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Summary of WP Student Team

How German Automakers Must Adapt to Stay Competitive Against BYD's Strategic Approach Across the Automotive Value Chain

Group constitution:

Student Name	Program	Individual Title
Lily Gaertner	Management	How German Automakers Must Adapt to Stay Competitive Against BYD's Strategic Approach Across the Automotive Value Chain - Upstream Strategies

Work project carried out under the supervision of:

Advisor: Professor Andrew Harrison

A Work Project, presented as part of the requirements for the Award of a Master's degree in Management from the Nova School of Business and Economics.

HOW GERMAN AUTOMAKERS MUST ADAPT TO STAY COMPETITIVE AGAINST BYD'S STRATEGIC APPROACH ACROSS THE AUTOMOTIVE VALUE CHAIN

Lily Gaertner (58101)

Work project carried out under the supervision of:

Professor Andrew Harrison

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Abstract

This thesis investigates the disruptive influence of BYD’s value chain strategy on the automotive industry, focusing on its implications for German original equipment manufacturers. Through an in-depth analysis of upstream, midstream, and downstream activities, it reveals how BYD's end-to-end control drives cost leadership, accelerates innovation, and challenges the traditional model. Set against intensifying global electrification, the analysis underscores mounting competitive pressure on established automakers and shifting consumer expectations worldwide. This study argues that BYD redefines automotive value creation and concludes with strategic recommendations for German automakers: leverage ICEV cash-cow, reinvest in EV capabilities, forge an EU battery standard, and amplify brand equity.

Keywords: Automotive industry, Automotive value chain, Battery electric vehicles, BYD, Chinese cars, Electrification, German OEM challenges, Vertical integration

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III List of Abbreviations

AI	Artificial Intelligence
BEV	Battery-Electric Vehicle
COGS	Cost of Goods Sold
EV	Electric Vehicle
GDP	Gross Domestic Product
ICEV	Internal Combustion Engine Vehicle
IEA	International Energy Agency
IP	Intellectual Property
LFP	Lithium-Iron-Phosphate
OEM	Original Equipment Manufacturer
R&D	Research and Development

1 Introduction

1.1 Contextualization of the Problem

Back in a 2011 interview, a Bloomberg reporter asked Tesla's founder and CEO Elon Musk whether BYD could rival Tesla; he erupted in laughter, answering rhetorically: "*Have you seen their car?* [..] *I don't think they have a great product; the technology is not very strong*". He clearly emphasized that he does not take them seriously as competition (Bloomberg 2023). Fast-forward to today, the punchline has flipped: In 2025 CNBC posted that Chinese electric vehicle (EV) giant BYD outpaced Tesla, reaching annual sales of more than $100 billion USD. BYD also dethroned Tesla in vehicle quantities, selling approximately 100,000 more units in 2024 than Tesla's 495,000 cars sold (CarNewsChina 2025a). Bloomberg (2025a) reported: "BYD beats Tesla with Five-Minute EV Battery", referring to a new technology that can charge a battery electric vehicle (BEV) almost as fast as it takes to refuel an internal combustion engine vehicle (ICEV). The implications extend beyond Tesla to the (EV producing) German automotive Industry. The sector accounts for around 10 % of the EU manufacturing sector's gross value added and 8 % of total employment (Bencivelli et al. 2024). A structural collapse here would not just damage an industry, it would jeopardize economic prosperity and the foundation of European industrial competitiveness.

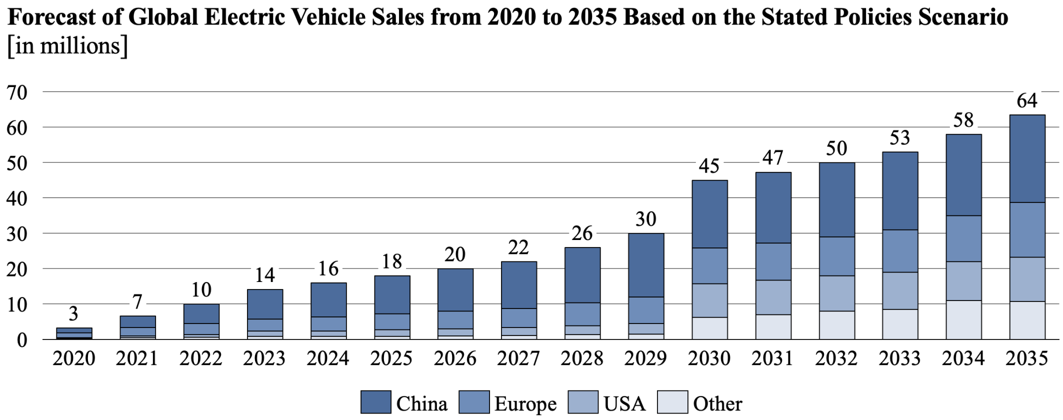

Figure 1: Outlook for Electric Mobility (Own Illustration, Source: IEA 2024a)

At the center of this transformation lies the rise of electric vehicles. With over 40 million EVs already on the road worldwide and sales surpassing 16 million units in 2024 as seen in Figure 1, the shift is unmistakable (Cui and Zhao 2024). According to the International Energy Agency (IEA) within just a few years, the global share of EVs in new vehicle sales has jumped from 4.2 % in 2020 to over 20 % in 2024 (IEA 2024b). But this transformation is not being led by the traditional automotive giants. Instead, it is driven by new players, particularly from China who have emerged since the early 2000s and are now shaking up the industry. As illustrated by Figure 2, China is the clear leader, making up over 36 % of global vehicle sales across engines in 2024 – with 12.9 million EVs sold (IEA 2024b). This solidifies its position as a dominant powerhouse in the global EV industry and is reinforced by China's control over more than half of the world's EV production (Cui and Zhao 2024).

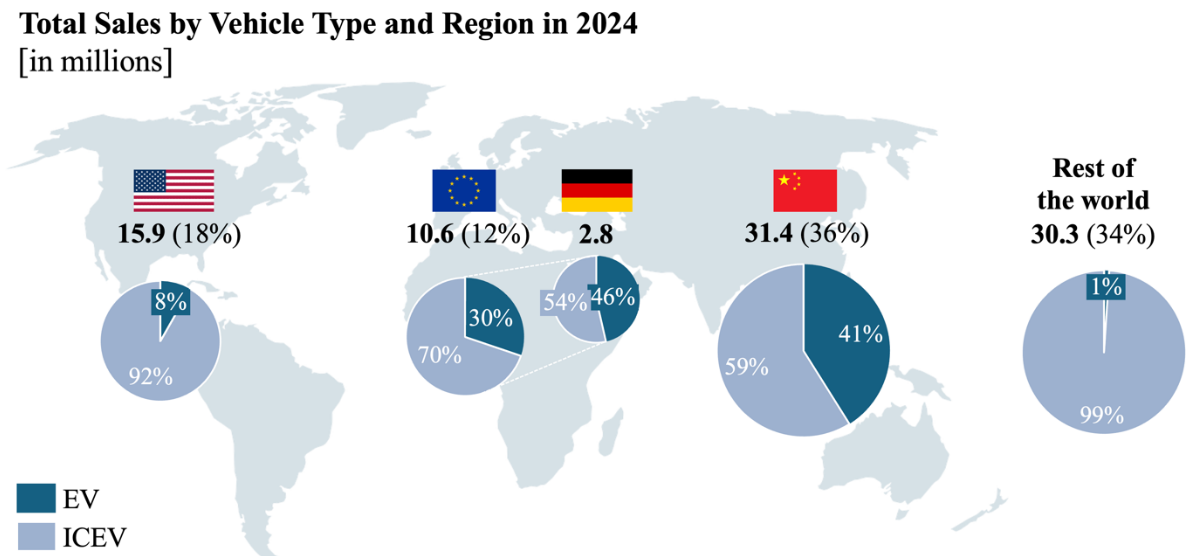

Figure 2: Total Vehicle Sales in 2024 (Own Illustration, Based on IEA 2024b)

To date, almost all big automobile companies in the world have built their branches in China, but Chinese domestic companies are the fastest in terms of development and innovation (Wang 2023). Surpassing Tesla in 2023, BYD has emerged as the undisputed leader and became the world's top EV manufacturer with a 36 % market share in China and a 22 % global share (Xu 2024). Warren Buffett, known as the world's most far-sighted investor, placed a

$232 million USD bet on BYD, acquiring a 10 % stake in 2008. This move wasn't driven by speculative hype, but rather by what he described as BYD's "capacity for innovation" (Wang & Kimble 2010). BYD differentiates itself from other original equipment manufacturers (OEM) in their integrated value chain approach, involving a vertical control with an advantage in cost and production efficiency.

This strategic edge is being closely monitored at the highest levels of the German automotive industry. A country purchasing head at BMW stated that the company is actively analyzing BYD's integrated value chain and deriving concrete takeaways for its own operations, noting that "*China is no longer copying production strategies; rather, the roles have reversed*." This candid admission signals not only a recognition of BYD's structural superiority but an urgency among German OEMs to rethink their competitive frameworks. Traditional automakers like Volkswagen, BMW and Mercedes-Benz face a mounting crisis of declining sales in China and growing threats in their local markets due to the unprecedented speed at which companies like BYD are rapidly innovating and disrupting their business models. The old rules no longer apply. Markets are fragmenting, competition is intensifying, and the battle for dominance in electric mobility is accelerating (Cui and Zhao 2024). For legacy OEMs, it is no longer a matter of incremental shifts; it is a full-scale battle for survival. The global shift to electric mobility is real and rapid, and BYD is not just pushing the envelope, it is rewriting the rules (Bencivelli et al. 2024).

