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Charging Ahead: Key Success Factors of Chinese Manufacturers in the Battery Electric Vehicle Industry

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Management from the Nova School of Business and Economics.

CHARGING AHEAD: KEY SUCCESS FACTORS OF CHINESE MANUFACTURERS IN
THE BATTERY ELECTRIC VEHICLE INDUSTRY – AN ANALYSIS OF THE IMPACT
OF PHYSICAL RESOURCES AND LABOR DYNAMICS

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Abstract:

This thesis explores the disruptive transformation of the automotive industry, focusing on the rise of Chinese battery electric vehicles (BEVs). It assesses how physical resources, technological advancements, and robust governmental support have catalyzed the success of Chinese BEV manufacturers, leading to global market share growth. Utilizing a mixed-methods approach that includes a literature review, market data and expert interviews, the research outlines the strategic execution behind this industry shift. The findings highlight a systematic, strategic approach rather than coincidence, and suggest significant implications for the future global competition in the automotive sector.

Keywords:

Automotive, China, Electric Vehicles, Transformation, Innovation, Government Intervention, Strategic Analysis, International Business

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Contents

List of Abbreviations.....	3
1 Introduction	4
1.1 Relevance of the Topic and Motivation	4
1.2 Research Question	6
1.3 Overview of the Global Automotive Industry	6
2 Methodology	9
2.1 Secondary Data: Literature Review.....	10
2.1.1 Search Strategy	10
2.1.2 Procedure	11
2.2 Secondary Data: Market, Media and Data Analysis.....	12
2.3 Primary Data: Expert Interviews	13
2.3.1 Expert Selection.....	13
2.3.2 Interview Guide	14
2.3.3 Data collection and Analysis	15
3 Background Information on the Chinese Automotive Industry	15
3.1 Historical Evolution: Emergence of the Chinese Automotive Industry.....	15
3.2 Status quo: Significance of the Chinese Automotive Industry.....	19
4 Unique factor conditions of Chinese BEV industry	23
4.1 Physical Resources and Labor Dynamics.....	23
4.1.1 Secondary Data: Literature Review and Data Analysis	23
4.1.2 Primary Data: Expert Interviews	31
4.1.3 Comparison of Secondary and Primary Data	37
4.1.4 Conclusion	37
5 Discussion	38
5.1 Success of Chinese OEMs: Coincidence or Systematic Strategy Payoff?	38
5.2 Outlook for the Chinese Automotive Industry.....	40
5.3 Limitations of the Study and Future Research Directions.....	42
6 Conclusion	44
References	45
Appendix	62

List of Abbreviations

Advanced Driver Assistance Systems	ADAS
All-China Federation of Trade Unions	ACFTU
Battery Electric Vehicle	BEV
Belt and Road Initiative	BRI
Center for Strategic & International Studies	CSIS
Compounded Annual Growth Rate	CAGR
Corporate Average Fuel Consumption Credits	CAFC
European Union	EU
Electric Vehicle	EV
First Automobile Works	FAW
Foreign Direct Investment	FDI
Gross Domestic Product	GDP
Internal Combustion Engine	ICE
Joint Venture	JV
New Energy Vehicles	NEV
Original Equipment Manufacturer	OEM
Production of NEV Credits	NEVC
Research and Development	R&D
Research Question	RQ
Rest Of World	ROW
State-Owned Enterprise	SOE
United States	US
United States Dollar	USD

1 Introduction

1.1 Relevance of the Topic and Motivation

“I believe the auto industry will change more in the next five to ten years than it has in the last 50” – Mary Barra, CEO of General Motors (Barra 2016). The automotive industry is in the midst of the most disruptive transformation of its history. The contemporary era is distinguished by technological developments such as electric propulsion systems, autonomous driving, and software-defined vehicles. While the internal combustion engine (ICE) has been dominant for the last 100 years, the Volkswagen scandal seemed to be a turning point with more than 11 million diesel-powered vehicles being affected by manipulation software, causing incorrect emission testing results (Backhaus 2022). A recent automotive study comprising over 27,000 global regular mobility users from 15 countries revealed that 42% of respondents expressed a preference for an electric vehicle (EV) as their next purchase (Mc Kinsey & Company 2024). The shift to battery electric vehicles (BEVs) is also evidenced by a 108% increase in global BEV sales in 2021 (Backhaus 2022). Furthermore, consumers’ priorities are increasingly oriented towards flexibility, sustainability, and connectivity. This results in higher relevance of innovative business models, as evidenced by an anticipated expansion of the global mobility as a service market with a compounded annual growth rate (CAGR) of 35.6% from United States Dollar (USD) 103.23 billion in 2022 to USD 1.2 trillion in 2030 (Grand View Research 2022). This dynamic environment forces traditional players to rethink their strategic approaches and product portfolios to satisfy consumer needs. At the same time, it provides a unique opportunity for new market entrants to gain a foothold. The most recent events demonstrate that established original equipment manufacturers (OEMs), are encountering significant challenges in achieving their targeted sales volumes, resulting in overcapacities in production (Behrmann, Ainger, and Raymunt 2024). The Volkswagen Group, which retains its position as the world's largest automaker by revenue (USD 322.3 billion in 2023), has announced its intention to close plants

in its home market of Germany for the first time in history (Murphy and Schiffrin 2024). This represents a turning point not only for the company but also for the automotive industry in Europe as a whole. Other traditional players show similar symptoms. Stellantis, for example, faced more than a 33% decline in its production volume in Italy and an overall 50% cut of its net profits for the first half of 2024 (Behrmann, Ainger, and Raymunt 2024). Several challenges can be seen as causes for these symptoms. Firstly, the global economy was hit by the Covid-19 pandemic and two major wars in recent years (Kearney 2023). Secondly, established OEMs in Europe are experiencing difficulties in meeting expectations for developing new, high-standard supporting technologies in-house, which are necessary for mastering automotive transformation. Volkswagen, for instance, was forced to partner with Xpeng from China and Rivian from the USA in order to be competitive in the software environment (Reuters 2024). Lastly, serious new competition has entered the playing ground, especially in the field of BEVs. Market penetration rate of BEVs has nearly reached 25% in 2023 in China, the largest automotive sales market. On a global scale, the trend towards BEVs is also clear: While in 2020 only 3% of vehicles sold globally were battery electric, the share increased to 12% in 2023 (Ritchie 2024). This is particularly relevant since for the first time in history, Chinese automakers are posing a serious threat to traditional Western brands as they offer BEVs at comparable quality but cheaper prices across all vehicle segments, as evidenced by a study conducted by McKinsey (Heineke, Kampshoff, and Möller 2024; Yang, Gu, and Zi Ling Tan 2023). In 2023, Chinese manufacturer BYD achieved a global market share of 15.6% in BEV unit sales, which is more than three times that of the leading company from Europe, Volkswagen (Statista 2023). This work analyzes the root of the success of Chinese OEMs in the BEV segment as, from a European perspective, understanding this is critical to maintain competitiveness in one of Europe's most significant industries with a 7% contribution to the gross domestic product (GDP) of the European Union (EU) (European Commission 2024a).

1.2 Research Question

This thesis provides detailed insights into the Chinese BEV industry and examines its unique factor conditions leading to its success, with a particular focus on the following three areas: (1) *Physical Resources and Labor Dynamics*, (2) *Technological Innovation and Strategic Integration*, and (3) *Government Support and Regulatory Frameworks*. The objective is to address the following research question (RQ): *What are the key success factors that have contributed to the rapid growth in global market share of the Chinese BEV industry, and what are future implications for the automotive sector?* In addition to an analysis of existing literature and data resources, this work will provide value by incorporating first-hand insights from renowned experts in the field to close existing research gaps and present a more complete picture.

1.3 Overview of the Global Automotive Industry

As of 2023, the global automotive industry market was valued at USD 3,565 billion and is projected to grow at a CAGR of 6.8% reaching a total market size of USD 6,861 billion in 2033 (Spherical Insights 2024). Its relevance to the global economy cannot be understated. In Europe, the automotive industry alone contributes 7% to the European GDP and is responsible for 6.1% of total EU employment (Cornet et al. 2023). The current state of the global automotive industry is visualized in Figure 1 below, by breaking it down into four distinct geo-regions.

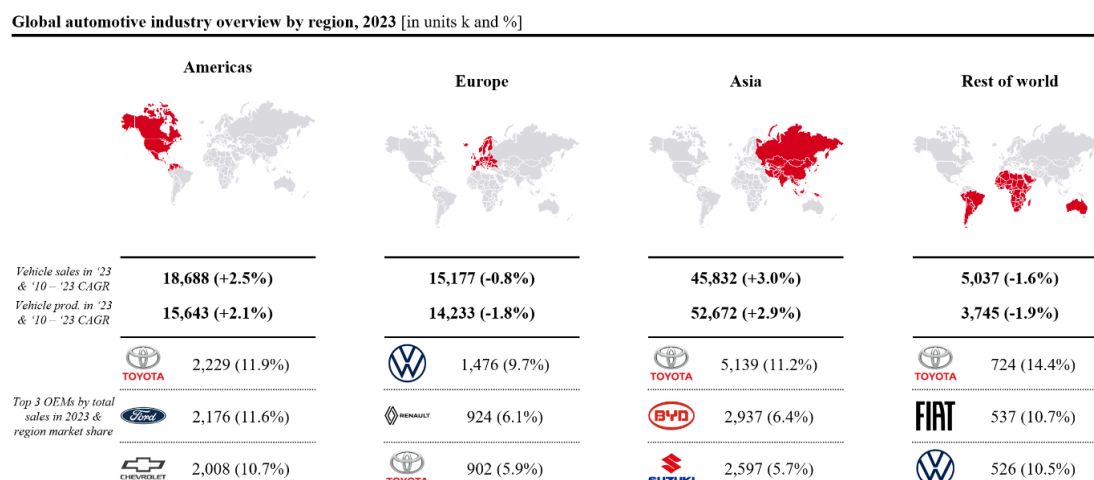


Figure 1: Global automotive industry overview, 2023 [in units k and %] (own illustration, based on MarkLines 2024a).

As of 2023, the Asian automotive market is the largest globally, with 45.8 million vehicles sold

and 52.7 million vehicles produced within the region. These figures underscore the economic importance of Asia as both a critical market for foreign OEMs and a major production hub for vehicles with global sales destinations. Vehicle sales and production in the region have experienced notable growth, with CAGRs of 3% and 2.9%, from 2010 to 2023 respectively. This growth is largely driven by the expanding middle class across various Asian countries, positioning Asia as the most significant market for many OEMs (Hong and Park 2020). Toyota maintains a dominant presence in the Asian market, with over 5.1 million vehicles sold in 2023, representing a market share of 11.2%. This figure is particularly notable when compared to the combined 12.1% market share of the second and third-largest OEMs, BYD and Suzuki. Toyota leads vehicle sales in the Americas as well, where it sold 2.2 million vehicles in 2023.

The Americas, the second-largest automotive market globally, experienced 18.7 million vehicles sold in 2023, with a CAGR of 2.5% in sales and 2.1% in production between 2010 and 2023. However, unlike the more fragmented Asian market, the top three OEMs in the Americas, Toyota, Ford, and Chevrolet, account for 34.2% of the total market share. While the automotive production industry has its roots in the Americas, particularly in the US due to the influence of Henry Ford and the Ford Motor Company (Caf Dowlah 2018), the region's role as a production center has diminished. In 2023, 15.6 million vehicles were produced in the Americas.

A comparable number, 14.2 million, were produced in Europe that same year. Despite its relatively small population, Europe's vehicle production is significant. However, it has been on a decline, with a negative CAGR of 1.8% since 2010. This decline can largely be attributed to the fact that the European market was hit especially hard by the Covid-19 pandemic and has experienced a slower recovery compared to other regions (Musa et al. 2023). The European market is also fragmented, with the top three OEMs - Volkswagen, Renault, and Toyota - holding 21.7% of the market share, led by Volkswagen with 1.5 million vehicles sold in 2023. The rest of the world (ROW) accounted for 5.0 million in vehicle sales and 3.7 million in production.

Group Section

With significant sales markets being Brazil (2.2 m vehicles sold) and Australia (1.2 m vehicles sold) and production hubs being in Brazil (2.2 m vehicles produced) and Argentina (0.6 m vehicles produced).

Change in total vehicle sales and production per region, 2010 – 2023 [in %]

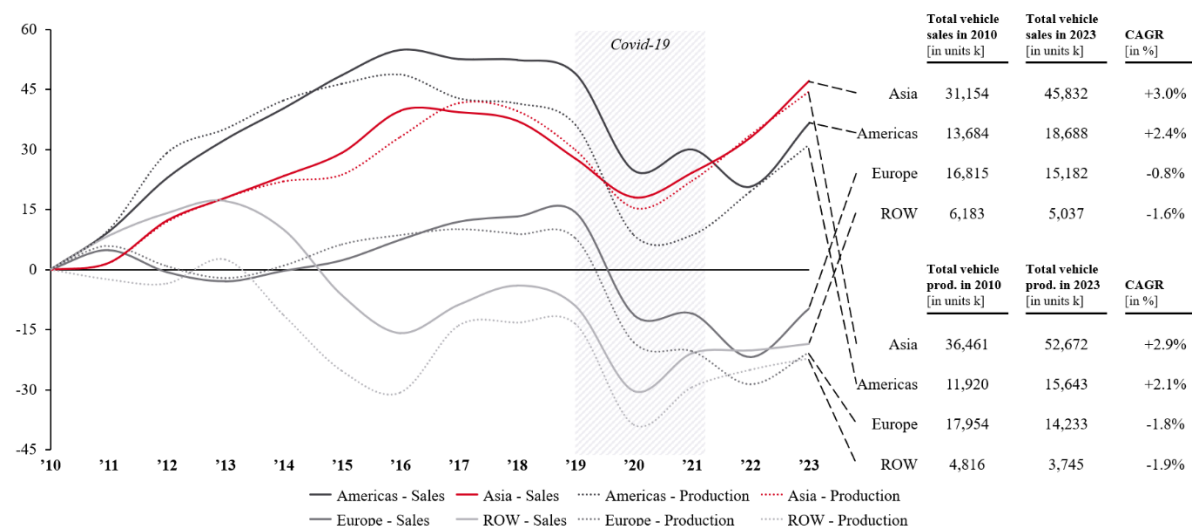


Figure 2: Change in total vehicle sales and production per region, 2010-2023 [in %] (own illustration, based on MarkLines 2024a).

