The interviewee highlights that customers are not primarily purchasing the object (the car) but rather the emotional value it delivers, what he terms the “fun-to-drive” promise. While the company has successfully maintained emotional appeal with plug-in hybrid models, the transition to BEVs presents an unresolved challenge: no current BEV has succeeded in replicating the multisensory emotional experience traditionally associated with high-performance sports cars. The interviewee is cautious about the use of artificial sounds, arguing that authenticity, rather than the artificial or natural origin of the sound, is decisive. If future BEVs can deliver an experience perceived as authentic and emotionally engaging, he suggests that customers may ultimately embrace them.

E-Fuels & Alternative Solutions (S2)

The interviewee is ambivalent about the role of e-fuels as a scalable solution for the supercar segment. While acknowledging their potential to maintain combustion-engine offerings, he notes that current e-fuel technologies are too costly and insufficiently available to serve as a widespread alternative. He also expresses concern over their true sustainability, emphasizing the need to consider the full production and energy footprint. Nonetheless, he remains open to e-fuels as a potential complement to BEVs if the underlying technological and economic conditions evolve.

Post-2035 Product Lineup (S2)

The interviewee underscores that the future product lineup will be viable only if it continues to fulfill the core mission of the brand: delivering authentic, emotionally compelling sports cars. He dismisses the idea that consumers will pay a premium merely for new technologies like BEVs; instead, consumers will pay for the experiential and emotional value those technologies enable. He further stresses that the company’s future success depends on retaining authenticity and exclusivity, regardless of the propulsion system. While the brand is not oriented toward volume growth, maintaining demand at current levels (~10,000 units per year) is contingent upon successfully translating the brand’s core values into an electrified future.

Summary of interview S3

Profile S3

The interviewee is a highly experienced design engineer and entrepreneur with over 25 years of expertise in the high-performance automotive sector. Having contributed significantly to the development of several hypercar models, particularly within a niche European manufacturer, he has also worked across various segments, including electric commuter vehicles and cargo bikes, reflecting a deep commitment to sustainability and innovation.

Electrification Strategy (S3)

The interviewee highlights the technical and organizational complexities of electrifying hypercars, particularly the challenges posed by high performance requirements, battery weight, thermal management, and supply chain stability. Notably, the interviewee played a key role in developing hybrid solutions, focusing on battery integration and high-voltage systems. **Supplier instability**, including disruptions caused by competitor acquisitions, has prompted a shift toward in-house technological development to maintain performance standards and secure supply chains. He emphasizes that while electrification is advancing, it remains a slower and more resource-intensive process in the hypercar sector compared to mass-market automotive segments.

Brand Identity & Emotional Appeal (S3)

The interviewee underscores the centrality of sensory experience, engine sound, mechanical feedback, and vibration, to the emotional appeal and brand identity of supercars. Drawing an analogy with mechanical watches, he suggests that consumers value craftsmanship and exclusivity over functional utility, indicating that the unique experiential aspects of combustion-engine vehicles remain highly valued. He anticipates the integration of artificial sound and simulated gear shifts to preserve emotional engagement in electric models. However, he expresses skepticism regarding consumer willingness to pay premium prices for electric supercars, given the perception of lower production costs relative to combustion-engine counterparts.

E-Fuels & Alternative Solutions (S3)

The interviewee offers a critical view on the economic and technical viability of e-fuels and hydrogen in the context of passenger vehicles, citing inefficiencies and energy intensity. While recognizing the promise of e-fuels and hydrogen in industrial sectors such as steel production, he suggests that their application in automotive contexts is less practical. Instead, he points to biofuels, such as hydrotreated vegetable oil and flexible alcohol-based fuels (E85/E100), as more feasible alternatives for maintaining the performance characteristics

demanded by supercar consumers. Additionally, he notes that enhancing the driving experience of electric vehicles, through features like boost buttons or simulated gear shifts, may help bridge the gap in consumer acceptance.

Post-2035 Product Lineup (S3)

The interviewee anticipates a bifurcation of product strategies post-2035. While larger manufacturers may offer electric vehicles to comply with regulatory mandates, they are also likely to maintain combustion-engine models for track-only applications, where regulatory constraints are less stringent. For ultra-low-volume manufacturers producing fewer than 1,000 vehicles per year, he notes that regulatory exemptions allow greater flexibility, enabling them to focus on exclusivity and customer demand rather than strict sustainability targets. He positions forthcoming electric models, such as those from Ferrari, as crucial test cases for market reception and adaptability.

Summary of interview S4

Profile S4

The interviewee is a senior figure involved in battery development at a leading European luxury automotive brand. With a direct role in the launch of the company's first fully electric vehicles, he provides valuable insights into the technological, strategic, and consumer-related challenges of transitioning a high-performance brand toward electrification in the context of the EU's 2035 zero-emission target.

Electrification Strategy (S4)

The interviewee underscores that while battery electric vehicles can already deliver competitive power and torque, key performance attributes for supercars, they continue to lag behind internal combustion engine vehicles in terms of range and charging times. He notes that current battery chemistry limits fast-charging capabilities, with charging sessions of approximately 10–15 minutes still insufficient to match the refueling convenience of gasoline engines. As such, while the technological feasibility of BEVs for high-performance applications exists, he argues the technology remains incomplete for full-scale substitution of ICE models by 2035.

Importantly, he positions hybridization as the most viable transitional solution, emphasizing its ability to combine the benefits of electrification with the driving freedom and performance

expected by consumers. He anticipates that even with anticipated technological progress over the next decade, the electric range and charging times will remain limiting factors for the supercar segment.

Brand Identity & Emotional Appeal (S4)

The interviewee stresses that consumer attachment to ICE vehicles is deeply tied to emotional and symbolic dimensions, such as sound, driving feel, and the freedom associated with long-range travel. He highlights the importance of customization and "tailor-made" solutions in the luxury segment, noting that while some consumers are drawn to the technological novelty of BEVs, others seek experiential compromises, such as artificial sound systems, to preserve elements of the traditional driving experience.

Moreover, he emphasizes that even affluent consumers are price-sensitive and consider residual value when purchasing high-end vehicles. For many, the decision to invest in a luxury vehicle is influenced by its perceived investment potential, making price parity or premium pricing for BEVs a significant challenge.

E-Fuels & Alternative Solutions (S4)

The interviewee expresses skepticism about the widespread viability of hydrogen and fuel-cell technologies in the supercar segment, citing their weight, energy density, and packaging limitations. He regards e-fuels as a potentially promising, though still underdeveloped, niche alternative that could support compliance with emissions targets without requiring radical vehicle redesigns.

Post-2035 Product Lineup (S4)

The interviewee anticipates that hybridization will remain the primary solution through 2035, offering a "right compromise" between emissions reduction and consumer expectations. He also suggests that certain high-performance models may be granted regulatory derogations, given the niche nature of the supercar market. He points to geopolitical variation, particularly between Europe and major markets such as the United States and China, as a critical factor shaping product strategy, arguing that brands must retain multi-powertrain portfolios to remain globally competitive.