1.2 Research Gap and Question

While extensive research exists on Tesla's disruptive influence in the EV market, including comparative studies between Tesla and BYD (Lin 2024; Qiu, Zhang, and Zong 2022; Xu 2024), a significant gap remains in understanding BYD's specific impact on traditional German OEMs across the automotive value chain. Current literature often narrows its focus to vertical integration or general market performance, failing to dissect how BYD's end-to-end value chain, from research and development (R&D) to manufacturing and sales, directly challenges the structural foundation of legacy automakers. This gap is particularly significant given BYD's dominant role in China, the largest EV market, and its rapid international expansion, outpacing traditional competitors in both sales volume and cost efficiency (Xu 2024). Against this backdrop, this thesis addresses the following research question:

How Must German Automakers Adapt to Stay Competitive Against BYD's Strategic Approach Across the Automotive Value Chain?

This inquiry is of immediate strategic relevance for incumbent automakers. BYD's evolution from a battery manufacturer to a global EV market leader exemplifies not just incremental innovation, but a systematic redefinition of value creation in the automotive sector. As regulatory pressure and consumer demand accelerates the shift toward electrification, traditional players face existential threats unless they rethink their legacy value chains. This study provides an assessment of BYD's disruptive model, providing actionable insights for German OEMs to ensure long-term viability.

1.3 Thesis Outline

The thesis is methodically organized. Chapter 2 provides a comprehensive overview of the current BEV market, BYD's history and market position, and introduces the automotive value chain for the subsequent analysis. Chapter 3 outlines the empirical methodology, while Chapters 4 and 5 analyze the value chain strategies of BYD, split in first upstream, and then mid- and downstream components. Within each section, all findings lead to this thesis' recommendations. Finally, Chapter 6 synthesizes the cross-chapter findings into an integrated SWOT analysis and delivers a prioritized action agenda for traditional OEMs.

2 Literature Review

2.1 The Current BEV Market: Overview and Dynamics

Driven by technological advancements and growing environmental concerns, the global EV market is expected to grow exponentially (Deng 2024). IEA (2024a) forecasts that the number of electric vehicles worldwide will reach 250 million by 2030 and 525 million by 2035, representing over 25 % of all vehicles on the roads. Annual sales are expected to reach 65 million by 2035, while the penetration rate of EVs is forecasted to exceed 50 %. According to Roland Berger (2024), electrification is a major automotive trend, with battery electric vehicles expected to reach even around 71 % of global new vehicle sales by 2040. Moreover, Spherical Insights (2024) valued the global automotive industry at $3.56 trillion USD in 2023 and Global Market Insights (2023) estimates the global battery electric vehicle (BEV) market at approximately $345 billion USD, roughly 10 % of the total market size. Though growth rates vary significantly across regions and segments.

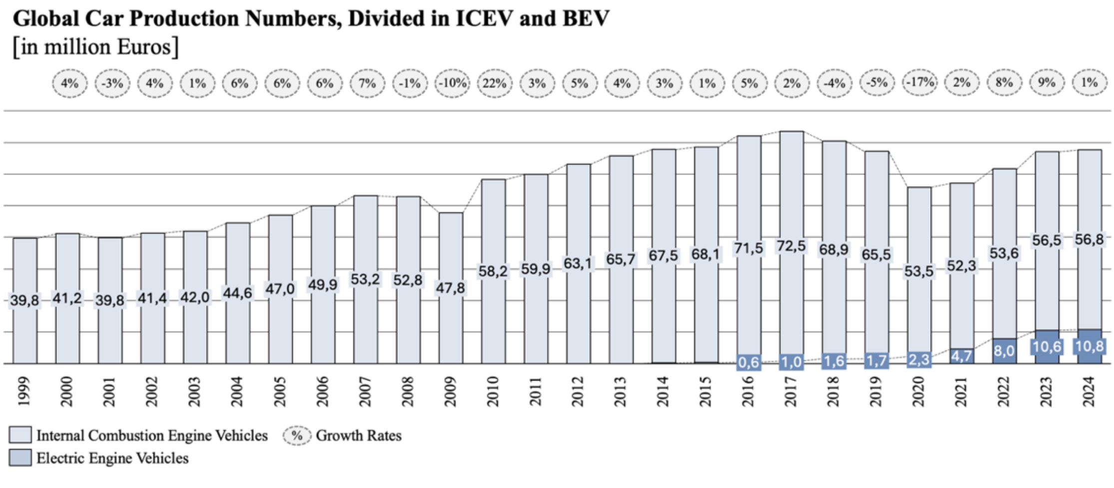

Figure 3: Global Car Production (Own Illustration, Source: CEIC Data (n.d.), Statista Electric Vehicle Share 2024)

Figure 3 shows that the global vehicle production has experienced fluctuations but illustrates an upward trend since 1999 with rising global Gross Domestic Product (GDP) per capita. The U.S. and Europe have led the global automotive industry through capital dominance and technological leadership. However, today governments are setting ambitious targets, including banning fuel cars by 2035, to achieve carbon neutrality (Deng 2024) and China has emerged as the global leader in BEV manufacturing. This growth was not organically driven but by strategic government initiatives. “What the EV’s had going for them, is that the head of ministry of science and technology was a big believer in [BEVs] and his sense was that Chinese companies were just never going to be able to compete on internal combustion engine technology” (Vox 2024). Consequently, for the first time in 2023, China surpassed Germany in exporting around 3 million vehicles compared to Germany’s 2.6 million (Vox 2024).

Traditionally, industries with high capital intensity and high operational leverage tend to be highly concentrated, as substantial entry barriers limit competition. The automotive industry historically followed this trend: The Herfindahl Index, a common measure of market concentration, yields a calculated value of approximately 1797 in 2023 (Appendix 5), indicating a relatively competitive market. However, the rise of EVs, enabled new players to enter the market, leading to increased competition. Everyone is eager to seize the opportunity, making the competitive environment more fragmented (Qiu, Zhang, and Zong 2022). The transition to electric mobility is a prime example of disruptive innovation. Companies that are quick to innovate and adapt will secure their position, while those that fail to evolve risk losing relevance. Figure 4 underscores this shift: In 2024 the well-known German manufacturers account for just over 10 % of the global BEV market in 2024, a stark contrast to their dominance in the ICEV era. Tesla ranks second globally, while BYD alone captures one-third of the total market revenue, surpassing all legacy OEMs combined. The new energy

Selected Brands BEV Market Shares, 2024
[in Percent]

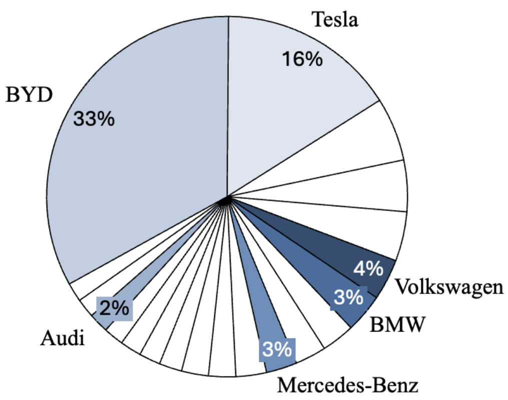

Figure 4: Market Shares (Source: Auto Vista Group 2025)

automotive industry is still in its early stages, and the low entry barriers expose incumbents to greater uncertainty and competitive threats (An 2021). Roll Call (2024) reports that these lower barriers result from requiring less components that can be delivered prepackaged as well as a much less complex supplier structure. This leads research to predict that BEV profit margins will surpass those of ICEVs, which currently rank between 6 and 13 %, driven by decreasing battery cost and increasing economies of scale (T&E 2022).

2.2 BYD's History and Market Position

BYD Company Limited, founded in February 1995 by the 29 year old Chinese battery chemist Wang Chuanfu and headquartered in Shenzhen, China, has evolved from a small battery manufacturing company into a world-class-tech enterprise and one of the major players in the electric vehicle market (Deng 2024). Originally focused on rechargeable batteries for various electronics, BYD became the world's second-largest manufacturer of nickel-cadmium batteries and quickly expanded into mobile phone batteries before venturing into the automotive sector with the acquisition of Xi'an Qinchuan Automobile in 2003 (Zheng et al. 2013).