The four automotive markets differ in size and levels of fragmentation and exhibit distinct historical growth patterns in both production and sales. As previously mentioned, the European automotive market was among the most impacted by the Covid-19 pandemic. This is illustrated in Figure 2, which displays the percentage change in vehicle sales and production across the Americas, Asia, Europe and the ROW from 2010 to 2023. Asia experienced robust growth in both sales and production until 2016, when sales stagnated, followed by production stagnation in 2017. Europe, on the other hand, exhibited slower, but steady growth in both sales and production until the onset of the pandemic. ROW experienced a decline in both metrics until 2016, after which it began to recover. Following a challenging 2019, which saw global automotive production decline to below 87.1 million vehicles, ending a decade of continuous growth, the industry faced an unprecedented crisis in 2020 due to the Covid-19 pandemic which resulted in prolonged shutdowns across much of the automotive sector and its extensive global supply chain, making 2020 the most severe crisis the industry has ever faced (OICA 2020a). While all

markets were significantly impacted by the pandemic, the paths to recovery varied widely among the four regions. Asia recovered most rapidly, with minimal disruptions and has since surpassed its pre-pandemic sales and production levels. In contrast, other regions faced a more prolonged recovery, worsened by supply-chain challenges such as semiconductor shortages, the Russian invasion of Ukraine and rising material and energy costs, which all contributed to further declines in 2022 (Mogge and Daniel 2022). Although these issues have largely been addressed, both sales and production in these regions remain below their pre-pandemic levels. The automotive industry has undergone significant transformation and disruption in recent years, with the Covid-19 pandemic serving as a major catalyst. Asian OEMs, already on a trajectory of growth, seem to have navigated these challenges more effectively than their global counterparts, solidifying their position as dominant players in the global automotive industry.

2 Methodology

This thesis adopts a mixed-methods approach, specifically an explanatory sequential design, which integrates both primary and secondary research methods to provide a comprehensive analysis of the RQ (see Appendix 1: Methodology overview (own illustration)). This approach is grounded in the concept of triangulation which enhances the credibility of findings by combining multiple data sources (Creswell and Plano Clark 2007). The research process was initiated by the collection of qualitative and quantitative secondary data. A thorough literature review was conducted to identify key success factors of the Chinese BEV industry highlighted in existing studies. Additionally, recent market, media, and dataset analyses were included to capture the latest industry developments, providing valuable insights not yet fully reflected in academic literature. The findings gained from this secondary research informed the subsequent primary research phase and supported the development of an interview guide for industry experts. Through semi-structured interviews, the insights from secondary research were either validated, expanded, or questioned. Finally, a comparative analysis was undertaken between

the secondary and primary data, aiming to derive a well-rounded conclusion, including both perspectives.

2.1 Secondary Data: Literature Review

To identify existing relevant academic work and establish a knowledge base, a literature review was carried out. The systematic approach outlined by Watson and Webster (2002) was used as a framework to obtain an accurate overview of the available literature (see Appendix 2: Systematic literature review (own illustration based on Webster and Watson, 2002)).

2.1.1 Search Strategy

Initially, related articles within the same subject area were identified to determine relevant journals and refine the scope of the review. Based on this preliminary analysis, a search string was developed, consisting of carefully selected keywords representative of the core themes (see Appendix 3: Combination of keywords used to search the database (own illustration)). The keywords form the three categories: (1) *EV industry*, (2) *China's role in the EV market*, and (3) *Potential success factors*. The created search string can generate a variety of combinations from the keywords of the three categories, e.g., searching for a paper that revolves around the keywords “*Electric Vehicle*”, “*China*”, and “*Competitive Advantage*”. The specified keywords were checked for occurrence in the title, abstract and author keywords of an article. The use of the asterisk (*) for each keyword in the search string enabled the inclusion of word variants and broader results.

Additionally, the journal archives for *Journal of International Business Studies*, *Journal of Business Research*, *Asia Pacific Journal of Innovation and Entrepreneurship*, and *Journal of Cleaner Production* have been searched for relevant studies. These journals were chosen due to their high impact factor (Clarivate 2024) and their relevance to the research topic, particularly in areas such as electric mobility and international business strategies. Only articles, proceeding papers and reviews published since 2015 are considered for the initial identification phase. This

specific year was selected due to the introduction of the "*Made in China 2025*" initiative, which aims to establish China's status as a global leader in high-tech industries, with the automotive sector playing an important role and solidified China's commitment to electric and fuel cell vehicles. Studies published after this milestone are expected to offer greater relevance, as they reflect the most current developments and shifts within the automotive industry following the policy's introduction. Nonetheless, forward and backward citation searches were employed to incorporate relevant literature published prior to this period.

2.1.2 Procedure

Using the explained search string, illustrated in Appendix 3: Combination of keywords used to search the database (own illustration), the Web of Sciences database was searched. Web of Science is a multidisciplinary research database that provides access to high-quality, peer-reviewed scholarly articles, citation data, and comprehensive indexing across sciences. The resulting *443 records* and the *21 records* identified in journal archives were then evaluated for relevance and usefulness in three steps (see Figure 3).

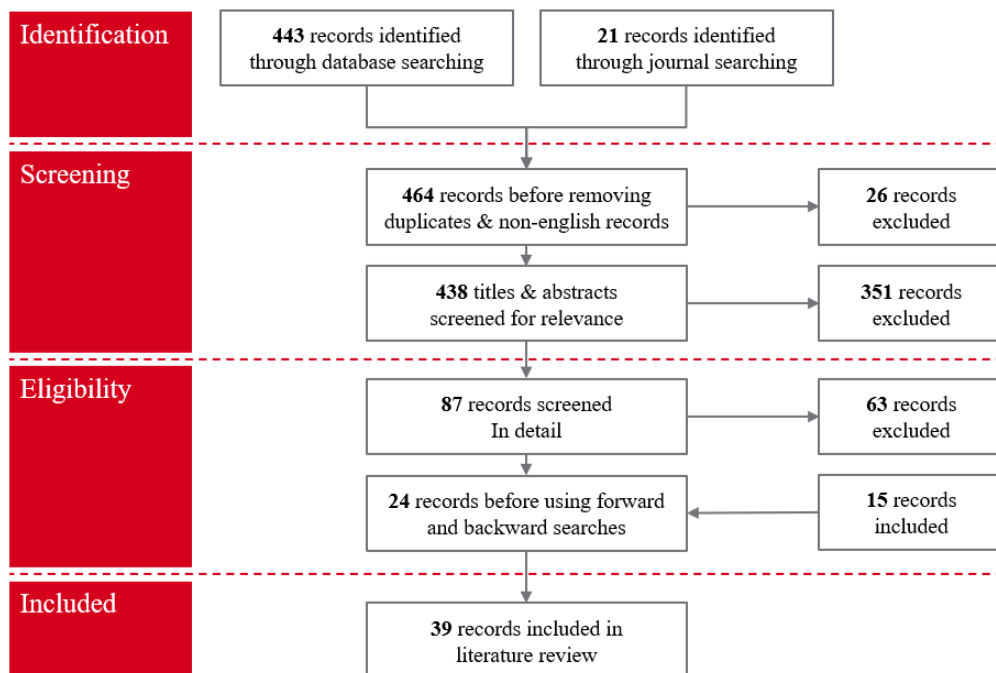


Figure 3: Flow chart of literature identification (own illustration).

In the first step, duplicates as well as non-English records were removed, and the title was

screened for relevance, i.e. record must meet both of the following criteria:

- Record must address EVs within the automotive industry, covering areas such as market growth, technological advancements, or strategic developments.
- Record must include discussions of China or Chinese OEMs, offering insights into their impact and role in the global EV market.

In the subsequent detailed filtering, the articles initially classified as relevant were reevaluated by checking the abstract and content with one additional criterion:

- Record must mention or analyze key success factors in the Chinese EV industry, highlighting areas enabling the competitive positioning of Chinese OEMs.

In the last step, the database was expanded using forward and backward search and supplemented with *15 additional findings*. This results in a total number of *39 records* considered relevant for our academic knowledge base.

2.2 Secondary Data: Market, Media and Data Analysis

For the analysis of market reports, media coverage, and datasets, a consistent search strategy was applied, building upon the structured approach used in the literature review. Key search terms and themes were carried over to ensure alignment across all data sources. Credible outlets such as renowned consulting firms (e.g., McKinsey, Boston Consulting Group), financial news platforms (e.g., Bloomberg, Reuters), and industry databases (e.g., MarkLines, International Energy Agency) were prioritized. Each source was assessed for relevance and credibility within the EV industry and the context of Chinese OEMs. The collected data was synthesized through thematic analysis, identifying key trends and insights. For automotive sales and production data, MarkLines served as the primary source. MarkLines is a comprehensive data search platform offering a database that covers vehicle sales in 62 countries (accounting for 96% of global sales) and production data from 43 countries (representing 97% of global production) (MarkLines 2024a). For this thesis, sales and production data from 2010 to 2023 was downloaded in an

Excel format, containing 55,588 and 6,734 data row entries, respectively. To extract more detailed insights, additional parameters were included. For sales data, the brand's country and region of origin, as well as the region of sale, were added. Vehicle types and powertrains were also categorized for improved clarity. In production data, similar parameters were included, excluding powertrain variations. MarkLines provided the foundation for all sales and production figures, ensuring consistency and comparability throughout the analyses in this thesis. A detailed breakdown of the data, along with the applied parameter adjustments, is provided in Appendix 4: MarkLines classification of countries and continents (MarkLines 2024a)⁴, Appendix 5: MarkLines classification of cars, busses, trucks and others (MarkLines 2024a), Appendix 6: MarkLines classification of powertrain type (MarkLines 2024a), Appendix 7: MarkLines sales data analysis (MarkLines 2024a)⁷, Appendix 8: MarkLines production data analysis (MarkLines 2024a), and Appendix 9: MarkLines sales market share analysis China (MarkLines 2024a)⁹.

2.3 Primary Data: Expert Interviews

To integrate the opinions and knowledge of experts from the field into the thesis, qualitative expert interviews were conducted. The interviews followed a semi-structured approach so that additional suggestions from the experts interviewed could be incorporated (Kallio et al. 2016). A guideline was used to ensure that similar and complete information is collected from the various interviewees. Each interview was conducted in the form of a video call. For the documentation of the interview, an audio recording was made and transcribed to minimize data loss.

2.3.1 Expert Selection

The selection of interview partners significantly determines the quality of information in the expert interview. The following criteria were therefore used in the search for interview partners:

- Does the expert have valuable information and is he or she able to present it precisely?
- Is the expert available and willing to provide information?

In order to reduce subjective perceptions, multiple interviewees were consulted. To minimize bias, interview partners from various relevant entities and fields of activity were surveyed (Gläser and Laudel 2010). The selection includes experts who have gained experience in the automotive or EV sector, knowledge of government policies and regulatory frameworks, or a research background in sustainable technologies and market dynamics particularly relating to the success of Chinese OEMs. In addition to existing contacts, professional social platforms such as LinkedIn were used for the acquisition of experts. Ultimately, the selection process resulted in 13 interviews of renowned experts, who can be found anonymized in Appendix 10: Overview of interviewees (own table)¹⁰.

2.3.2 Interview Guide

An interview guide was created and followed carefully to ensure depth and clarity in data collection (see Appendix 11: Guide for semi-structured expert interviews (Hornstein, Schallenberg, and Schauer 2024)). The guide documented general information such as the expert's background, job title, and interview details, which provided context for the analysis. An introduction followed, which was used to establish ethical compliance by securing consent, explaining confidentiality, and providing an overview of the research objectives to align expectations. The core of the interview consisted of thematically organized questions in four areas: (1) *Introductory Questions*, (2) *Physical Resources and Labor Dynamics*, (3) *Technological Innovation and Strategic Value Chain Integration* and (4) *Government Support and Regulatory Frameworks*, each with a set of pre-defined questions, used to guide but not limit the interview process. Finally, the final section summarized key findings, invited additional reflections, and thanked the expert, ensuring a professional and collaborative conclusion. This structured approach balanced focus and flexibility, enabling the collection of rich insights.

2.3.3 Data collection and Analysis

The data collection was carried out through the transcription of the recorded interviews. A qualitative content analysis following the summarization method according to Mayring (2015) was applied to evaluate the expert interviews. This method involves systematically reducing the material while preserving the core content, creating an abstracted but representative body of the source material. The analysis was conducted in several steps. In the first step, the statements from the expert interviews were collected and paraphrased according to the Z1 rule. Non-content-bearing text elements were removed, and all statements were translated into a uniform linguistic level. The paraphrased statements were then transformed into grammatical shorthand. In the second step, the statements were generalized according to the Z2 rule, further abstracting and generalizing the content. The third step involved reducing the material following the Z3 rule, where paraphrases with similar content were merged, and non-relevant paraphrases were removed to further condense the material. If necessary, this reduction process could be repeated (Z4 rule). This summarization process resulted in a category system with thematic structuring. The full analysis following Mayring's approach is presented in Appendix 12: Expert interview analysis according to Mayring, which details the *17 clusters* that emerged from the expert interviews.

3 Background Information on the Chinese Automotive Industry

3.1 Historical Evolution: Emergence of the Chinese Automotive Industry

While the Chinese automotive industry today represents one of the largest and most important players within the global market, up until the late 1970s, there was basically no passenger car production in China (Holweg, Luo, and Oliver 2009). The rise of the Chinese automotive industry can generally be segmented into five phases that can be seen in Figure 4.

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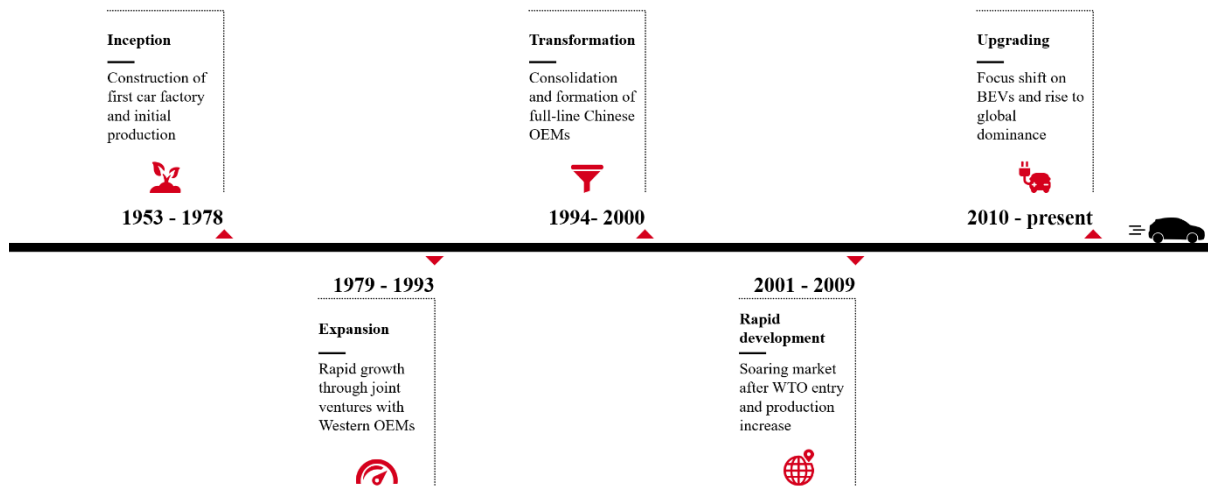


Figure 4: History of China's automotive industry (own illustration, based on IMD 2024).

Inception: After the Chinese Communist Revolution, the development of China's automobile industry was slow, hindered by civil war and limited market competition. Early growth in the 1950s relied heavily on Soviet assistance, including the establishment of the *First Automobile Works* (FAW) in 1953, which began producing Jiefang trucks in 1956 and Hongqi sedans in 1958 for government and military use (First Automobile Works 2020). Other vehicle assembly factories emerged in the 1950s and 1960s in cities like Beijing, Shanghai, Nanjing, and Jinan, with the *Second Automobile Works* (now Dongfeng) founded in 1968 (Dongfeng Motor 2024). In the 1970s, China's international relations evolved, marked by its change in representation in the UN in 1971 and the normalization of China-US relations in 1978. After chairman Mao's death in 1976, Deng Xiaoping shifted the focus from political to economic priorities, adopting the slogan “*Developing Productive Power*” The transition from a planned to a market economy gave local governments more autonomy, leading many to prioritize the automotive industry, which drove increases in production and product variety (Holweg, Luo, and Oliver 2009).

Expansion: In July 1979, China enacted its first *Law on Joint Venture Using Chinese and Foreign Investment*, aimed at attracting foreign technology and capital. China focused on limiting imports while boosting local production through joint venture (JV) agreements, which contributed to the country's rapid economic growth (Zhao 2022). Notable collaborations included a 1983 contract with American Motors Corporation to produce Jeep vehicles in Beijing (The New

York Times 1984), a 25-year agreement with VW in 1984 to make passenger cars in Shanghai (Volkswagen 2024) and a similar deal with Peugeot in Guangzhou (Stellantis 2020). However, these early JVs mainly involved assembling vehicles from knock-down kits, limiting China's access to foreign technology. By the late 1990s, eight JV enterprises were producing passenger cars in China, including Shanghai Volkswagen, FAW-Volkswagen and Beijing Jeep (Chang 2009). A more comprehensive overview of Sino-Foreign JVs can be found in Appendix 13: Sino-Foreign joint ventures, 1983–1992 (Yuan Jia-Zheng and Carles Brasó Broggi 2023).

Transformation: In 1994, the Chinese government designated the automotive industry as a “*Pillar Industry*” to drive the national economy. This decision was based on its links to sectors like metallurgy, petroleum, chemistry, electronics, and textiles, aiming to push enterprises toward greater specialization and coordination. This led to the *Automotive Industry Policy* with four main goals: (1) *Establish large-scale producers of saloons and light trucks*, (2) *Improve the components industry*, (3) *Develop product innovation*, and (4) *Promote individual car ownership*. The policy also addressed local content, environmental concerns, and foreign investment conditions (Holweg, Luo, and Oliver 2009). While JVs were critical to early industry development, the policy formally restricted foreign companies to a maximum of 50% ownership and two JVs per vehicle type, aiming to protect domestic firms by fostering technology transfer and managerial expertise (IMD 2024). Despite these restrictions, more JVs were established, which are detailed in Appendix 14: Sino-Foreign joint ventures, 1993–2001 (Yuan Jia-Zheng and Carles Brasó Broggi 2023). The 1990s also saw the rise of private companies, which disrupted state-owned enterprise (SOE) monopolies. Companies like Geely, Great Wall, and BYD classified as independent Chinese manufacturers and sought to develop local competition. Some retained partial state ownership, while supplying both SOEs and non-SOEs. SOEs continued to control international technology transfers, but non-SOEs were encouraged to compete and boost market supply (Yuan Jia-Zheng and Carles Brasó Broggi 2023). A list of independent

Chinese automobile manufactures can be found in Appendix 15: Independent Chinese Automobile manufacturers (Yuan Jia-Zheng and Carles Brasó Broggi 2023).

Rapid development: China joined the WTO in 2001, marking a significant turning point for the general Chinese economy and the automotive industry (Ke 2022). Following China's entry into the WTO, automotive tariffs were gradually reduced, significantly reshaping the market. Foreign manufacturers introduced their latest models to the Chinese market, offering consumers a wider selection of vehicles at competitive prices. As a result, demand surged, and competition intensified within the industry. By 2006, import tariffs on complete vehicles were lowered from 80 to 100% before WTO entry to 25%, while local content requirements were reduced from 40% in first year of production to no required ratio after WTO entry (Holweg, Luo, and Oliver 2009). In January 2007, China overtook Japan to become the world's second-largest vehicle market, following the US, driven by a 37% surge in car purchases (China Daily 2007). Following the 2007-2008 global financial crisis, the Chinese government introduced policies to boost car sales, including a car-scrappage scheme and reduced sales tax on smaller vehicles. These measures lead to significant demand for cars with engines under 1.6 liters, leading to a doubling of production and sales in 2009 and 2010 and a swift recovery from the financial crisis. Both the scrappage scheme and tax discount ended in late 2010 (Baker and Hyvonen 2011).

Upgrading: In 2010, China became the largest automotive industry, after surpassing the US and selling more than 16.5 million vehicles (MarkLines 2024a). From 2010 onwards, the Chinese automotive industry has experienced unprecedented growth, both in total vehicle sales and production, which is detailed in Figure 5. From 2010 to 2017, total vehicle sales in China increased from 16.5 million to 27.3 million units, while production rose from 16.8 million to 27.4 million units, reflecting CAGRs of 7.4% and 7.3%, respectively. This growth was halted by the pandemic, which caused three consecutive years of declining sales and production.

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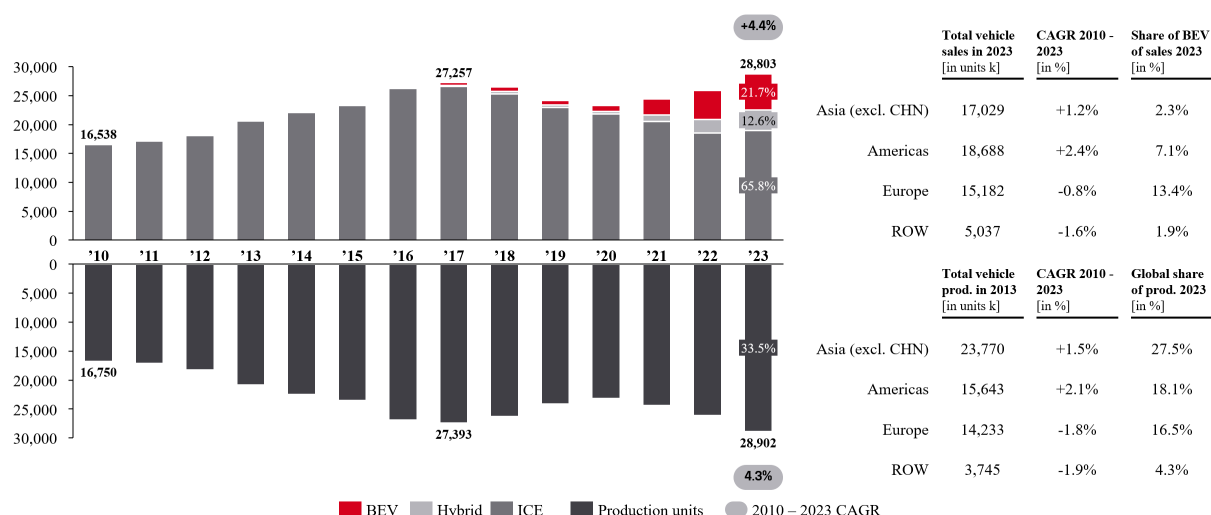


Figure 5: Vehicles sales by powertrain and total vehicle production in China, 2010-2023 [in units k and %] (own illustration, based on MarkLines 2024a).

However, China recovered quickly, achieving record highs in 2023 with 28.8 million vehicles sold and 28.9 million produced. When compared globally, China's automotive growth is especially striking. Between 2010 and 2023, China achieved a CAGR of 4.4% in vehicle sales and 4.3% in production, nearly double that of the Americas, which posted CAGRs of 2.4% in sales and 2.1% in production. In contrast, Europe experienced negative CAGRs of -0.8% in sales and -1.8% in production. China has become the dominant force in global automotive production, accounting for 33.5% of all passenger vehicles produced worldwide. The rise of BEVs in China has been particularly notable. In 2023, BEVs made up approximately 21.7% of all new vehicle sales in China, far exceeding the 13.4% share in Europe and the 7.1% in the Americas.

3.2 Status quo: Significance of the Chinese Automotive Industry

In 2022, China had a GDP of USD 17.9 trillion (Trading Economics 2024) with 10% being attributed to the automobile gross output (Ji 2022), making the industry one of the most significant drivers of the country's economy today. To put this in perspective, in Europe, traditionally one of the leading regions for the sector, the automotive industry's contribution to GDP is 7%, which is USD 0.68 trillion less in absolute terms than in China (European Commission 2024a). In addition, the global market share of Chinese brands is expected to grow from 21% in 2024

to 33% in 2030, according to an automotive report by AlixPartners (Koenig 2024). To understand the significance of the industry in China today, several factors should be examined:

Domestic Market Size: The international comparison confirms what has been suggested earlier in this thesis: China is the world's largest single country market for passenger car sales, accounting for 56% of Asia's revenues and surpassing the continent of Europe by USD 100 billion (see Figure 6) (Statista 2024). Interestingly, China's motorization rate (number of vehicles in use per 1,000 inhabitants) of 223 is significantly lower than that of the Americas (average of 443) and Europe (average of 518), while it has the second highest average annual growth rate after Vietnam at 14% (OICA 2020b). The Chinese automotive market is expected to become even more important in the future as individual mobility becomes more widespread.

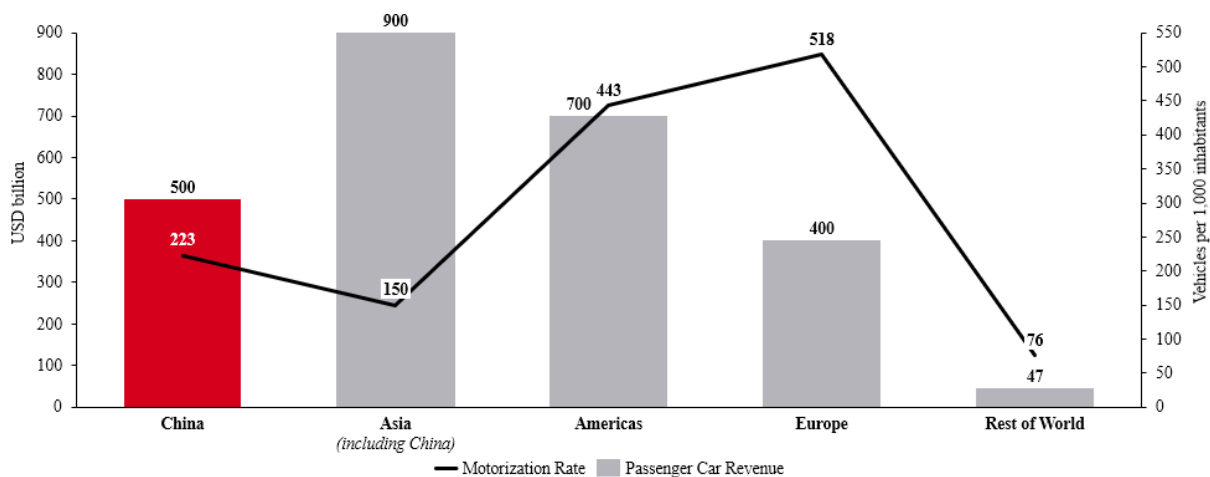


Figure 6: Passenger car revenue, 2023 [in USD billion], and motorization rate, 2020 [in vehicles per 1,000 inhabitants], by location (own illustration, based on Statista 2024, OICA 2020b).

Brand Shares in China (ICE vs. BEV): A closer examination of the Chinese passenger car market reveals two distinct profiles for the ICE and BEV segment. Established international players continue to maintain a dominant role in the ICE segment, with a sales share of 45% and Volkswagen alone controlling 11% of the Chinese market in 2023. In contrast, Chinese players have gained a leading position in the Chinese BEV market, with a sales share of 60% and the top two brands, BYD and GAC, controlling more than 30% of the BEV market (see Figure 7) (MarkLines 2024a). While particularly western companies enjoyed a competitive edge through

superior brand images and ICE technology in the past, the playing field has changed for BEVs. Local buyers prefer domestic models due to cost and technology advantages, enabled by an increased focus on EVs by local brands (Shiv Shivaraman 2024). This trend is expected to gain further importance in upcoming years, with the BEV penetration rate in China projected to increase from 22% in 2023 to over 45% in 2030 (Goldman Sachs 2024).