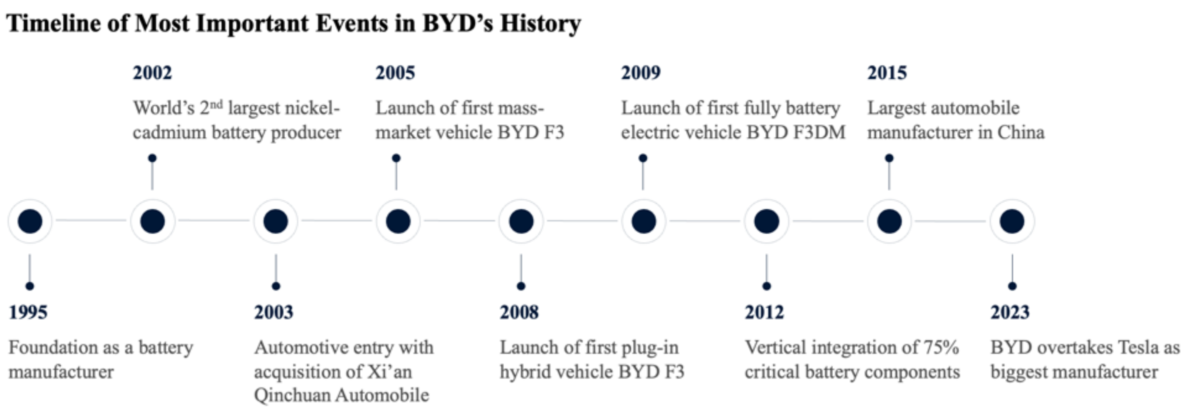

Figure 5: Timeline of Most Important Events in BYD's History (Own Illustration, Based on Cui and Zhao 2024, Lin 2024 Zheng et al. 2013, Wang 2011)

As shown in Figure 5, this move allowed BYD to launch its first mass-market vehicle, the F3, in 2005 which quickly became one of the best-selling vehicles in China thanks to its competitive pricing and similarity to the highly popular Toyota Corolla. Its development was driven by reverse engineering, a defining characteristic of BYD's early R&D strategy. By dismantling and studying existing models, particularly from Japan, BYD was able to accelerate production while significantly reducing costs by up to one-third (Wang 2011). BYD built a reputation for offering high-performance vehicles with advanced battery technology and energy efficiency at affordable prices, making electric mobility accessible to a wider range of consumers. In 2008, the company made an entry into electrification with the launch of the F3DM, its first plug-in hybrid vehicle, followed by its first battery electric vehicle, the e6, in 2009 (Cui and Zhao 2024). Today, while BYD operates across several divisions, cars remain the company's strategic focus, accounting for nearly 80 % of revenue, as seen in Figure 6.

Figure 6: BYD Revenue Share in 2024 (Source: BYD 2025)

Next to its own core brand, BYD markets premium brands such as Yangwang, Denza, and Fangchengbao (BYD Annual Report 2023) within their multi-brand strategy, which directly targets higher end brands like Mercedes-Benz and BMW from Germany. Investors have realized BYD's value quickly. Figure 7 illustrates a 704 % growth within five years, positioning BYD among the so-called "Terrific 10", China's ten leading technology companies. The Hong Kong listed shares jumped 12 % to a record high during the week of 16th March 2025 after BYD unveiled a battery that can recharge an EV in five minutes (Yahoo Finance 2025). The surge pushed the company's market capitalization to almost $162 billion USD - more than Ford, General Motors and Volkswagen combined (Bloomberg 2025b).

Figure 7: BYD Stock Price (Own Illustration, Source: Refintiv Eikon 2025)

BYD's corporate philosophy emphasizes innovation and sustainability, prioritizing cost-effective and eco-friendly solutions (He 2024). This vision leverages significant expertise in battery technology, anchored by founder Wang Chuanfu's background and BYD's global leadership in mobile phone battery manufacturing. Central to the company's strategic approach is vertical integration, enabling independent innovation throughout the value chain, as most components are self-developed and produced internally (Chen, Li, and Liu 2024). Before entering the electric vehicle market, BYD had established a strong lithium-ion battery supply chain, producing already 75 % of critical components in-house by 2012. The limited external sourcing, primarily from Chinese suppliers, further enhances cost and technological advantages (Lin 2024). This closed-loop industrial approach controls production comprehensively, driving technological innovation, reducing costs, minimizing dependence on external suppliers, and accelerating scalability (Zheng et al. 2013). A key strength is BYD's ability to innovate cost-effectively. Instead of replicating traditional automaker methods, BYD developed a semi-automatic manufacturing process combining manual and mechanical elements, lowering costs by up to 25 % compared to European competitors (Gong 2024).

2.3 Automotive Value Chain

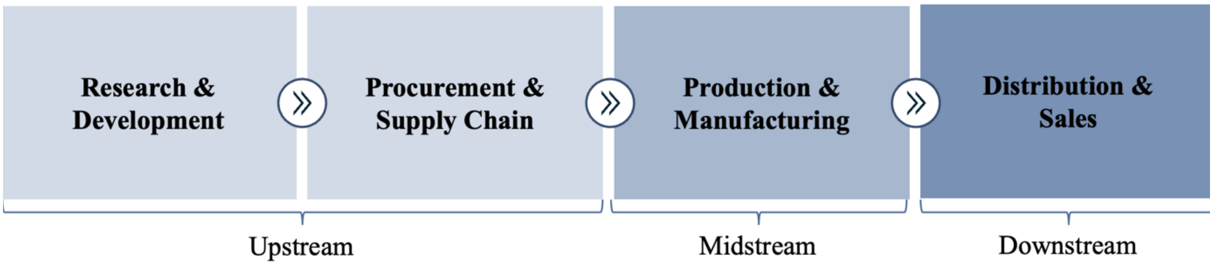

Figure 8: Automotive Value Chain (Own Illustration)

The automotive industry plays a pivotal role in driving broader economic growth, particularly in Germany, where it constitutes a cornerstone of industrial output and employment. Its multi-tiered supplier network contributes value at every stage, each level of the three-tier hierarchy represents a billion-euro industry in itself (Handelsblatt 2018). Against this backdrop, the structure and efficiency of the automotive value chain become critical levers of national economic performance. This thesis adopts the value chain framework as its analytical foundation, highlighting the key value-creating activities that underpin competitive advantage. As illustrated in Figure 8, the automotive value chain is segmented into three core stages: Upstream (R&D, procurement, and supply chain), midstream (production and manufacturing), and downstream (distribution and sales).

Today's automotive value chain is increasingly complex due to the coexistence of electric vehicles alongside traditional internal combustion engine vehicles. To maintain competitiveness, major industry players are heavily investing in upstream and midstream innovations, particularly battery technology (Xu 2024). This evolution emphasizes the strategic advantage of vertical integration, allowing companies to control all stages from material sourcing to vehicle assembly, reducing risks and enabling technological advances (Gong 2024).

3 Methodology

3.1 Choice of Method

To investigate how German automakers must adapt to stay competitive against BYD's strategic approach across the automotive value chain, this thesis employs a mixed-methods approach, as shown in Figure 9. According to psychologist Steve C. Currall "Mixed methods research involves the sequential or simultaneous use of both qualitative and quantitative data collection and/or data analysis techniques." This allows for a more comprehensive understanding of research and enables the cross-validation of data which enriches the depth of analysis through diverse perspectives and enhances the robustness of findings by integrating numerical data with detailed narrative insights (Johnson, Onwuegbuzie, and Turner 2007).

Figure 9: Research Structure (Own Illustration)

3.2 Primary Data Collection

This thesis employs expert interviews analyzed using Philipp Mayring's qualitative content analysis, a structured method designed to minimize subjective biases, enhancing credibility and consistency in qualitative research (Mayring 2015, p. 49). The coding and analysis process was conducted using MAXQDA, a software tool specializing in qualitative data analysis. The final sample includes ten individual experts from three key domains as depicted in Appendix 1, Table 2: (1) executives from BYD, including both OEM-level and retail perspectives; (2) senior professionals from established German manufacturers such as Mercedes-Benz and Volkswagen (3) consultants and partners from leading strategy firms and automotive consultancies. This targeted diversity ensures comprehensive analysis across multiple perspectives.

The sample size is limited to ten participants, aligning with the study's scope and ensuring detailed engagement with each expert. The interview guide was developed following Mayring's deductive category formation methodology, with the complete guide and interview transcripts available in Appendix 2 and 3.

Additionally, an online survey was employed to gather insights into the consumer perspective of Chinese EVs, focusing on sales and product development. Conducted via Qualtrics, a platform known for standardized survey creation, the survey employed predefined responses to enhance data consistency and reliability. In total, 136 responses were collected over a two-week period, primarily from general consumers reached through open distribution on social media. The survey followed a self-selection sampling strategy, allowing broad participation without demographic or geographic restrictions to enhance generalizability and reduce bias. A G*Power analysis based on a medium effect size ($f^2 = 0.15$), power of 0.80, and $\alpha = 0.05$ for linear regression confirmed that 136 participants met the minimum required sample size for statistically valid results. The complete survey guide is provided in Appendix 4.

3.3 Secondary Data Collection

Secondary data collection expands research by leveraging existing sources such as academic journals, industry reports, and company annual reports. Reviewing secondary data allows validation of primary findings and ensures the research is grounded in credible knowledge. The literature review consolidates existing studies on BYD's increasing influence in the global automotive sector. Databases like ResearchGate, JSTOR, Google Scholar, and consultancy reports provided academic articles and industry insights. A systematic search prioritized highly cited academic papers and reputable consultancy sources, using targeted keywords such as "BYD automotive value chain," "BYD vertical integration," and "automotive industry development" to ensure focused, relevant, and reliable findings.

4 Upstream Strategies

According to Yu (2024) the upstream value creation refers to the early-stage activities of research and development of critical technologies as well as souring of key components by suppliers. The interview experts agree that the new core competencies and future vehicle differentiation will be driven by battery and software and that OEMs must take ownership to remain competitive. Therefore, this section covers BYD's technological and strategic foundation, including its innovation approach, patent strategy, supplier relationships, and vertical integration, followed by recommendations for traditional automotive manufacturers.