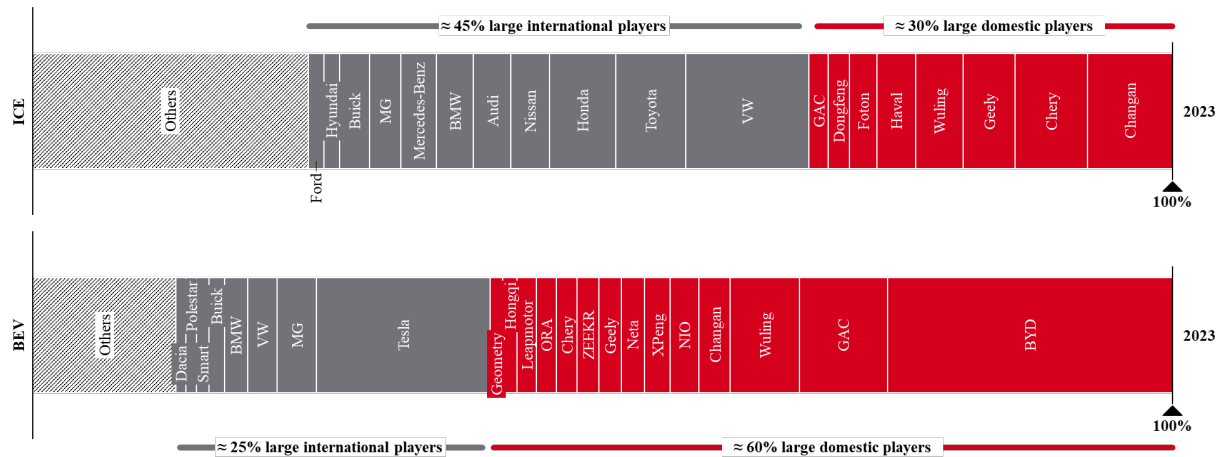


Figure 7: Brand shares for passenger car sales in China, 2023 [in %] (own illustration, based on MarkLines 2024a).

International Significance of Chinese Automotive Industry: In addition to the domestic success of Chinese OEMs in the BEV segment, there has been a notable increase in vehicle exports, from one million units in 2020 to 4.9 million units in 2023. As a result, the country became a larger exporter than Germany and Japan. This development is promoted by exports of EVs, which constituted a 25% share of total exports in 2023, up from 15% in 2021 (Buchholz 2024). While the automotive sector in Asia overall accounts for a substantial proportion of global sales, China is the primary contributor of the continent, with a 21.9% share. This establishes the country's industry as the largest in the sector (see Figure 8) (MarkLines 2024a).



Figure 8: Global vehicle sales share of China's automotive industry in the international comparison, 2023 [in %] (own illustration, based on MarkLines 2024a).

Global Expansion Outlook for Chinese OEMs: Chinese OEMs primarily focused on the domestic and less developed markets in the past. Current efforts, however, show an increased targeting of global key markets, including North America and Europe (Deloitte 2022). A detailed examination of vehicle launch schedules proves an initial prioritization of Europe with 17 out of 30 analyzed major brands having already entered the market or announced their vehicle launches for the future, compared to six in North America (see Figure 9) (MarkLines 2024c). Expansion strategies include a primary trial phase of exporting to local markets from China with sales partnerships and, if successful, subsequently opening factories and implementing independent sales organizations to build up more agile supply-chains and reduce trade tariffs (Reuters 2024a; Fletcher and Urquhart 2024; Hedin Mobility Group 2024).

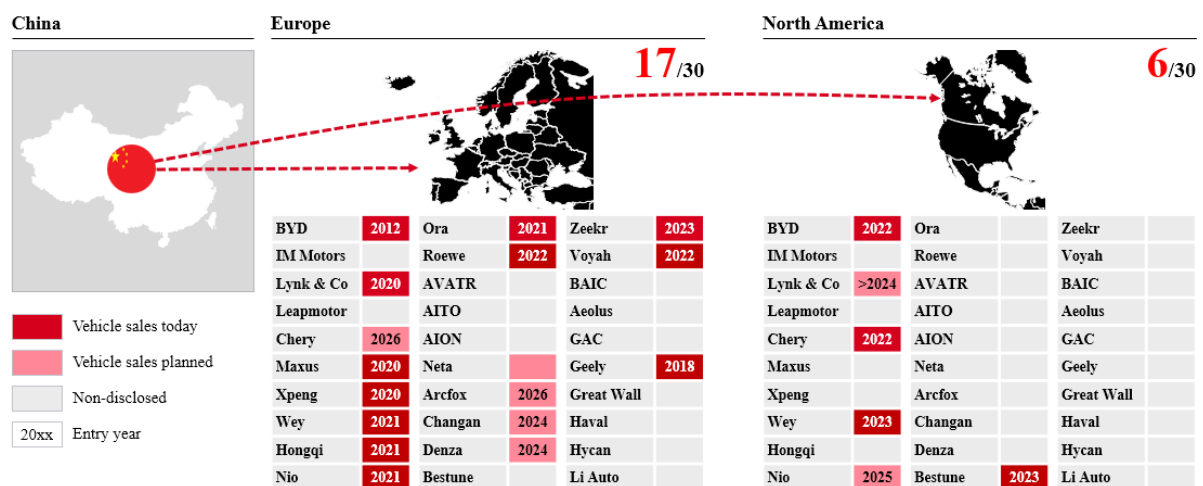


Figure 9: International expansion overview of Chinese OEMs for Europe and North America (own illustration, based on MarkLines 2024c).

4 Unique factor conditions of Chinese BEV industry

4.1 Physical Resources and Labor Dynamics

This chapter examines three key success factors: China's access to physical resources, its refining industry and labor force characteristics and their corresponding influence on China's BEV industry. The initial research is mainly based on analysis of secondary data, which is later verified and expanded through expert interviews to provide further insight into these factors and their impact, an approach also followed in chapter 4.2 and chapter 4.3.

4.1.1 Secondary Data: Literature Review and Data Analysis

With China's early transition towards BEVs, its automotive industry faced a historical shift, which dramatically altered the structure of the automotive value chain and the vehicle manufacturing process. Perhaps one of the most challenging aspects of the ICE to BEV transformation is the change in raw materials used in the production process. While certain production characteristics remain unchanged, several areas, especially battery and electric powertrain operations, are entirely new and require both new production processes and inputs (Smith et al. 2022). The difference in materials used for an ICE vs BEV can be seen in Figure 10.

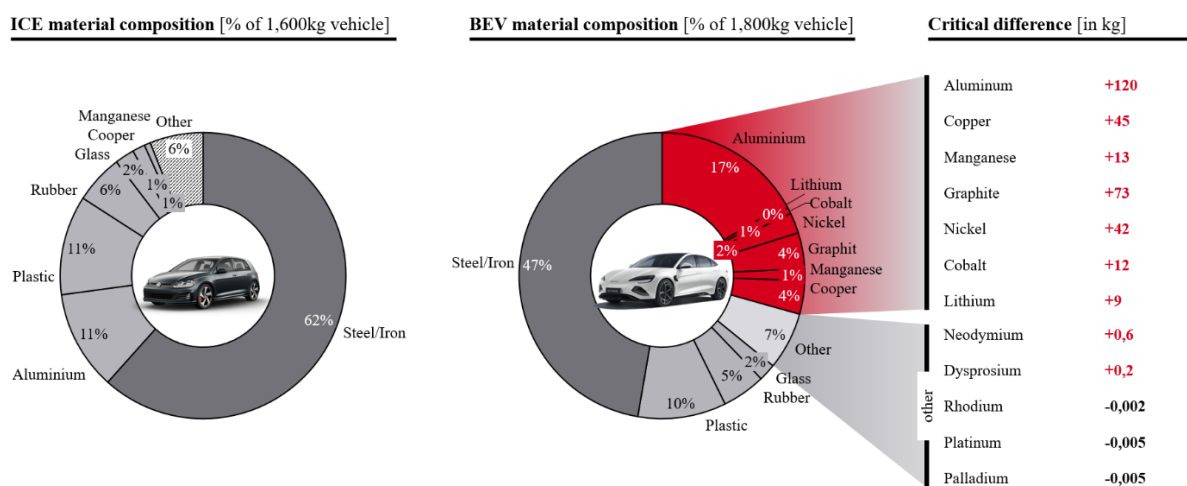


Figure 10: Material composition of ICE vs BEV (own illustration, based on Porsche Consulting 2024).

The variation in engine and transmission systems between ICE vehicles and BEVs results in a significantly changed material composition. BEVs lack the engine and transmission found in

ICE vehicles, which require a complex assembly of casted parts typically made from steel and iron. Instead, BEVs use lightweight materials such as aluminum and composites to offset the weight of the heavy battery (Billy and Müller 2023). While steel and iron account for approximately 1.1 tons in ICE vehicles, they now only constitute about 0.8 tons in comparable BEVs. In addition, BEV production relies heavily on materials such as lithium, cobalt, and nickel. Lithium provides the high energy density required for battery storage, while cobalt and nickel enhance the battery's stability and capacity with materials like neodymium and dysprosium being used in permanent magnet (Turcheniuk et al. 2021; Junne et al. 2020). This shift in material composition, though not a direct success factor, required major greenfield investments and may have acted as a catalyst. Although BEVs require fewer raw materials over their lifetime due to the lack of continuous fuel consumption, their initial production is resource intensive, especially when it comes to sourcing metals for batteries (Parikh, Shah, and Prajapati 2023). Therefore, to ensure a stable supply chain for BEV production, the Chinese government in cooperation with domestic OEMs has strategically secured access to critical materials both domestically and abroad. An overview of materials found in mainland China (dark red) and their respective applications, as well as other countries that act as significant suppliers of critical raw materials used in automotive production (light red), can be seen in Figure 11.

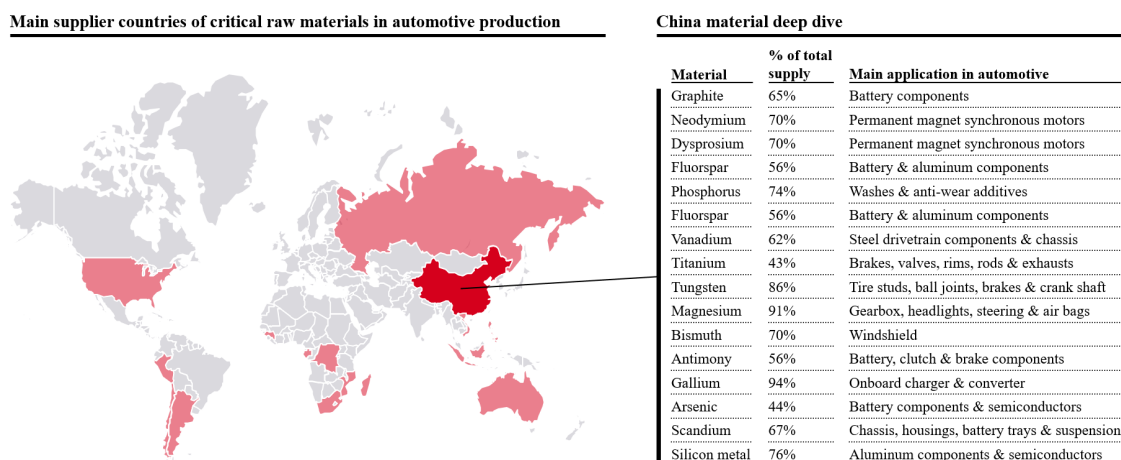


Figure 11: Relevant automotive materials coming from China (own illustration, based on European Commission 2023b and United States Department of Energy 2023).

While significant amounts of materials used in automotive production come from the Americas

(such as copper and lithium), Africa (manganese and cobalt), Australia (aluminum and lithium), and Russia (nickel and cobalt), China is home to a wide range of minerals critical to the sector. As previously discussed, further important materials in BEV production are graphite, neodymium, and dysprosium, of which China supplies approximately 65%, 70%, and 70% of the global total, respectively. In addition, China concentrates the supply of other key materials for automotive production, holding 94% of the world's gallium (used in chargers and converters), 91% of magnesium (used in transmissions, steering components, and airbags), and 86% of tungsten (used in tire studs, ball joints, and brakes). While China benefits from its abundance of critical raw materials within its own borders, particularly compared to Europe, the government has actively pursued strategies together with private companies to secure additional key materials for BEV production. Through domestic initiatives, international partnerships and investments, and strategic alliances, China strengthens its supply chains, enabling its OEMs to maintain a competitive edge in the global EV market (BBC 2024). Through the Belt and Road Initiative (BRI), China has secured access to critical minerals in countries across South America, Asia, and Africa. Notably, 70% of the Democratic Republic of the Congo's mining sector is dominated by Chinese investors, according to Energy Monitor. Recent expansions have been particularly strong in Africa and Latin America. The number of Chinese-owned mines outside China, containing critical minerals like cobalt, lithium, and copper, is set to more than double, from 40 currently in operation to 89 planned (Bindman 2023). Figure 12 showcases the location of planned greenfield mines that contain transition materials that are majority-owned by Chinese companies, as well as the top 10 countries with Chinese mineral operations. The geographical distribution of planned greenfield mines is concentrated in resource-rich regions like South America, Africa, and Australia. South America hosts significant sites in Peru (8 mines for copper, iron, and zinc) and Ecuador (6 mines for copper and zinc). Africa's key locations include the Democratic Republic of the Congo (4 mines for cobalt, copper, and lithium) and South

Africa (3 mines for copper, manganese, and zinc).

Location of planned greenfield mines containing transition minerals* that are majority-owned by Chinese-domiciled companies



*Mines containing either of the following minerals as a primary commodity: chromium, cobalt, copper, graphite, iron ore, lead, lithium, manganese, vanadium and zinc

Top ten countries with overseas mines containing critical minerals, majority-owned by Chinese companies

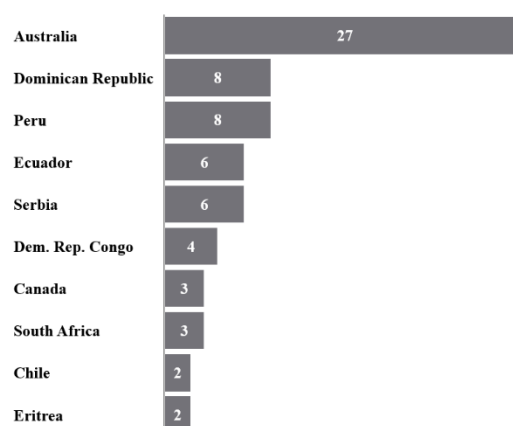


Figure 12: Location of Chinese overseas mineral operations and top 10 target countries (own illustration, based on Energy Monitor 2023).

Australia leads with 27 Chinese-owned mines, focusing on copper, lithium, and zinc. Material sourcing may be key to the Chinese BEV industry's success, with strategic efforts ensuring access to cheap critical minerals and a stable supply chain. While literature lacks a direct link to BEV success, this will be explored through expert interviews later. The described sourcing initiatives have been predominantly driven by SOEs, though private sector participation (i.e. OEMs) has grown steadily, aided by streamlined approval procedures for foreign transactions under USD 1 billion, introduced in 2014 (S&P Global 2021). Since the early 2000s, the Chinese government has promoted overseas investment in mineral assets to secure raw material supplies and reduce reliance on volatile commodity markets. While focusing on resource-rich developing countries, these investments have often faced criticism for governance issues, ecological harm, and social conflicts. Local communities and civil society groups have raised concerns about environmental and human rights abuses tied to Chinese operations (Scungio 2021). Despite these criticisms, scholars note that Chinese investments have contributed to the green and high-quality development of mining sectors in BRI partner countries across Asia, Africa, Europe, and the Americas (Global Times 2023a). Meanwhile, the US, the UK, and the EU have

developed strategies, such as the *Critical Raw Materials Act* and *Minerals Security Partnership*, to reduce their reliance on Chinese mineral supplies (BBC 2024).

While China holds a dominant position in sourcing minerals essential for BEV production, an even greater advantage lies in the refinement process of these minerals. Mineral refinement refers to the processing of raw materials, such as lithium, cobalt, nickel, and manganese, which are essential components of EV batteries. The refinement process involves extracting these minerals from their ores and purifying them to meet the specific chemical and structural requirements for e.g. battery production (Barman, Dutta, and Azzopardi 2023). China's total share of both mining and more importantly refinement can be seen in Figure 13. For copper, China accounts for only 8% of global mining but for 44% of refining, making it the largest supplier of refined copper in the world. Similarly, China mines 11% of the world's cobalt but refines 77%, once again positioning it as the top global supplier.

China's share of global supply of key minerals from existing and announced projects, 2023 [in %]

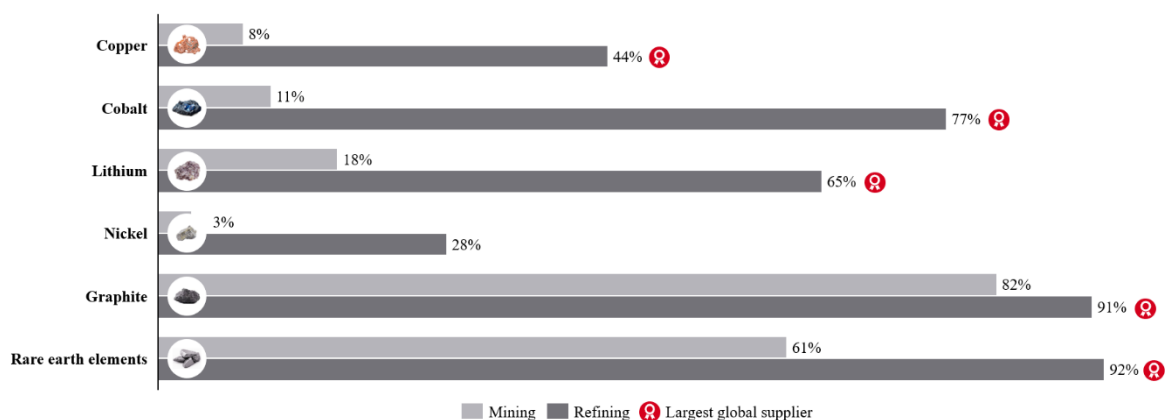


Figure 13: China's share of global supply of key minerals (own illustration, based on International Energy Agency 2023d).

China leads the lithium supply chain with 18% of mining and 65% of refining. It dominates graphite and rare earth elements, supplying 91% of refined graphite and 92% of refined rare earth elements, respectively, solidifying its position as the top global supplier. This underscores China's critical influence in mineral refining, especially for the minerals essential to BEVs. China has mastered the costly and environmentally harmful refinement process over 30 years,

building technical expertise, taking advantage of lower wages, and potentially overlooking environmental impacts. This dominance may be a key success factor, ensuring a reliable, cost-effective supply of materials used in BEV production. However, few scholars link this directly to BEV success, and further investigation through expert interviews is needed. In contrast, Western companies have faced challenges in refining with its technical complexities and pollution issues (Jowitt 2022). China's grip on the refined mineral market is so tight, that in 2012 when the Chinese government introduced strong export quotas, the WTO had to intervene to guarantee a stable supply outside of China (World Trade Organization 2014). To reduce reliance on China, Western tech start-ups, such as *AMG Lithium* are developing new rare earth refining methods to cut environmental impact and support the clean energy transition. By 2025, these innovations could reduce toxic by-products and enable firms to charge premium prices for eco-friendly minerals. However, with no commercial launches yet, experts caution that these unproven technologies may not meet high expectations or global electrification goals. For now, China remains the leader (Scheyder 2023).

Scholars suggest that China's access to critical resources, supported by government-backed investments, has been key to its BEV industry success. The shift from ICE to BEV technology reshaped the automotive value chain, with China's dominance in minerals like lithium, cobalt, and rare earth elements providing a major advantage. This control has cemented China's leadership in the global BEV market through domestic resources and international investments. The next section explores another potential success factor: the Chinese labor market.

According to the 2023 All-China Federation of Trade Unions (ACFTU) survey, China's total number of laborers has grown to 402 million people at the beginning of 2022, up from 391 million recorded in 2017 (Huld 2023). An overview of different key metrics from that survey can be found in Figure 14. The total labor force includes 402 million individuals who are primarily engaged in manual or physical labor. The average age of these workers is 38.3 years,

making the workforce slightly younger than in Europe (41.0 years). Educational attainment is also a significant factor, with workers averaging 8.1 years of formal education. This level is comparable to countries such as Brazil (8.3 years) and Indonesia (8.6 years) but falls significantly short of leading automotive nations like Germany, where the average education level reaches 14.3 years.

Key metrics of the Chinese labor market, 2022 [in millions, years and Euros]

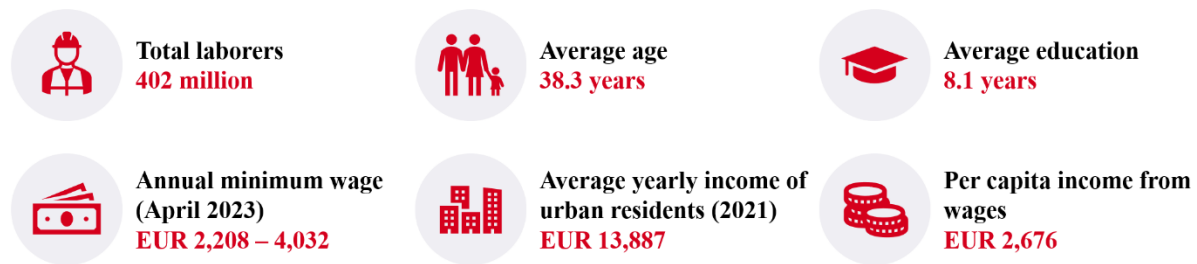


Figure 14: Overview of China's labor market (own illustration, based on Dezan Shira & Associates 2023 and Global Data Lab 2024).

In terms of economic indicators, the annual minimum wage in 2023 varied between EUR 2,208 and EUR 4,032, illustrating regional differences in earnings. In addition, the average annual income of urban residents was recorded at EUR 13,887 in 2021, while the per capita income from wages across all of China was EUR 2,676. Scholars note that China's labor cost advantage has been a major driver of its economic success, particularly in attracting FDI and becoming a global manufacturing hub. In the early 1990s, China's manufacturing wages were among the lowest in Asia, making it highly competitive (Huang, Sheng, and Wang 2021). However, labor costs have risen significantly in recent decades, with wages increasing more than fivefold between 1993 and 2015, surpassing many neighboring countries. The implementation of a minimum wage system in 1994 further shaped labor costs (Casale and Zhu 2013). Despite the rise in wages, China's labor market reforms, including the introduction of more comprehensive minimum wage policies and stricter enforcement, have kept labor costs developments relatively low compared to the US and Europe. While the labor cost index in the US and Europe stands at 120 and 109 points respectively, China's labor cost index is significantly lower at 64 (Trading Economics 2024b). According to the Reshoring Institute, workers in the manufacturing industry

in countries such as Germany and the US earn an average of about USD 33,000 per year, while their Chinese counterparts earn about USD 13,000 for similar work. As wages rise in China, companies are considering moving production to other, lower-cost Asian countries. However, completely exiting China is often seen as risky, leading many companies to adopt a "*China +1 or China +2*" strategy, where they maintain some production in China while expanding operations to one or more additional countries (Reshoring Institute 2022). While foreign OEMs benefit from lower labor costs in China, they still face higher wages in their home markets, unlike Chinese BEV manufacturers, which have focused their workforce domestically from the start. Beyond being cost-effective, China's labor force is highly skilled, thanks to government-led initiatives like the "*National Medium- and Long-Term Talent Development Plan*" (2010–2020), issued by the Central Committee of the Chinese Communist Party and the State Council in 2010. This blueprint aimed to transform China into a global innovation leader, increasing skilled workers from 114 million to 180 million by 2020, a goal reportedly surpassed with over 200 million skilled workers in 2021 (Brookings 2010; The State Council of the People's Republic of China 2021). FDI has also boosted demand for both high- and low-skilled workers, with a stronger impact on high-skilled roles (Rong et al. 2020). Before Covid-19, Chinese automotive companies used structured training programs like those in the West to address skill gaps (Jürgens and Krzywdzinski 2014). Post-pandemic, the government intensified efforts with initiatives like the "*National Technician Training Program*" and the "*Skills for All*" campaign, focusing on technological skills critical to the BEV industry (Liang 2024; The State Council of the People's Republic of China 2024). Collaboration among the Chinese government, educational institutions, and industry partners aims to bridge skill gaps and meet the demand for skilled workers, making the workforce a success factor for many industries. However, the connection to the success of Chinese BEV OEMs needs validation through expert interviews. The literature review analyzed potential key success factors behind China's BEV dominance,

focusing on its access to critical resources and labor market characteristics. It highlighted significant differences in material consumption between ICE and BEV production, emphasizing China's strategic efforts to secure raw and refined minerals. Additionally, it examined the Chinese labor market, noting its cost competitiveness and high skill levels. The next chapter aims to validate these findings and bridge identified gaps by engaging with industry experts, offering deeper insights into whether the success factors identified in the literature align with practical experiences and expert perspectives.

4.1.2 Primary Data: Expert Interviews

The following chapter presents the results of the expert interviews, focusing on their perspectives on the impact of physical resources and labor dynamics. To provide a comprehensive understanding of China's efforts to secure raw materials both domestically and internationally, the development of its refining industry, the contributions of its workforce, and the overall future of China as a global BEV production hub, the experts' insights were synthesized and organized into five distinct clusters.

CL1.1 - Greenfield Opportunity driven by Material Transition: The shift from ICE vehicles to BEVs has created both opportunities and challenges for the automotive industry, allowing Chinese OEMs to develop a distinctive competitive position within the market. The experts underscore the shift in material composition in BEVs as an impactful, though differently weighted, success factor for Chinese BEV OEMs. Multiple experts agree that the distinctive material composition required for BEVs has given Chinese OEMs a competitive advantage by allowing them to break with established manufacturing approaches (E2, E3, and E5). E2 emphasized that this shift has allowed Chinese OEMs to enter a previously saturated market dominated by traditional Western manufacturers. E5 further elaborated that it enabled Chinese manufacturers to "rethink traditional approaches" and incorporate innovative elements. However, E9 and E13 considered the unique material composition of BEVs compared to ICE to be only a secondary

contributor to the success of Chinese OEMs, pointing to other potentially more influential elements in the growth of the industry. E8 pointed out that while lightweight materials such as various steels and carbon, have seen increased use in BEVs, they also have traditionally been used in vehicle manufacturing and do not represent a fundamentally new development unique to BEVs. Instead, the distinctive "skateboard" design of BEVs, with batteries integrated into the chassis, marked a shift to a whole new product category that required new design knowledge and skills. According to E8, this design introduced, among others, materials not previously required in conventional vehicles, underscoring the need for adaptation. While most experts acknowledge that the shift in material aided Chinese OEMs, the extent to which this factor alone has driven success is debatable, with some seeing it as a fundamental advantage and others as a secondary one.