4.1 Research and Development

4.1.1 Accelerated Innovation Through Focused R&D Investments

Central to BYD's rise to global prominence is a disciplined, long-term commitment to independent technological innovation. Since its founding, BYD has consistently upheld a self-reliant innovation strategy which has allowed the company to build strategic autonomy in its most critical technological domains, above all battery technology (Qiu, Zhang, and Zong 2022). Wang Jianjun, BYD's spokesperson, attributes the company's rapid growth to "all-dimensional innovation" across technology, markets, and production flows. Rather than relying on incremental improvements or external licensing, BYD focuses on end-to-end innovation patterns that prioritize internal control, cost optimization, and long-term Intellectual Property (IP) protection (Zheng et al. 2013). Over more than two decades, the company has continuously developed proprietary battery technologies that underpin its leadership in the BEV segment. BYD's R&D model accelerates time-to-market, enables rapid iteration, and shields the firm from supplier dependence that often hamper traditional OEMs (An 2021). This innovation philosophy is backed by substantial investment. In 2022 alone, BYD spent 2.52 billion EUR on R&D, a staggering 160 % increase year-over-year, as shown in Figure 11. To the expert of Interview III engineering expertise is decisive. With over 69,000 R&D personnel, the company has built one of the largest engineering teams in the global auto industry, allowing it to pursue multiple innovation streams in parallel, from batteries and drivetrains to smart software and production automation. A cornerstone of BYD's technology leadership is its patent strategy (Deng 2024). BYD's patent innovation index, quantity and intensity ranked first in China's BEV patents (Qiu, Zhang, and Zong 2022). As of 2023, the firm had filed more than 48,000 patent applications and secured over 30,000 granted patents globally, as shown in Figure 10 (Statista 2023). "*A lot of people don't believe in electric mobility, a lot of companies don't believe it, and some governments still don't believe it.*", Interviewee I begins. In contrast, thanks to BYD's long-term product vision and rapid pace of technological inno-

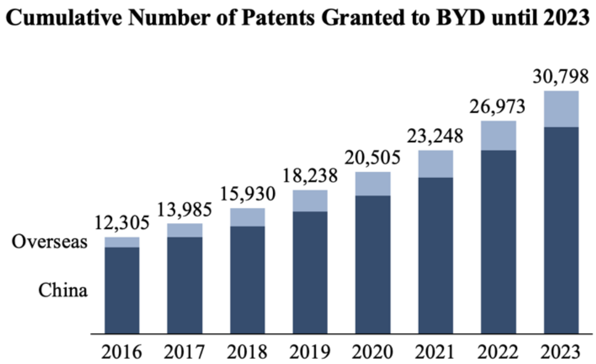

Figure 10: Cumulative Number of Patents Granted to BYD (Own Illustration, Source: BYD CSR Report 2023)

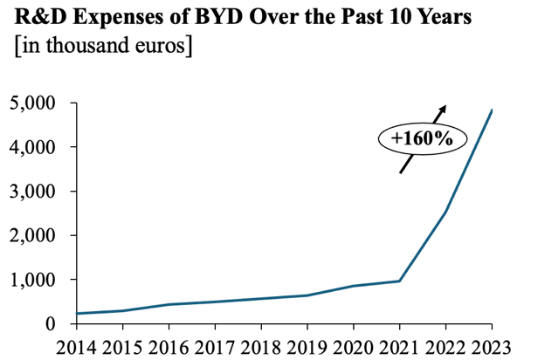

Figure 11: R&D Expenses of BYD (Own Illustration, Based on Financial Statements of BYD)

vation, the company has secured a leading position in China's domestic new energy vehicle market, gaining a significant first-mover advantage. A key driver of this sustained leadership is BYD's ability to continuously adapt its corporate strategy and strengthen its decision-making capabilities (Chen, Li, and Liu 2024). BYD was one of the first to recognize and implement the topics that are important for customers. Moreover, they have teams that rapidly address issues post-launch, continuously refining the product in the market which is a stark contrast to traditional OEMs like Volkswagen. There, deeply rooted bureaucratic structures and regulatory complexity slow down innovation and require vehicles to be perfected before market launch. Interviewee VIII noted that Volkswagen historically treated the battery merely as a commodity, with development cycles of up to 48 months and a 36-month planning horizon, compared to just one year at leading Chinese manufacturers. While Chinese manufacturers innovate at speed, European OEMs remain constrained by institutional inertia and a legacy of over-engineered processes, the interview experts explain. "*They have lost a lot of ground, especially in the Chinese market over the last five years alone, because all these new brands are coming up from China which were far ahead of the traditional manufacturers*", interview partner I states. According to the expert from Interview VII it is critical to focus on future technologies, as failure to do so will render traditional manufacturers irrelevant in the industry landscape.

4.1.2 Technological Ownership in Core Technologies

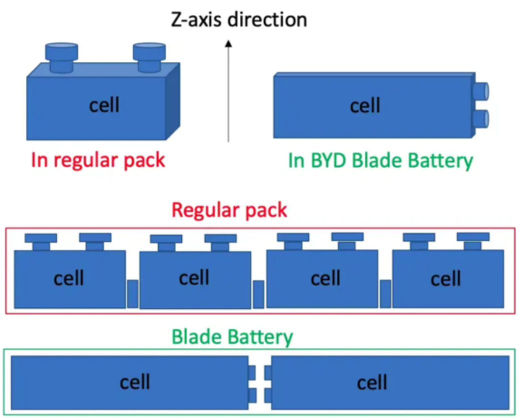

Figure 12: Cell Arrangement Comparison of a Regular Pack vs. BYD Blade Battery (Source: BYD BD Auto Group 2024)

"*Back in the days, batteries were mainly used for smaller things such as toothbrushes, shavers, mobile phones and remote control. Nobody was thinking about electric vehicles. […] The battery gave BYD the leading edge and the foot in the door.*" (Interview I). BYD's Blade Battery represents a major breakthrough in EV energy storage, redefining long-standing industry standards in performance, safety, and cost efficiency. Historically, lithium iron phosphate (LFP) batteries were considered inferior due to their lower storage capacity per unit of volume, making them less attractive for long-range EV applications. However, BYD's innovations in battery structure and integration have allowed LFP technology to rival and break the dominance of Tesla and CATL in the ternary lithium space (Chen et al. 2024). According to Interview III, the control over research and development and know-how about batteries, has clearly contributed to their success. "*If they had simply bought like other corporations, they would not be where* *they are now*", he continues. As seen in Figure 12, regular battery packs resemble a box filled with upright bricks. The stubby cells leave gaps and need extra frames ("modules"), to keep them in place. In contrast, BYD reshapes each cell into a long and rigid "blade", stacking them sideways so the cells themselves act as the frame. This configuration virtually eliminates inactive volume and thus elevates the energy density within the same external envelope (BYD BD Auto Group 2024). Moreover, the durability of the Blade Battery is a key differentiator. One of the fundamental challenges of EV adoption has been battery longevity as degradation over time reduces range and necessitates costly replacements. BYD's Blade Battery boasts exceptional cycle life, capable of enduring over 4,000 charge cycles while still retaining 70 % of its original capacity (Ogan and Chen 2016). Beyond performance, safety remains a defining characteristic of the Blade Battery. One of the primary risks associated with lithium-ion batteries is thermal runaway, where excessive heat leads to fires or explosions. Ternary lithium batteries, due to their reliance on nickel and cobalt, are particularly susceptible to such incidents. In contrast, LFP chemistry naturally offers superior thermal stability. BYD took this a step further with its Blade Battery, subjecting it to the nail penetration test, the industry's most stringent safety benchmark (Hasan et al. 2023). Unlike conventional batteries that can catch fire or explode under extreme pressure, the Blade Battery remained intact and did not exhibit thermal runaway, setting a new safety standard in the EV industry. Further safety tests demonstrated that the Blade Battery could be completely engulfed in fire without exploding (Ogan and Chen 2016).

Ternary lithium batteries rely on nickel and cobalt, two materials subject to extreme price fluctuations due to supply constraints and geopolitical factors. LFP batteries, by contrast, use abundant and cheaper materials, making them more economically viable for large-scale EV production (Cui and Zhao 2024). With over two decades of continuous innovation, the company has established a vertically integrated battery industry chain, reducing dependency on volatile material markets while maintaining strict quality and cost control (Deng 2024). According to expert VII this efficiency allows BYD to "*significantly reduce the cost per kilowatt-hour for the batteries, which then positively affects the margins, which we do not see so much with the European OEMs*." "*BYD is one of the few manufacturers alongside Tesla who still have margins in the electric vehicle segment*", interview expert III adds.

4.2 Sourcing

4.2.1 Independence Through Secured Critical Raw Materials

China's dominance in the raw material value chain represents a decisive advantage for its electric vehicle industry and is particularly beneficial for vertically integrated players such as BYD. At the core of this strategic position lies China's unparalleled control over the extraction, importation, and – most critically – the processing of key battery inputs such as lithium, cobalt, and graphite. Despite not being the world's largest lithium extractor, China is the largest importer of lithium and leverages this position with extraordinary geopolitical and economic foresight. Over 60 % of Chile's lithium carbonate output, Chile being the second-largest global producer, was exported directly to China. Moreover, Chinese state-owned enterprises now control two of the world's leading lithium producers, collectively accounting for 68 % of global output. Another Chinese firm holds a strategic 24 % stake in Sociedad Química Minera, a Chilean lithium giant responsible for 16 % of global production. This network of control ensures that China remains the bottleneck through which most lithium must flow, either as raw input or in processed form (Bencivelli et al. 2024). The same pattern holds true for other critical minerals. Figure 13 illustrates China's dominance in the global processing of strategic minerals. It becomes evident that across cobalt, lithium, graphite, and rare earths, China controls the majority of global refining capacity with a share above 60 %.