CL1.2 - Securing Critical Materials beyond the Borders of Mainland China: China's strategic approach to securing access to key raw materials has played a central role in the success of the BEV industry according to the experts. Experts agree that China's proactive investments in raw material acquisition have strengthened the position of Chinese BEV OEMs and make it difficult for other countries to bypass China for battery and cell production (E1, E8, E11, and E13). E7 and E11 emphasized China's strategy of securing raw materials through international investments, especially in Africa and South America, supported by government initiatives like the BRI. E1 highlighted China's early foresight in securing battery materials internationally, with E7 and E11 adding that Chinese BEV OEMs benefit from these partnerships, by gaining stable and early access to critical resources. E11 also mentioned that China's investments often include infrastructure to streamline the transportation of resources from Africa and South America, ensuring a reliable supply of raw materials. In addition, E4 and E6 pointed out that China's investment strategy in emerging markets is relatively unrestricted in comparison to the regulatory and ethical considerations of Western investments. This direct, no-strings-attached approach

has fostered robust relationships with resource-rich countries, although this has occasionally led to increased scrutiny in some regions (E5). E10 highlights that China's resource acquisition strategy contrasts with that of the US and Europe, where partnerships often focus on security and cooperative frameworks. In addition to foreign investment, China's pursuit of domestic initiatives to improve raw material security, such as investing in battery recycling was mentioned by E5 and E7. E7 notes that major OEMs and battery manufacturers, such as CATL, are actively promoting recycling programs as a way to reduce dependence on imported materials. Among experts there were also concerns about potential future weaknesses in China's resource strategy. For example, E9 suggests that China's dominance in access to resources could be threatened by a technological shift in battery materials. E10 and E13 also highlight the geopolitical complexities of global resource competition, noting that this is a dynamic area where governments, rather than OEMs, are the primary drivers of access to strategic resources. E12 raises additional concerns about the power imbalance created by China's dominance, particularly the dependencies it is creating with both suppliers and consumers, which may pose risks to China in the long term.

CL1.3 - Leading Authority in Material Refinement: The expert interviews provide a differentiated view of Chinese OEMs' strategic advantages through mineral refining. While experts agree that China's resources and low-cost refining generally benefit Chinese BEV OEMs, their views differ on the long-term sustainability and the extent of these advantages as technology evolves. E1 pointed out that Western OEMs need to purchase refined raw materials at higher prices, which raises vehicle costs, giving Chinese OEMs a significant cost advantage. E2 explained that China's lower labor costs and relaxed environmental regulations allow it to operate more cheaply in the refinement process, allowing Chinese BEV OEMs access to cheaper materials in return, but also stressed the need for other countries to reduce their dependence on China through regulatory measures. The importance of mineral refining was reiterated by E7, who

emphasized its contribution to success in times of limited supply. E9 on the other hand, considered advances in cell technology to be more important than mineral refining itself, suggesting that China's role in refining may not be as important as its control over battery technology. Meanwhile, E8 suggested that rapid advances in battery technology - such as higher energy densities, faster charging and recycling - could reduce demand for refined raw materials over time. E11 added that reducing reliance on China for rare earths is increasingly a priority for countries and companies, with advances in battery technology enabling alternatives and a move towards self-sufficient production for other countries and OEMs in turn. However, despite these potential advancements, E3 noted that China's strong position in material refining is unlikely to change in the foreseeable future.

CL1.4 - Proficiency and Work Ethic of Chinese Labor Force: The interviews revealed that the success of Chinese BEV OEMs is underpinned by a unique set of workforce-related factors that collectively support rapid growth and competitiveness. E1, E5, and E11 emphasized that the Chinese workforce is young, highly motivated, and has a remarkable work ethic, working longer hours and taking less vacation than their Western counterparts. E8 noted that this drive is often seen in emerging industries, which tend to be more dynamic and focused than saturated markets. In addition, E11 described how this work ethic extends to a commitment to continuous learning and a focus on practical results. The experts also highlighted a sophisticated approach to training that allows for rapid development of employees in specialized areas. E2 and E3 noted that Chinese employees receive highly focused, on-the-job training that is specific to their roles, which supports operational efficiency. E11 elaborated on this, explaining that while foreign trainers initially helped Chinese factories to establish production quality, local expertise has grown considerably. Today, Chinese workers are handling production and technology development independently, supported by training programs that bring knowledge from Western institutions, such as universities or OEMs back to China. In addition, the role of industry-academic

collaborations was noted by E7 and E13, who cited partnerships between major OEMs such as BYD with top Chinese universities. E10 noted that former JV employees bring invaluable technical expertise that Chinese OEMs have integrated into BEV production processes. Although there is a broad base of well-educated talent, E12 noted that there are some differences in skill levels within the workforce. While the top tier of Chinese graduates from elite universities rivals their Western counterparts, the average level of education in China remains lower. In terms of wages, there was a consensus among the experts that China's wage levels remain lower than in the West, creating a low-cost workforce. E1 and E4 noted that while academic wages in Tier 1 cities have risen, overall wage levels are still comparatively low, maintaining China's attractiveness as a manufacturing hub.

CL1.5 - Relocation of Production Capacity from China: As an overarching outlook, the interviews revealed that China's rising wages are reshaping but not displacing its role as a global manufacturing hub. E6 highlights that productivity gains from a skilled workforce and cultural norms favoring longer working hours help sustain competitiveness despite wage increases. E12 adds that wage growth over the next 5-7 years will not significantly shift production volumes outside China. While E4 acknowledges rising costs for skilled positions, production workers remain far cheaper than in Western countries, preserving China's cost advantage. E3 and E11 emphasize that automation is helping mitigate wage pressures, with Chinese OEMs leveraging technology and shifting production to lower-cost regions within China like Anhui. However, simpler, labor-intensive tasks are beginning to move to countries with lower labor costs, such as Vietnam or Indonesia, as noted by E4 and E5. Nonetheless, E7 stresses that China's reliance on complex supply chains makes relocating high-tech production challenging. For international expansion, E8 and E11 highlight that Chinese OEMs are establishing facilities in Europe, Morocco, and Turkey to meet trade regulations and access subsidies. Despite these shifts, E4, E7 and E13 underscore that China's domestic market and regional diversity, combined with its

"dual circulation" strategy will solidify its position as a BEV production hub in the future.

Figure 15 illustrates the experts' evaluation of the success factors covered in this chapter.

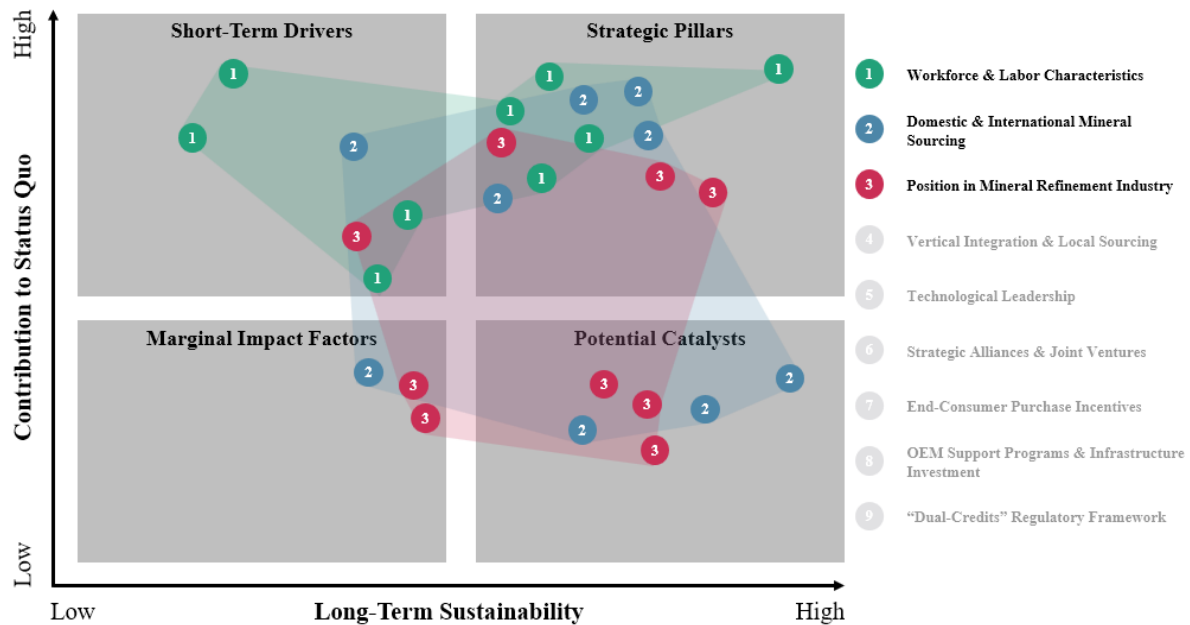


Figure 15: Result matrix of expert factor evaluation for physical resources and labor dynamics (own illustration).

Overall, success factor 1, "*Workforce & Labor Characteristics*", was widely recognized by the majority of experts as a key success driver in the past. This was attributed to China's relatively inexpensive yet highly skilled workforce, combined with an exceptional work ethic. While some experts foresee a diminishing significance for this factor, most agree it will remain vital in sustaining the success of Chinese BEV OEMs in the future. The historical impact of factor 2, "*Domestic & International Mineral Sourcing*", was viewed with varying perspectives. While five experts credited a significant portion of the success of Chinese BEV OEMs to the early efforts of the Chinese government, backed by the expertise of domestic OEMs, to secure critical raw materials, others considered its impact more marginal. These experts highlighted its contribution as indirect. However, there is greater agreement among experts that this factor is likely to remain sustainable and impactful in the future, especially when compared to factor 1. Factor 3, "*Position in the Mineral Refinement Industry*", follows a similar pattern but with slightly greater consensus among experts. While its impact, both historically and in the future, is generally regarded as more marginal, it is marked by a higher level of consensus among the experts.

4.1.3 Comparison of Secondary and Primary Data

While secondary data did not explicitly identify the shift in material mix between ICE vehicles and BEVs as a key success factor for Chinese BEV OEMs, several experts considered it significant, with some viewing it more as a catalyst for success. China's dominance in raw material mining and refining is well-documented in secondary data, but its direct link to the success of Chinese BEV OEMs is less clear. Experts, however, made this connection, identifying it as a key success factor, with the reliable and affordable use of raw materials being mentioned as significant contributors to the success of Chinese BEVs. The strongest alignment between secondary and primary data occurred in the evaluation of the Chinese workforce. Both sources consistently ranked the labor force as essential to China's manufacturing rise, emphasizing their high qualifications and relatively low labor costs, with expert interviews confirming its role as a key success factor in the BEV industry specifically. Overall, expert interviews bridged the gap left by secondary data, linking the change in material mix, dominance in mining and refining, and the Chinese workforce to the success of Chinese BEV OEMs.

4.1.4 Conclusion

This chapter identified access to inexpensive, high-quality raw and refined materials and especially the Chinese workforce as key success factors underpinning the recent achievements of Chinese BEV OEMs. The primary objective was to analyze the downstream input factors of the Chinese BEV industry and assess their contribution to its unprecedented success. These factors' positive impact was validated by renowned scholars and industry experts from both the West and China. A firm grip on the early stages of the value chain emerged as the reoccurring theme and as a driver for success of Chinese BEV OEMs. While some risks were identified that could weaken the dominant position of Chinese BEV manufacturers, the industry's access to physical resources, and the strength of the Chinese labor force are expected to remain key drivers of future success for Chinese BEV OEMs, further boosting production volumes in China.

5 Discussion

5.1 Success of Chinese OEMs: Coincidence or Systematic Strategy Payoff?

Figure 16 illustrates that all experts surveyed either fully or partly agree with the view that the Chinese BEV industry is well ahead of competing nations. This perspective is confirmed by the international sales data presented in Chapter 3, which indicates that Western players were surpassed by Chinese companies in terms of leading market shares for EVs.



Figure 16: Experts' view on Chinese OEMs being ahead in the BEV segment (own illustration).

In order to gain insight into the factors that have contributed to the industry's growth, three areas of potential success factors were subject to detailed examination in Chapter 4. In the following, the results will be discussed from a macro perspective to ascertain whether this development was a mere coincidence or the result of a deliberate and strategic plan of action.

The Chinese BEV industry benefits from a unique interplay of resource availability and labor cost advantages. China's strategic investments in securing critical raw materials for BEVs, including lithium, , and rare earth elements, have resulted in the establishment of a robust supply chain that supports cost-effective BEV production. Furthermore, the government-backed BRI has served to enhance accessibility to these resources on an international scale. However, while advantageous, this factor alone does not guarantee systematic success, as geopolitical risks and shifts in battery technology could challenge this advantage in the future. On the labor side, China's skilled yet relatively low-cost workforce has been instrumental in maintaining competitive production costs. Initiatives, such as the “*National Talent Development Plan*” and targeted training programs, in addition to a systematic knowledge transfer from Western OEMs, have increased workforce readiness for the BEV sector. Furthermore, the interviewed experts have

highlighted the work ethic advantages multiple times. These structural efforts and features indicate a deliberate strategy, underscoring that success in this area is not merely coincidental.

China's excellence in technological innovation, combined with deliberate and coordinated strategic initiatives, forms another cornerstone of its industrial success. Early JVs with foreign OEMs facilitated knowledge transfer and technological advancements, laying a robust foundation for the industry's growth. The vast domestic market provided the scale and stability essential for fostering rapid innovation and large-scale expansion. Targeted strategic actions have further reinforced the industry's competitive edge. Vertical integration has improved cost efficiency, ensured quality control, strengthened supply chain resilience, and accelerated development cycles. Moreover, the strategic utilization of local suppliers and partnerships with technology enterprises has enabled the creation of a sophisticated and highly integrated industrial cluster. Leadership in battery manufacturing and software integration has positioned Chinese OEMs at the forefront of the global market, effectively addressing evolving consumer demands with innovative and cost-efficient solutions. These advancements underscore the outcome of a deliberate and systematic strategy, rather than serendipitous circumstances.

The Chinese government's policies have constituted a systematic enabler for the rise of the BEV industry. Following the classification of the NEV sector as a strategically important component of the country's national economy, a comprehensive set of measures was implemented within the context of a three-phase government support process. These included financial incentives on the supply and demand sides, extensive infrastructure investments, and the "*Dual-Credits System*", which requires NEV quotas for manufacturers' fleets. Furthermore, the implementation of protectionist regulations for FDIs facilitated the systematic transfer of knowledge in the initial stages of the local automotive industry, thereby establishing the foundation for its success. While other countries have also introduced support mechanisms, China's approach is dis-

tinctive in its long-term orientation and well-coordinated execution, which is enabled by a single-party political system. The integrated policy environment has resulted in sustained momentum, making success more attributable to strategic foresight than chance.