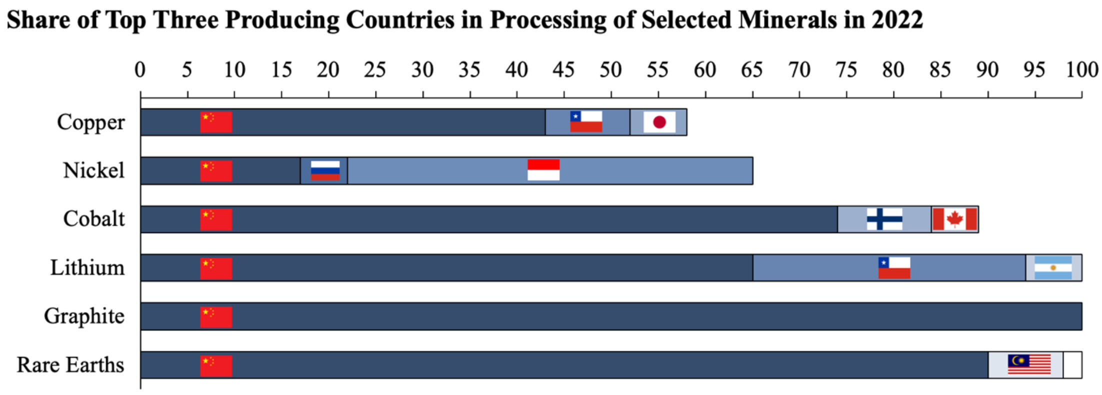

Figure 13: Share of Producing Countries in Processing of Selected Minerals (Own Illustration, Source: IEA 2023)

China processes much of the cobalt sourced from the Democratic Republic of Congo, which holds a 74 % share of global production. Even more significantly, up to 98 % of the world's graphite is refined in China (Bencivelli et al. 2024). This centralisation of refining capacity secures Chinese firms enormous leverage across the global battery supply chain. In fact, around two-thirds of the world's lithium and cobalt, 60 % of aluminium, and 80 % of polysilicon are processed in China, according to (Xu 2024). These figures underscore a structural asymmetry: While the raw materials may originate elsewhere, value creation through refinement remains predominantly Chinese. "*That is a huge advantage in China, you can get the original resources from China, rare earths partly, lithium is available all over the world, but the whole refinery, the whole processing industries are in China. You can source everything in China for a car if you want.*" (Interview III). For Chinese OEMs like BYD, this structural advantage translates into concrete economic benefits. Battery cells account for up to 40 % of the cost of a battery electric vehicle (BEV), and China's control over upstream materials, combined with lower labor costs, results in battery prices that are 17 % lower than in the European Union (Bencivelli et al. 2024). This upstream control is matched by dominance in cell production.

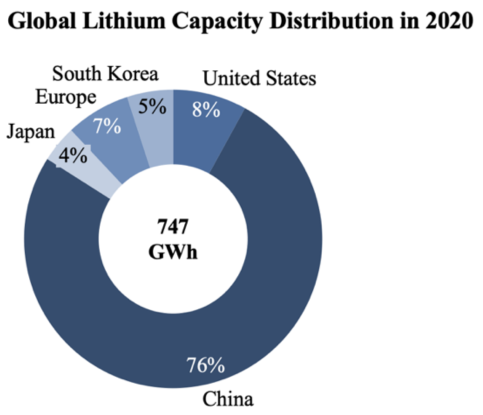

Figure 14: Global Lithium Battery Cell Manufacturing Capacity (Own Illustration, Source: FCAB 2023)

As shown in Figure 14, China held an overwhelming lead over other major regions with a 76 % share of global lithium battery cell manufacturing capacity in 2020 (FCAB 2023). This efficiency feeds directly into BYD's competitive edge, not just in domestic markets, but increasingly in global ones. As a vertically integrated company, BYD benefits directly from this ecosystem, internalizing value that European competitors must outsource. This not only enhances margin control but also reduces vulnerability to supply chain shocks (Lin 2024). "*They are naturally more independent from any global delivery difficulties and especially also from all the geopolitical issues that we currently have, because they are simply much more resilient as an economy, but also as a company.*" (Interview V).

4.2.2 Vertically Integrated Operations Lead to Cost Control

The vertical integration strategy is a defining feature of BYD's rise as a dominant force in the EV sector. Since acquiring Xi'an Qinchuan Automobile and entering vehicle manufacturing, the company has pursued a tightly controlled, self-reliant industrial model. As explained by the interview experts, producing only a small number of vehicles initially made it difficult to attract reliable partners or gain supplier trust. In this context, building and controlling everything in-house was not just strategic, it was a necessity. This approach has shaped nearly every aspect of BYD's operations, from lithium extraction in Salt Lake regions to the production of metallic materials, batteries, electric motors, and final vehicle assembly. This integrated ecosystem has set BYD apart from both Chinese and Western competitors, many of whom rely on fragmented, multi-tier supplier networks (Huang, Liu, and Qu 2023).

The primary logic behind BYD's vertical integration was clear: cost efficiency, control over critical technologies, and most importantly, security of supply. At a time when global EV supply chains were immature and highly volatile, BYD's ability to internalize value creation proved to be a competitive advantage. This was particularly evident in upstream capabilities, where the company invested heavily to ensure independence. For instance, BYD's ¥200 million CNY (≈ €24 million EUR) acquisition of Sino MOS Semiconductor (Ningbo) Inc. in 2008 was a calculated move to internalize the R&D and production of EV motors. Moreover, BYD's internal manufacturing capabilities allowed the company to respond with agility and cost discipline. A notable example is the company's in-house development of moulds for EV production. Rather than outsourcing, which would have required up to two years and cost between ¥150 million CNY (≈ €18 million EUR) and ¥200 million CNY (≈ €24 million EUR), BYD completed the task internally in just eight months, at a significantly lower cost of ¥70–80 million CNY (€8.5 million EUR – €9.6 million EUR) (Gong 2024).

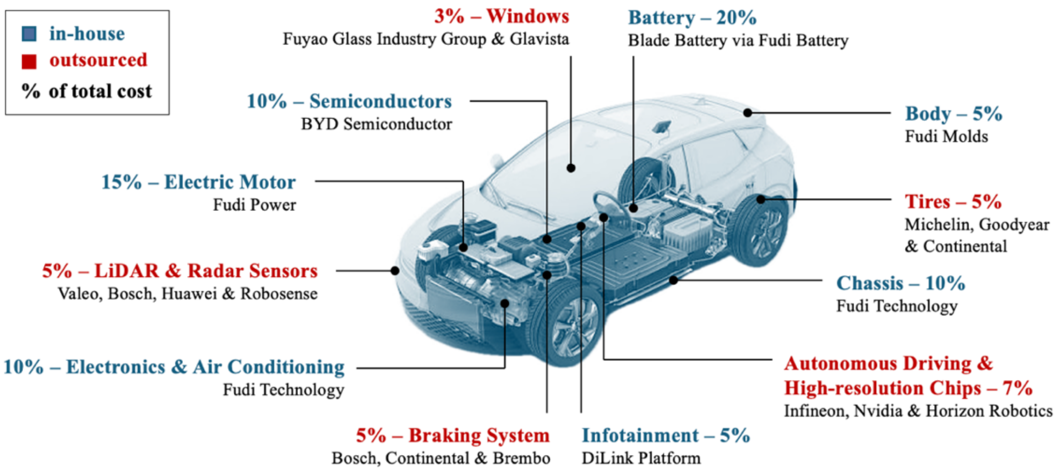

Figure 15: In-house vs Outsourced Components of BYD (Own Illustration, Based on BYD Official Website, Company Reports, Expert Interviews, and Supplier Disclosures)

As illustrated in Figure 15, BYD manufactures around 75 % of its vehicle components in-house (blue), a figure unmatched by any major global OEM. The remaining 25 % (red) is sourced externally, encompassing primarily ancillary or specialized parts. "*They really dominate everything from the battery, from the mine to the final production, and that earns this advantage*" (Interview III) In contrast, traditional Western carmakers typically operate with a vertical integration rate between 20 % and 30 %, relying heavily on external Tier-1 and Tier-2 suppliers for core systems such as powertrains, batteries, and semiconductors. This structural difference translates into fundamentally distinct operational philosophies. According to the expert from Interview V, Western OEMs function as system integrators: They assemble vehicles from a vast network of supplier-provided modules and systems, coordinating a highly globalized but fragmented value chain. BYD, on the other hand, has built an industrial ecosystem that resembles a vertically integrated manufacturing cluster.

At the core of BYD's advantage is its complete control over the battery production chain. "*BYD started relatively early to take over battery production, research, etc., on their own*", the interview expert VII starts and the expert from Interview V explains: "*BYD builds up the battery from the beginning, including chemistry etc. and even the cell factories of Western automobile manufacturers don't build up the cells from the beginning, they assemble them*". Unlike competitors that rely on external suppliers, BYD has 100 % independent R&D, design, and production capacity, ensuring full autonomy over technological advancements and cost structures (An 2021). "*Maybe we should have done that ten years ago, now it has become too expensive to buy battery manufacturers*", the expert from interview III admits. The direct control over transaction costs and resources, enabled by vertical integration and patent strategy, ensures that innovation is not only fast and focused but also cost-efficient. "*BYD with its own battery production and development, naturally has a cost advantage in a central component, where we at Volkswagen or other OEMs, have huge problems especially when it comes to pricing situations, because a battery is simply a cost factor*" (Former Product Manager at Volkswagen). This is also evident in Figure 16 which compares two models of similar size and function at BYD and Volkswagen.

However, BYD's vertical integration strategy is not without its limitations. The interview experts explain that as long as BYD makes a good battery and no other manufacturer, is accordingly ahead, it is a totally relaxed concept. But as soon as an external supplier develops a

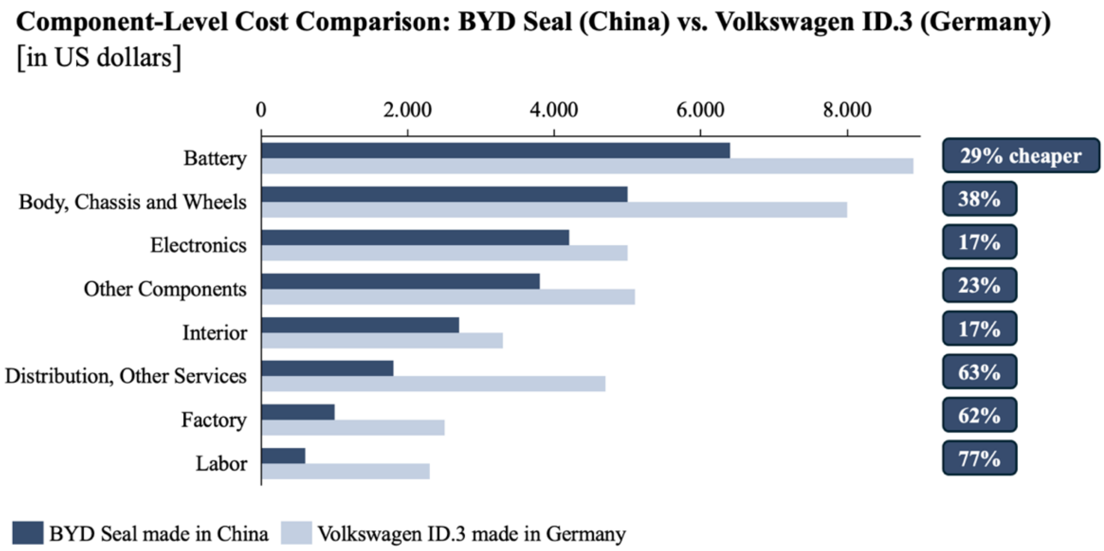

Figure 16: Component-Level Cost Comparison: BYD Seal vs Volkswagen ID.3 (Own Illustration, Source: UBS 2023)

significantly superior battery innovation, BYD faces the risk of being locked into a capital-intensive production infrastructure that may no longer reflect the technological frontier. "*You always have to be a bit on the top level, because [....] it is not so easy to switch so quickly*.", the expert from Interview V confirms. High vertical integration is only feasible when the complexity of production is relatively low. This trade-off was highlighted by almost all interview partners, who explained that as the options for vehicle configurations increase, the level of automation in production must decrease, making vertical integration less advantageous. As the EV industry matures and becomes increasingly modular and innovation-driven, the closed nature of vertical integration may inhibit flexibility and speed in areas such as software development, digital ecosystems, or third-party partnerships. "*If the supplier comes with huge volume reductions and teaching costs we can often push them away or relocate the costs elsewhere, but BYD must carry them themselves if their factories are not running.*" (Interview III). Recent analyses suggest that BYD's historically closed model may now be out of step with the market-oriented direction of new energy vehicle technologies. (Deng 2024) warns that this insularity could become a liability for BYD's long-term development, especially as the industry shifts toward more open innovation networks and collaborative value chains.

Indeed, BYD has recognized this strategic inflection point. In recent years, BYD began to move toward a hybrid model, retaining vertical control in critical upstream sectors while opening parts of its supply chain to external collaboration and co-development (Yu 2024).

4.2.3 Strategic Autonomy Through Supplier Networks

The changing supplier model at BYD exposes growing cracks in its tightly integrated system. As (Zheng et al. 2013) point out, the transaction cost advantages of outsourcing begin to outweigh those of vertical integration as enterprises scale. "*It is often simply cost issues, that you outsource topics*", interview partner V asserts. For BYD, this inflection point appears overdue. What once gave the company speed and cost control now risks becoming a constraint. Interviewees point out that outsourcing was not only cheaper in the past, but strategically advantageous, enabling OEMs to pressure suppliers and stay lean. Today's environment, defined by rapid innovation, compressed product cycles, and global complexity, leaves little room for insular models. BYD's continued insistence on doing everything in-house could hamper its ability to adapt, collaborate, and compete at the frontiers of automotive technology.

Cost control has been a defining logic behind BYD's supplier strategy. BYD has successfully reduced its raw material procurement costs by establishing long-term partnerships with high-quality suppliers, leveraging centralized purchasing and streamlined supply chain coordination. These measures have enabled the company to scale efficiently while keeping cost pressures in check. Yet, this success comes at a price (Dong 2024). The company's historically decentralized and dispersed upstream procurement structure has led to inconsistencies in supplier quality and compromised the overall efficiency of its supply chain. To address these frictions, BYD is gradually shifting toward a more open and collaborative supply chain model, one that prioritizes precision in supplier selection and deepens strategic partnerships (Yu 2024). The interview partner I explains that while many components are subcontracted and sub designed, the company remains "*very much integrated with the suppliers*." Unlike the more fragmented European model, where the same suppliers may serve different OEMs across countries, BYD's network is marked by closer alignment and tighter control. This allows for faster iterations, reduced complexity, and stronger consistency in execution, he continues.

However, this structural advantage is not without controversy. One of the most significant levers BYD employs in its supplier relationships is aggressive supply chain financing. According to expert I, suppliers often wait up to 275 days for payment, nearly five times longer than the industry norm of 60 days seen in Germany. This delayed payment model effectively turns suppliers into financiers of BYD's operations, giving the company a substantial working capital advantage. "*The suppliers are actually financing BYD […] they don't have to spend one cent, and yet the part will come in*", the expert admits. The implications of such a model extend beyond mere cash flow management. The interview partners warn of the systemic risk this practice introduces. As BYD expands rapidly, taking on more suppliers and capital obligations, its financial exposure deepens. "*If the expansion in Europe is not a success and they have overcapacities, then it can really bang*" he notes. This dependency on long payment cycles becomes a liability if demand falters or operational miscalculations occur.

4.3 Recommendations for Upstream Strategies

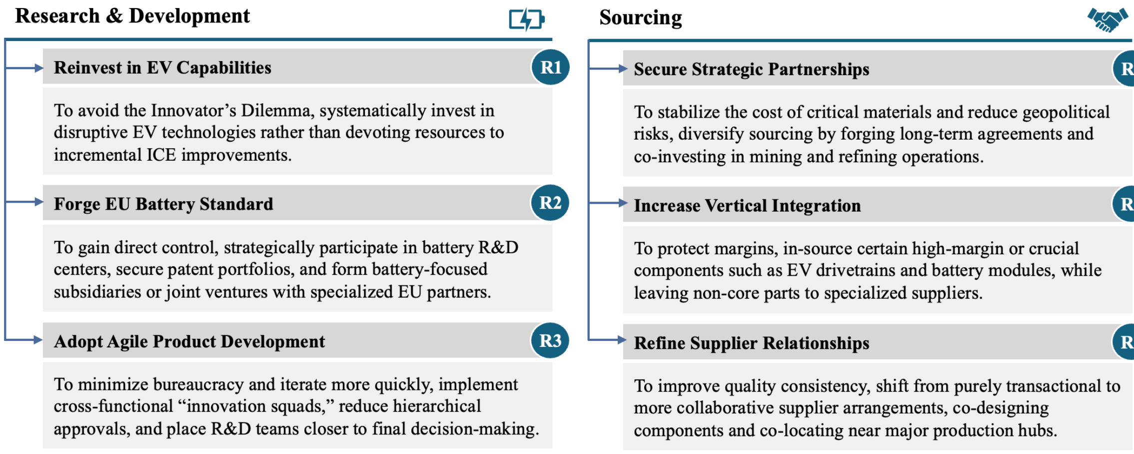

Figure 17: Upstream Recommendations for German OEMs (Own Illustration)

Building on the insights derived from the preceding analysis of upstream activities, the following recommendations, illustrated in Figure 17, provide a strategic roadmap for Western OEMs to enhance competitiveness. Scholars have long warned of the "Innovator's Dilemma," in which successful incumbents risk losing ground to disruptive entrants when they concentrate on sustaining improvements to mature technologies rather than investing in emerging paradigms (Christensen 1997). A key starting point lies in **reinvesting in EV capabilities (R1).** The expert from Interview I notes that global automotive firms failing to pivot decisively toward electrification risk falling behind in key segments. By investing in EV architectures and scaling down ICEV programs, Western OEMs can better respond to shifting consumer preferences and regulatory pressures aimed at net-zero targets (An 2021). Interview I recommends European firms collaborate more with Asian industry leaders and global research institutions rather than limiting efforts to local universities. Interview III similarly argues that cooperation with China or other Asian partners is essential. From his view, Europe must overcome political hurdles and embrace open technology transfer to stay competitive. Reorienting investment means not just reallocating budgets, but maximizing impact through global expertise, via joint ventures in China, partnerships with Asian battery leaders, and collaboration with top international universities.