The findings collectively indicate that the success of the Chinese BEV industry is far from coincidental. Instead, it reflects a well-executed systematic strategy that leverages physical resources, technological advancements, and comprehensive government support. While the interplay of the whole set of factors was instrumental, discussions with renowned experts revealed marginal differences in importance. Technological leadership is expected to drive success in the long-term, while topics such as workforce characteristics and direct purchasing subsidies may have mainly been significant in the past. External factors such as global demand for greener mobility also have contributed to the industry's growth. However, the deliberate and multi-dimensional approach adopted by Chinese stakeholders has been the defining driver of their rise to leadership in the global BEV market.

5.2 Outlook for the Chinese Automotive Industry

The global automotive industry is in the midst of an historic change right before our eyes, driven by the rapid adoption of BEVs, and disruptive changes in business models and value chains. Among the frontrunners of this revolution, the Chinese automotive industry has demonstrated remarkable agility and innovation. Having evolved from domestic players to global competitors, Chinese OEMs are well-positioned to shape the future of mobility as NEVs are projected to account for nearly half of the global market and an impressive 77% of the Chinese market by 2030 (AlixPartners 2021). ICE vehicles on the other side continue to decline in relevance. Chinese OEMs are poised to lead the next chapter of global automotive growth and transformation, leveraging a faster speed-to-market and advanced customer value propositions (i.e. advanced software features, lower cost, etc.). Furthermore, Chinese OEMs benefit from interna-

tional investment. Funding of Chinese automotive startups accounts for 2/3 of global automotive startup funding, fueling innovation and sustaining their competitive edge in the long term (Porsche Consulting 2024). However, significant challenges lie ahead. On the international stage, Chinese OEMs are likely to face increased regulatory hurdles. Europe, as an example, initiated strict rules that require substantial localization of vehicle (45% of vehicles value) and battery production (60% of battery pack and 50% of battery cell value) (European Parliament 2024). Chinese OEMs are already responding with localized production strategies in Europe and the United States, breaking from the focused local sourcing in China and its advantages (AutoTech News 2024). Manufacturers that fail to meet these requirements risk facing substantial tariffs, which could undermine their competitiveness (World Trade Organization 2024; Tagesschau 2024). Moreover, several experts in the interviews conducted indicated a possible development towards FDI restrictions (e.g., JV requirement) for Chinese OEMs. Macroeconomic pressures and technological shifts, especially in electrification and connectivity, will continue to reshape the competitive environment, demanding adaptability and resilience. Brand perception will also be a challenge, as negative views of Chinese cars averaged 62% compared to just 45% for Western cars in the important European market (Roberts 2023). Overcoming historical biases associated with the "*Made in China*" label will be critical for achieving widespread acceptance in Western markets. Furthermore, competition within the Chinese market itself remains intense, with over 30 domestic OEMs competing for market share. This fragmentation will lead to further consolidation, a hypothesis underscored by the interviewed experts, as smaller players struggle to achieve profitability amidst increased competition (Roland Berger 2024). As Chinese OEMs aim to transition from rapid domestic growth to global dominance, their ability to balance speed, innovation, and cost efficiency with regulatory compliance and brand-building will determine their long-term success. However, failure to navigate these challenges could stall their ascent and create opportunities for traditional players to reclaim market

share through targeted localization, innovation, and strategic alliances. Traditional OEMs must adopt targeted strategies to compete effectively in the global BEV market. This includes accelerating development cycles through agile software methodologies, decoupling hardware from software processes, and enhancing cross-functional collaboration. Localizing production and R&D in crucial markets like China may enable traditional OEMs to align their offerings with local consumer demands, which prioritize advanced technology and connectivity. Moreover, addressing supply chain vulnerabilities is critical. Investing in battery and semiconductor production and adopting circular practices, such as recycling battery materials, reduces Chinese import reliance. Additionally, closing the software talent gap through reskilling, strategic hiring, and attracting global talent, along with fostering collaborative efforts like shared software platforms and tech partnerships, can drive innovation and reduce costs. These strategic actions could equip traditional OEMs to remain competitive in the evolving, software-centric automotive landscape (Cornet et al. 2023; Roland Berger 2024). To support these efforts, it is essential for governments to facilitate traditional OEMs' transition in the BEV sector and boost the industry development of other NEV technologies. E3 highlighted that while European politicians consistently speak of reducing dependencies on China, they predominantly focus on BEVs, creating an unavoidable reliance due to the value chain (as discussed in the previous chapters). Meanwhile, alternative technologies such as E-Fuels, where Europe holds a competitive edge, with innovative companies like Climeworks, receive minimal attention.

5.3 Limitations of the Study and Future Research Directions

This thesis provides a comprehensive analysis of the success factors driving the growth of Chinese BEV manufacturers. Much like a sector time in motorsport, it offers a snapshot of past and present developments in the BEV industry. However, the race is far from over, as China continues to open its markets, and Western competitors adjust their strategies. Ongoing monitoring

of these developments is essential. As with any research, it is important to acknowledge limitations to present a balanced perspective. This study focuses on success factors broadly applicable to Chinese OEMs in the BEV segment. However, additional factors, such as evolving consumer preferences and market expansion strategies, have likely also contributed to their success. Moreover, this research examines overarching trends without delving into detailed case studies of individual OEMs. Furthermore, obtaining reliable information on China remains a challenge due to limited data transparency and potential inconsistencies in reported figures, requiring careful interpretation of numerical data. Additionally, the reliance on English-language sources introduces an inherent bias that may exclude valuable insights from Chinese and other non-English research. Similarly, while expert interviews aim to provide diverse perspectives, they may reflect subjective viewpoints shaped by individual experiences and expertise. Building on these limitations, several directions for future research emerge. Investigating BEV consumer preferences through large-scale quantitative research, particularly the features and innovations that influence purchasing decisions, could provide valuable demand-side insights. For a more technology-oriented perspective, comparative analyses between Chinese and non-Chinese OEMs could further highlight differences in technology adoption, production strategies, and market performance. Longitudinal studies examining the sustainability of the success factors identified in this thesis could provide deeper insights into their relevance under evolving conditions. Furthermore, a detailed examination of the internationalization strategies of Chinese BEV OEMs, particularly the challenges and successes they encounter in diverse global markets, would offer valuable insights into globalization and competitive strategy. Finally, as experts predict market consolidation and cannibalization both within China and internationally, this topic presents another promising area for future investigation. It would be valuable to explore whether Chinese brands will disappear or merge into a single corporation, like VW, and to evaluate the Chinese government's role in this process.

6 Conclusion

This work project set out to determine whether Chinese BEV OEMs are truly ahead of their Western counterparts and, if so, to uncover the reasons behind their success. After reviewing academic literature, analyzing extensive data, and engaging with industry experts boasting over a century of combined experience in China, we conclude that Chinese BEV OEMs have outpaced their Western rivals, not in every category but in critical areas, due to the interplay of multiple key success factors. This achievement is not the result of a last-minute, lucky maneuver similar to a risky overtaking move in the final corner of a race. Instead, it mirrors the execution of a meticulously planned race strategy in an endurance championship: one requiring precision, courage, and long-term vision. Their success did not hinge on a single factor, such as “*Physical Resources and Labor Dynamics*”, “*Technological Innovation and Strategic Integration*” or “*Government Support and Regulatory Frameworks*”. Rather, it was the seamless interplay of the confirmed success in these elements that allowed Chinese BEV OEMs to build their commanding position. Recognizing the near impossibility of catching up to Western OEMs in the ICE domain, Chinese policymakers and industry leaders initially shifted their focus toward NEVs more broadly. Over time, this focus became increasingly concentrated on BEVs, positioning them as the cornerstone of China's automotive strategy. What followed was not just a strategic shift but an industrial success story, driven by the efforts of millions, the vision of strong leaders, and the momentum of a growing economy. Some argue that natural advantages - such as access to rare earths or prior battery expertise - are the sole reasons for their ascent. However, this perspective oversimplifies the earned success of Chinese OEMs and may even highlight why Western OEMs have struggled to close the gap, as they may fail to fully acknowledge the skill and capabilities of their Chinese counterparts. While the race is far from over, the ability of Western OEMs to close the gap remains uncertain. The next years promise to be as dynamic and transformative as the journey so far, leaving the global automotive industry at the edge of its seat as we prepare for another lap.

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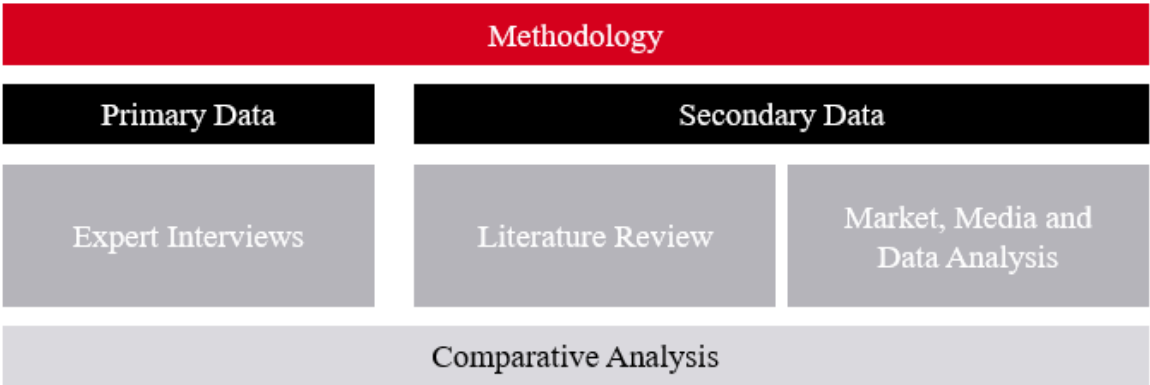
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Appendix

Appendix 1: Methodology overview (own illustration)

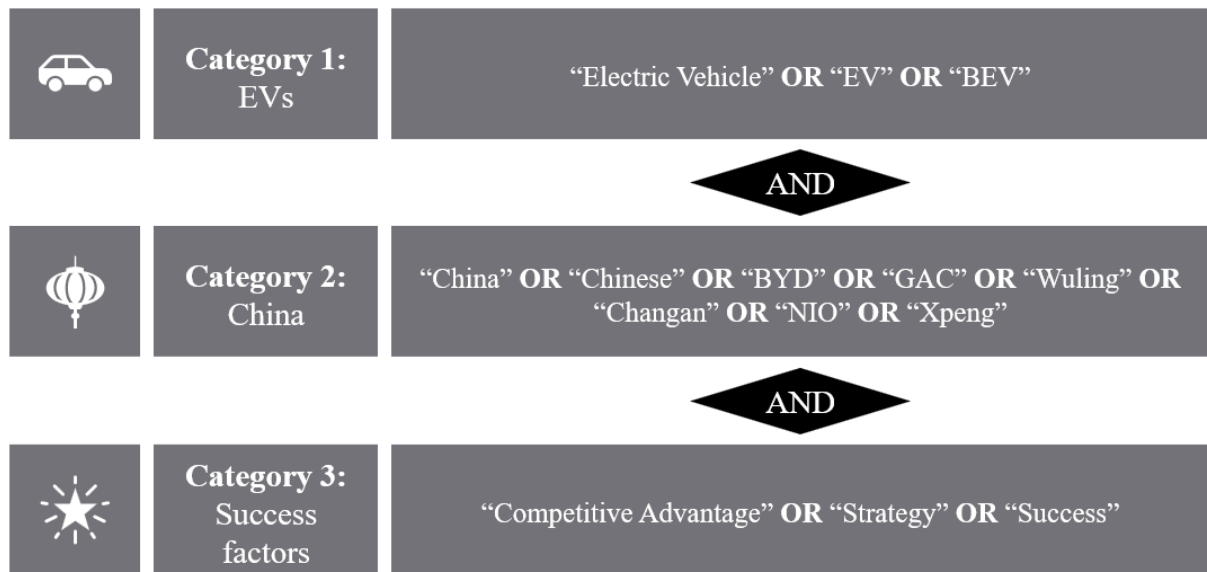


Appendix

Appendix 2: Systematic literature review (own illustration based on Webster and Watson, 2002)



Appendix 3: Combination of keywords used to search the database (own illustration)



Appendix

Appendix 4: MarkLines classification of countries and continents (MarkLines 2024a)

No	Country or Area	Continent	Continent aggr.
1	Afghanistan	Asia	Asia
2	Åland Islands	Europe	Europe
3	Albania	Europe	Europe
4	Algeria	Africa	ROW
5	American Samoa	Oceania	ROW
6	Andorra	Europe	Europe
7	Angola	Africa	ROW
8	Anguilla	North America	Americas
9	Antarctica	Antarctica	ROW
10	Antigua and Barbuda	North America	Americas
11	Argentina	South America	ROW
12	Armenia	Asia	Asia
13	Aruba	North America	Americas
14	Australia	Oceania	ROW
15	Austria	Europe	Europe
16	Azerbaijan	Asia	Asia
17	Bahamas	North America	Americas
18	Bahrain	Asia	Asia
19	Bangladesh	Asia	Asia
20	Barbados	North America	Americas
21	Belarus	Europe	Europe
22	Belgium	Europe	Europe
23	Belize	North America	Americas
24	Benin	Africa	ROW
25	Bermuda	North America	Americas
26	Bhutan	Asia	Asia
27	Bolivia (Plurinational State of)	South America	ROW
28	Bonaire, Sint Eustatius and Saba	North America	Americas