Central to the EV pivot is **forging an EU battery standard (R2)**, an area where BYD's example stands out. According to the expert from Interview V, batteries often comprise up to 40 % of a vehicle's total cost, underscoring the urgent need for Westen OEMs to take direct control over battery research, production and optimization. BYD's Blade Battery has been praised for its improved safety, reduced raw material costs, and longer cycle life (Cui & Zhao 2024), achievements that hinge on vertical integration and two decades of dedicated battery R&D (Deng 2024). While Western manufacturers traditionally relied on third-party suppliers to benefit from cost advantages, this approach has come at the expense of technological sovereignty and control over strategic components. "*We must be at the pulse of the times in China […] and get the battery back to Europe*" remarked the expert from Interview III, emphasizing that breakthroughs in battery chemistry and manufacturing processes often originate in fast-moving Asian ecosystems. Consequently, Western automakers must swiftly build or acquire deep battery capabilities, at best through the creation of a joint European battery standard, one that is internationally competitive and superior to BYD's current benchmark. As supported by recent literature, the most effective response to disruption lies in combining aggressive market competition with targeted collaboration in critical technology areas. Establishing a unified standard would serve as a strategic backbone for collaboration across European OEMs, enabling interoperability, accelerating innovation, and reducing duplication of R&D efforts.

Meanwhile, adopting **agile product development (R3)** processes is vital for embedding an innovation culture akin to that which powers BYD's rapid product cycles. Interview partner III stresses that slow-moving bureaucracies can delay critical decisions and stifle creativity, whereas Chinese OEMs exhibit a capacity for launching products quickly and refining them post-launch. This resonates with the broader challenge of organizational inertia described in the Innovator's Dilemma. Implementing small, cross-functional "innovation squads," granting them decision-making authority close to R&D leadership, and granting them the latitude to iterate on product performance in real time can help Western firms quickly respond to emerging customer demands and technological breakthroughs (Zheng et al. 2013).

However, transforming R&D alone is insufficient if sourcing practices rely on fragmented and cost-driven supply chain models. **Securing strategic material partnerships (R4)** requires Western OEMs to move beyond transactional supplier models and engage directly in upstream activities, particularly if they aim to internalize battery production. As critical minerals are subject to sharp price swings and geopolitical tensions, traditional procurement offers limited protection. In contrast, co-investments in mining operations or collaborations with established refiners not only reduce geopolitical risks but also provide a hedge against price volatility known to plague critical BEV minerals (Interview I). Literature on supply chain resilience likewise suggests that deeper engagement and co-investment in upstream capacity can be more cost-effective than reacting passively to periodic shocks (Huang, Liu, and Qu 2023).

Once raw materials are secured, **vertical integration of key EV components (R5)** becomes the next strategic priority. "*If an OEM only assembles pre-supplied parts, especially in a future dominated by software-defined vehicles, its role as an innovator diminishes*." (Interview V). Vertical Integration allows OEMs to reposition themselves as full-spectrum manufacturers, regaining control over core technologies and signaling to the market that vehicle production is not a commodity business open to any tech entrant. This distinction is essential in an era where firms like Xiaomi are entering the automotive space, leveraging brand and software capabilities without the depth of industrial manufacturing know-how. Moreover, experts from Interviews III and V uniformly emphasize that in-house battery production is pivotal for cost control and retaining technological flexibility. "*If you can produce it in-house, definitely the* *battery. […] Everything from the powertrain should be made yourself.*" (Interview III) Vertical integration should therefore focus on high-value, innovation-critical components such as batteries, electric drivetrains, control units, and proprietary software stacks. In contrast, lower-value or commoditized parts, such as windshield wipers or tires, can remain outsourced. "*Other topics, which are not so relevant, can be very cheaply covered by suppliers*" (Interview VII). Research confirms that vertical integration can enhance market responsiveness and foster deeper in-house know-how (Qiu et al. 2022), but experts caution that over-committing to every step of production risks reducing agility, particularly if superior external technologies emerge. Consequently, OEMs should vertically integrate around 40–50 % of the vehicle's cost structure, particularly in "top technology topics" like batteries and software to balance the benefits of vertical integration with the need for ongoing adaptability (Interview VII).

Finally, **fostering more collaborative supplier relationships (R6)** helps balance vertical integration benefits with the need for third-party expertise. BYD's reliance on local suppliers, reinforced by co-location and strict quality control, enables rapid iteration and cost discipline (Yu 2024). Western OEMs, used to transactional models driven by price, could instead pursue co-design, joint process improvement, and shared IP–becoming indispensable in innovation-led shifts. Such partnerships improve supply chain visibility, ensuring consistent quality and reducing friction typical in globalized networks, such as communication gaps or inconsistent standards (Dong 2024). Given China's strength in integrating supply chain layers, more collaborative, localized supplier frameworks in Europe could boost efficiency and accelerate tech adoption. Recent developments, like the 2024 Mitsubishi–Honda merger, support the idea that such approaches emerge during industry consolidation.

5 Conclusion

This thesis has the ambition of shedding light on BYD's revolutionary entry in the automotive industry as well as illuminating the implications for traditional OEMs. Figure 27 shows an

Figure 18: SWOT Analysis of BYD (Own Illustration)

overview of the research by utilizing the Strengths-Weaknesses-Opportunities-Threats (SWOT) framework. BYD's value chain strategy offers substantial competitive **strengths**. Its Blade Battery technology delivers safer, more durable, and cost-effective lithium iron phosphate batteries, providing a clear technological advantage. Agile innovation, coupled with flat hierarchies, accelerates product cycles and enables rapid post-launch enhancements. The vertically integrated supply chain secures critical materials like lithium and cobalt predominantly within China, yielding battery cost advantages of about 17 % compared to European OEMs. Additionally, BYD manufactures roughly 75 % of vehicle components internally, maintaining tight quality control and significantly lower production costs, achieving up to 75 % cost savings versus European rivals. Strategically, BYD has significant **growth opportunities** in Europe, driven by increasing governmental incentives for electric vehicles and its planned factory in Hungary, enabling expansion beyond China. Moreover, BYD's cost advantages allow aggressive pricing strategies, potentially lowering European retail prices by up to 30 % while retaining strong profitability. However, BYD also faces notable **weaknesses**. Low brand awareness and negative perceptions regarding the quality of Chinese vehicles limit consumer trust in Europe, posing hurdles against established brands with strong quality reputations. Considerable **threats** remain as well. Extensive vertical integration creates potential operational rigidity, reducing flexibility in adapting to superior technologies. Rising labor costs in China threaten to diminish BYD's existing cost benefits. Additionally, escalating tariffs on Chinese imports to Europe – potentially exceeding 17 % – represent a direct threat to BYD's competitive pricing and market entry strategies.

Based on the findings that BYD's business model is inherently different, and often superior to the established firms, they must react: The analysis conducted in this thesis reveals that a prompt and comprehensive transformation of the entire business model is imperative. Without adaptation, the industry risks collapse and the loss of millions of jobs. However, the situation is not irreversible. This paper outlines 4 key strategic recommendations, which should be integrated into operations as swiftly as possible, prioritized in the **following order: R7 > R2 > R4 > R11**:

- **R7 Leverage ICEV Cash-Cow:** The ICEV business model has been optimized over decades and has become a unique competitive advantage unmatched by any other country. German engineering expertise remains highly valued internationally but is, based on the BCG matrix, a depreciating asset with high market share and low growth. Therefore, profits from this model should be maximized for as long as the BEV standard has not yet achieved broad international adoption. Without a competitive cost structure, maintaining market viability is nearly impossible, especially given that BYD holds a cost advantage of two to three years, according to our research.
- **R2 Reinvest in EV Capabilities:** The resources generated should be strategically reinvested in the expansion of EV technologies – particularly in dedicated R&D battery

centers, patent development, and the establishment of partnerships that ensure a secure and specialized supply chain.

- **R4 Forge EU Battery Standard:** This could take the form of a European battery standard, in which OEMs collaborate on sourcing while continuing to compete in production and sales. As Bencivelli et al. (2024) point out, battery prices are 17 % lower in China versus the EU, such partnerships should aim to secure critical materials at lower costs, reducing the costs of German EVs and mitigating geopolitical risks.
- **R11 Amplify Brand Equity:** Finally, one remaining competitive advantage should be leveraged: Brand equity. German consumers prefer German-made vehicles. Brand perception often outweighs performance as a purchasing factor. This should be rapidly reinforced through bringing the product closer to the customer – for instance via experiential showrooms or pop-up stores.

6 Limitations

Naturally, this study also has limitations. A more comprehensive analysis, including comparisons with other Chinese manufacturers and U.S.-based OEMs, would provide additional insights. Geopolitical dynamics should be investigated using scenario analysis, for example, the tariff imposed by President Trump in 2025 or a militarized conflict between China and Taiwan. Further, expanding the quantitative survey, both by increasing the number of responses and by incorporating broader consumer segments, such as older customers or specifically BYD buyers, would enhance the statistical significance of the study. Moreover, BYD’s partial opacity limits data availability, particularly regarding model-level and country-level sales figures, which constrains the depth of the analysis. Lastly, the 2024 annual report was not included, as it had not been published at the time of writing. Future research should address these limitations.

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V Appendix

Appendix 1: Overview of Selected Experts Interviews

Overview of Selected Expert Interviews and Industry Backgrounds

Domain	Interview	Position	Company / Industry	Position
1	I	C-level Management Consultant	BYD	> 12 years experience in multiple functions at BYD
	II	Teamlead Sales	BYD Dealership	> 3 years experience in general management and sales
2	III	Senior Strategic Buyer	Mercedes-Benz	> 6 years experience in NEV commodity procurement
	IV	Senior Sales Manager	Mercedes-Benz	> 8 years expeeince in sales
	V	Former Product Manager	Volkswagen	> 5 years experience in modular electric-drive toolkit
	VI	General Manager	Volkswagen Dealership	> 3 years experience in general management and sales
3	VII	Consultant	Automotive Consultancy	> 3 years experience in automotive strategy across several consultancies
	VIII	Senior Project Manager	Strategy Consultancy	> 12 years experience in automotive strategy, including more than three years in China
	IX	Senior Project Manager	Strategy Consultancy	> 12 years experience in automotive production strategy, digital factories and supply chains
	X	Vice President / Partner	Strategy Consultancy	> 18 years experience in strategy consulting, expert in driving transformation in the automotive and mobility sectors

Table 1: Overview of Selected Expert Interviews and Industry Backgrounds (Own Illustration)

Appendix 2: Interview Guide

Introduction

1. Can you briefly describe your experience and background in the automotive industry?
2. How would you assess BYD’s approach and market position in the global automotive market, particularly compared to traditional automakers?

Upstream Value Chain

3. R&D: BYD has developed its own batteries and technology. How has this control over research and development contributed to its competitive position?
4. Do you see areas in their innovation approach where traditional automakers lag behind?
5. Supply Chain: BYD’s supply chain benefits from its vertical integration and reliance on local Chinese resources. How significant do you think this strategy is for their success, and what advantages or challenges do you see in this approach?

6. How sustainable do you think this advantage is, especially as BYD expands into new markets like Europe?
7. Which parts of the value chain do you believe should be in-house versus outsourced and what are the key reasons?

Midstream and Downstream Value Chain

8. Production: Modular and semi-automated production and BYD’s IT background are often highlighted as key to their efficiency. How do you think this production model compares to traditional automakers in terms of flexibility and cost efficiency?
9. Sales: BYD employs direct and indirect sales strategies, differing from traditional dealership-based models. How do you evaluate the effectiveness of these strategies in entering new markets like Europe?
10. Do you think consumers appreciate the new platforms of distribution?
11. How important is the support of the Chinese government in enabling BYD’s success, and could this level of reliance pose risks as BYD seeks to expand globally?

Impact on Traditional Automakers

12. How do you think BYD’s strategic approach, particularly its value chain and cost structure, has influenced the strategies of traditional automakers?
13. From your perspective, what long-term changes do you foresee in the global automotive value chain as a result of BYD’s approach?

Appendix 3: Interview Transcripts

https://drive.google.com/drive/folders/1WK6HX_KUEkIxGcyHFzvXGtQu0iZzz9R0

Appendix 4: Survey Guide

Thank you for participating in our survey!

As part of our Master's thesis we are gathering insights on how Chinese automakers, particularly BYD, are forcing established Western manufacturers like Volkswagen, Mercedes-Benz, and BMW to rethink their strategies along the value chain.

In this survey, we are especially interested in Western consumers' perceptions of Chinese-made electric vehicles. Your feedback will help us identify key factors that influence the adoption and purchase decisions in this rapidly evolving segment of the automotive market.

Completing this survey should take about 5–10 minutes. Your responses are anonymous and will be used exclusively for academic research. Participation is voluntary and you can withdraw at any time. All data will be reported in aggregate form to protect your privacy.

If you have any questions, feel free to contact us, Lily Gaertner and Jonathan Gröne, at 58101@novasbe.pt or 57844@novasbe.pt.

Thank you for your valuable time and input!

Section 1: Demographics

1. What is your age group?
   - 18-24
   - 25-34
   - 35-44
   - 45-54
   - 55-64
   - 65+

2. What is your gender?
   - Male
   - Female
   - Non-binary / third gender
   - Prefer not to say

3. What is your annual household income?
   - Less than 30,000 €

- 30,000 € - 49,999 €
- 50,000 € - 74,999 €
- 75,000 € - 99,999 €
- 100,000 € or more

4. What is your highest level of education?
   - High school or less
   - Some college
   - Bachelor's degree
   - Master's degree
   - Doctorate or professional degree

5. Where do you currently live?
   - Germany
   - Portugal
   - Italy
   - Spain
   - France
   - Other

Section 2: General Perceptions of EVs

6. What is your relationship of car ownership?
   - I currently own a car
   - I am planning to purchase a car in the near future
   - I have no intention of getting a car in my current phase of life
   - Not sure

7. How often do you use car sharing or ride hailing (e.g. Uber)?
   - Never
   - Rarely
   - Sometimes
   - Often
   - Always

8. How familiar are you with hybrid and battery electric vehicles?
   - Not familiar at all
   - Slightly familiar
   - Moderately familiar
   - Very familiar
   - Extremely familiar

9. How likely are you to consider purchasing an electric vehicle in the future?

- o Very unlikely
- o Somewhat unlikely
- o Neutral
- o Somewhat likely
- o Very likely

Section 3: Purchasing Behavior

10. What are the main reasons you would consider buying an electric vehicle? (Please Rank)
    - o Environmental concerns
    - o Fuel savings
    - o Government incentives
    - o Technological innovation
    - o Driving experience
    - o Social influence
    - o Other (please specify)

11. What are your most relevant purchasing criteria when buying an electric vehicle? (Select up to 3)
    - o Price
    - o Quality
    - o Country of origin
    - o Sustainability of production
    - o Energy efficiency
    - o Exterior design
    - o Interior and software experience
    - o Performance
    - o Range
    - o Charging speed
    - o Brand reputation

12. How do you value the following aspects of the purchasing process? (1-100 Skala)
    - o Timely availability
    - o Online purchase and selling process
    - o Local support and contact person
    - o Test driving
    - o Highly individual configuration

Section 4: Perception of Chinese EVs

13. How do you perceive Chinese-made electric vehicles? (Good or bad)
    - o Price

- Quality
- Sustainability of production
- Energy efficiency
- Exterior design
- Interior and software experience
- Performance
- Range
- Charging speed
- Brand reputation

14. How do you perceive Chinese-made electric vehicles in comparison to vehicles from traditional Western automotive brands (e.g. Volkswagen)? (Good or bad)

- Price
- Quality
- Sustainability of production
- Energy efficiency
- Exterior design
- Interior and software experience
- Performance
- Range
- Charging speed
- Brand reputation

15. In your opinion, what are the main barriers to purchasing an electric vehicle from a Chinese manufacturer? (Select up to 3)

- Price
- Lower quality
- Political reasons
- Reliability
- Limited availability of service centers
- Lack of brand recognition
- Vehicle safety
- Data security
- Other (please specify)
- No barrier

16. Do you think Chinese EV manufacturers will become dominant players in the global automotive market in the next 5-10 years?

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Section 5: Awareness and Perception of BYD

17. Have you heard of the Chinese automotive brand BYD?
    - Yes
    - No

(end of survey if *no* is selected)

18. How would you rate your general impression of BYD as a company?

    - Very positive
    - Positive
    - Neutral
    - Negative
    - Very negative

19. How likely are you to purchase an electric vehicle from BYD in the future compared to other electric vehicle brands?
    - Very likely
    - Likely
    - Neutral
    - Unlikely
    - Very unlikely

20. What do you believe are the key factors contributing to BYD's competitive advantage compared to traditional Western automotive brands (e.g., Volkswagen)? (Select up to 3)
    - Price
    - Quality
    - Governmental support
    - Sustainability of production
    - Energy efficiency
    - Exterior design
    - Interior and software experience
    - Performance
    - Range
    - Charging speed
    - Brand reputation

Appendix 5: Herfindahl Index

Brand	Total Sales (millions)	Market Share (%)	Marketshare squared
Toyota	8,57	11,07	122,54
Volkswagen	4,97	6,41	41,09
Honda	3,77	4,87	23,72
Ford	3,73	4,82	23,23
Hyundai	3,54	4,57	20,88
Nissan	2,98	3,84	14,75
Suzuki	2,92	3,77	14,21
Kia	2,73	3,53	12,46
Chevrolet	2,69	3,48	12,11
BYD	2,68	3,47	12,04
BMW	2,1	2,71	7,34
Mercedes-Ber	2,06	2,67	7,13
Audi	1,77	2,29	5,24
Tesla	1,77	2,29	5,24
Renault	1,44	1,85	3,42
Rest		38,36	1.471,49
SUM			**1.796,91**

Table 2: Herfindahl Index (Own illustration, Source: Road Genius 2024)