Appendix

29	Bosnia and Herze- govina	Europe	Europe
30	Botswana	Africa	ROW
31	Bouvet Island	South America	ROW
32	Brazil	South America	ROW
33	British Indian Ocean Territory	Africa	ROW
34	British Virgin Islands	North America	Americas
35	Brunei Darussalam	Asia	Asia
36	Bulgaria	Europe	Europe
37	Burkina Faso	Africa	ROW
38	Burundi	Africa	ROW
39	Cabo Verde	Africa	ROW
40	Cambodia	Asia	Asia
41	Cameroon	Africa	ROW
42	Canada	North America	Americas
43	Cayman Islands	North America	Americas
44	Central African Re- public	Africa	ROW
45	Chad	Africa	ROW
46	Chile	South America	ROW
47	China	Asia	Asia
48	China, Hong Kong Special Administrative Region	Asia	Asia
49	China, Macao Special Administrative Region	Asia	Asia
50	Christmas Island	Oceania	ROW
51	Cocos (Keeling) Is- lands	Oceania	ROW
52	Colombia	South America	ROW
53	Comoros	Africa	ROW
54	Congo	Africa	ROW
55	Cook Islands	Oceania	ROW
56	Costa Rica	North America	Americas

Appendix

57	Côte d'Ivoire	Africa	ROW
58	Croatia	Europe	Europe
59	Cuba	North America	Americas
60	Curaçao	North America	Americas
61	Cyprus	Asia	Asia
62	Czechia	Europe	Europe
62	Czech Republic	Europe	Europe
63	Democratic People's Republic of Korea	Asia	Asia
64	Democratic Republic of the Congo	Africa	ROW
65	Denmark	Europe	Europe
66	Djibouti	Africa	ROW
67	Dominica	North America	Americas
68	Dominican Republic	North America	Americas
69	Ecuador	South America	ROW
70	Egypt	Africa	ROW
71	El Salvador	North America	Americas
72	Equatorial Guinea	Africa	ROW
73	Eritrea	Africa	ROW
74	Estonia	Europe	Europe
75	Eswatini	Africa	ROW
76	Ethiopia	Africa	ROW
77	Falkland Islands (Malvinas)	South America	ROW
78	Faroe Islands	Europe	Europe
79	Fiji	Oceania	ROW
80	Finland	Europe	Europe
81	France	Europe	Europe
82	French Guiana	South America	ROW
83	French Polynesia	Oceania	ROW
84	French Southern Territories	Africa	ROW
85	Gabon	Africa	ROW

Appendix

86	Gambia	Africa	ROW
87	Georgia	Asia	Asia
88	Germany	Europe	Europe
89	Ghana	Africa	ROW
90	Gibraltar	Europe	Europe
91	Greece	Europe	Europe
92	Greenland	North America	Americas
93	Grenada	North America	Americas
94	Guadeloupe	North America	Americas
95	Guam	Oceania	ROW
96	Guatemala	North America	Americas
97	Guernsey	Europe	Europe
98	Guinea	Africa	ROW
99	Guinea-Bissau	Africa	ROW
100	Guyana	South America	ROW
101	Haiti	North America	Americas
102	Heard Island and McDonald Islands	Oceania	ROW
103	Holy See	Europe	Europe
104	Honduras	North America	Americas
105	Hungary	Europe	Europe
106	Iceland	Europe	Europe
107	India	Asia	Asia
108	Indonesia	Asia	Asia
109	Iran (Islamic Republic of)	Asia	Asia
109	Iran	Asia	Asia
110	Iraq	Asia	Asia
111	Ireland	Europe	Europe
112	Isle of Man	Europe	Europe
113	Israel	Asia	ROW
114	Italy	Europe	Europe
115	Jamaica	North America	Americas

Appendix

116	Japan	Asia	Asia
117	Jersey	Europe	Europe
118	Jordan	Asia	Asia
119	Kazakhstan	Asia	Asia
120	Kenya	Africa	ROW
121	Kiribati	Oceania	ROW
122	Kuwait	Asia	ROW
123	Kyrgyzstan	Asia	Asia
124	Lao People's Democratic Republic	Asia	Asia
124	Laos	Asia	Asia
125	Latvia	Europe	Europe
126	Lebanon	Asia	Asia
127	Lesotho	Africa	ROW
128	Liberia	Africa	ROW
129	Libya	Africa	ROW
130	Liechtenstein	Europe	Europe
131	Lithuania	Europe	Europe
132	Luxembourg	Europe	Europe
133	Madagascar	Africa	ROW
134	Malawi	Africa	ROW
135	Malaysia	Asia	Asia
136	Maldives	Asia	Asia
137	Mali	Africa	ROW
138	Malta	Europe	Europe
139	Marshall Islands	Oceania	ROW
140	Martinique	North America	Americas
141	Mauritania	Africa	ROW
142	Mauritius	Africa	ROW
143	Mayotte	Africa	ROW
144	Mexico	North America	Americas
145	Micronesia (Federated States of)	Oceania	ROW

Appendix

146	Monaco	Europe	Europe
147	Mongolia	Asia	Asia
148	Montenegro	Europe	Europe
149	Montserrat	North America	Americas
150	Morocco	Africa	ROW
151	Mozambique	Africa	ROW
152	Myanmar	Asia	Asia
153	Namibia	Africa	ROW
154	Nauru	Oceania	ROW
155	Nepal	Asia	Asia
156	Netherlands	Europe	Europe
157	New Caledonia	Oceania	ROW
158	New Zealand	Oceania	ROW
159	Nicaragua	North America	Americas
160	Niger	Africa	ROW
161	Nigeria	Africa	ROW
162	Niue	Oceania	ROW
163	Norfolk Island	Oceania	ROW
164	North Macedonia	Europe	Europe
165	Northern Mariana Islands	Oceania	ROW
166	Norway	Europe	Europe
167	Oman	Asia	Asia
168	Pakistan	Asia	Asia
169	Palau	Oceania	ROW
170	Panama	North America	Americas
171	Papua New Guinea	Oceania	ROW
172	Paraguay	South America	ROW
173	Peru	South America	ROW
174	Philippines	Asia	Asia
175	Pitcairn	Oceania	ROW
176	Poland	Europe	Europe
177	Portugal	Europe	Europe

Appendix

178	Puerto Rico	North America	Americas
179	Qatar	Asia	Asia
180	Republic of Korea	Asia	Asia
180	Korea	Asia	Asia
181	Republic of Moldova	Europe	Europe
182	Réunion	Africa	ROW
183	Romania	Europe	Europe
184	Russian Federation	Europe	Asia
184	Russia	Europe	Asia
185	Rwanda	Africa	ROW
186	Saint Barthélemy	North America	Americas
187	Saint Helena	Africa	ROW
188	Saint Kitts and Nevis	North America	Americas
189	Saint Lucia	North America	Americas
190	Saint Martin (French Part)	North America	Americas
191	Saint Pierre and Miquelon	North America	Americas
192	Saint Vincent and the Grenadines	North America	Americas
193	Samoa	Oceania	ROW
194	San Marino	Europe	Europe
195	Sao Tome and Principe	Africa	ROW
196	Sark	Europe	Europe
197	Saudi Arabia	Asia	Asia
198	Senegal	Africa	ROW
199	Serbia	Europe	Europe
200	Seychelles	Africa	ROW
201	Sierra Leone	Africa	ROW
202	Singapore	Asia	Asia
203	Sint Maarten (Dutch part)	North America	Americas
204	Slovakia	Europe	Europe

Appendix

205	Slovenia	Europe	Europe
206	Solomon Islands	Oceania	ROW
207	Somalia	Africa	ROW
208	South Africa	Africa	ROW
209	South Georgia and the South Sandwich Islands	South America	ROW
210	South Sudan	Africa	ROW
211	Spain	Europe	Europe
212	Sri Lanka	Asia	Asia
213	State of Palestine	Asia	Asia
214	Sudan	Africa	ROW
215	Suriname	South America	ROW
216	Svalbard and Jan Mayen Islands	Europe	Europe
217	Sweden	Europe	Europe
218	Switzerland	Europe	Europe
219	Syrian Arab Republic	Asia	Asia
220	Tajikistan	Asia	Asia
221	Thailand	Asia	Asia
222	Timor-Leste	Asia	Asia
223	Togo	Africa	ROW
224	Tokelau	Oceania	ROW
225	Tonga	Oceania	ROW
226	Trinidad and Tobago	North America	Americas
227	Tunisia	Africa	ROW
228	Turkey	Asia	ROW
229	Turkmenistan	Asia	Asia
230	Turks and Caicos Islands	North America	Americas
231	Tuvalu	Oceania	ROW
232	Uganda	Africa	ROW
233	Ukraine	Europe	Europe
234	UAE	Asia	Asia

Appendix

234	United Arab Emirates	Asia	Asia
235	UK	Europe	Europe
235	United Kingdom of Great Britain and Northern Ireland	Europe	Europe
236	United Republic of Tanzania	Africa	ROW
237	United States Minor Outlying Islands	Oceania	ROW
238	USA	North America	Americas
238	United States of America	North America	Americas
239	United States Virgin Islands	North America	Americas
240	Uruguay	South America	ROW
241	Uzbekistan	Asia	Asia
242	Vanuatu	Oceania	ROW
243	Venezuela (Bolivarian Republic of)	South America	ROW
243	Venezuela	South America	ROW
244	Vietnam	Asia	Asia
244	Viet Nam	Asia	Asia
245	Wallis and Futuna Islands	Oceania	ROW
246	Western Sahara	Africa	ROW
247	Yemen	Asia	Asia
248	Zambia	Africa	ROW
249	Zimbabwe	Africa	ROW
250	Taiwan	Asia	Asia
251	Hong Kong	Asia	Asia
252	South Korea	Asia	Asia
252	United Kingdom	Europe	Europe

Appendix

Appendix 5: MarkLines classification of cars, busses, trucks and others (MarkLines 2024a)

MarkLines	Categorization
Buses	Bus
Large Buses	Bus
Large Buses (Chassis)	Bus
Medium Buses	Bus
Medium Buses (Chassis)	Bus
Minibus	Bus
Small Buses	Bus
Small Buses (Chassis)	Bus
Midibus	Bus
4x4/SUV	Car
Cars	Car
Cars/Light Trucks	Car
CV	Car
GVs	Car
Include all models (Imported Cars)	Car
Light Commercial Vehicles	Car
Light Trucks	Car
Light Trucks (Chassis)	Car
Mini Cars	Car
Mini Trucks	Car
Mini Van	Car
Minivan	Car
MPV	Car
MPV/SUV	Car
N/A	Car
Panel Van	Car
Pickup	Car
Sedan/Hatchback	Car
Small Cars	Car
SUV	Car
SUV/CDV	Car
UVs/MPVs	Car
Van	Car
Window Van	Car
PPV	Car
Semi Trailer	Other
SPV	Other

Appendix

Tractors	Other
Extra Heavy Trucks	Truck
Heavy Trucks	Truck
Heavy Trucks (Chassis)	Truck
Heavy Trucks/Buses	Truck
MCV/HCV	Truck
Medium Trucks	Truck
Medium Trucks (Chassis)	Truck
Medium/Heavy Trucks	Truck
Mini Trucks (Chassis)	Truck
Prime mover	Truck
Trucks	Truck
Trucks/Buses	Truck
LCV (Trucks)	Truck
LCV (Multiple)	Truck
Include all models	Other
Light Trucks/Trucks/Buses	Truck
Sedan Type	Car
4x2	Car
4x4	Car
Pickup/Trucks	Car

Appendix

Appendix 6: MarkLines classification of powertrain type (MarkLines 2024a)

PowerTrain	PowerTrain aggr.
48V Mild HV	Mild Hybrid
EV	BEV
EV/FCV/PHV	BEV
FCV	FCEV
HV	Hybrid
HV/EV	Hybrid
HV/EV/PHV	Hybrid
HV/MHV	Hybrid
HV/PHV	Hybrid
Mild HV	Mild Hybrid
PHV	PHEV
ICE	ICE
N/A	ICE
DE	ICE
EV/PHV	BEV

Appendix

Appendix 7: MarkLines sales data analysis (MarkLines 2024a)

Analysis of historical vehicle sales

Sales analysis

Date: 05.09.2024

Total vehicle sales per continent															
A.	Vehicle sales per aggregated continent [absolut]														
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
Americas	13,684,347	14,980,145	16,816,263	18,141,106	19,203,748	20,345,772	21,198,853	20,890,441	20,856,909	20,984,054	17,973,840	17,791,745	16,526,995	18,680,218	2.4%
Europe	16,815,041	17,630,575	18,698,407	16,319,088	16,772,299	17,207,547	18,085,030	18,629,994	19,231,159	19,417,780	14,977,627	13,146,563	15,182,348	-0.8%	
Asia	31,153,932	31,704,676	34,964,649	36,770,299	38,440,147	40,270,828	43,541,438	43,414,389	42,742,953	39,809,874	36,784,037	38,700,585	41,448,165	45,832,062	3.0%
ROW	6,183,263	6,705,925	7,061,976	7,243,244	6,800,960	5,783,709	5,204,872	5,638,166	5,934,845	5,616,725	4,305,597	4,888,132	4,492,200	5,037,372	-1.6%
China	16,538,324	17,116,729	18,134,126	20,619,607	22,169,459	23,508,775	26,780,902	27,257,164	26,496,952	24,193,389	23,304,263	24,419,962	25,905,240	28,803,301	4.4%
B.	Change in vehicle sales per aggregated continent [%]														
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
Americas	0.0%	9.5%	22.9%	32.6%	40.3%	48.7%	54.9%	52.7%	52.4%	49.0%	24.6%	30.0%	20.8%	36.6%	
Europe	0.0%	4.9%	-0.7%	-2.9%	-0.3%	2.3%	7.4%	12.0%	13.4%	14.4%	-11.3%	-10.9%	-21.8%	-9.7%	
Asia	0.0%	1.8%	12.2%	18.0%	23.4%	29.3%	39.8%	39.4%	37.2%	27.8%	18.1%	24.2%	33.0%	47.1%	
ROW	0.0%	8.5%	14.2%	17.2%	10.0%	-8.5%	-15.8%	-8.8%	-4.0%	-9.2%	-30.4%	-20.9%	-20.2%	-18.5%	
China	0.0%	3.5%	9.6%	24.7%	34.0%	42.1%	61.9%	64.8%	60.2%	46.3%	40.9%	47.7%	56.6%	74.2%	

II. Total vehicle sales in China

A

Vehicle sales in China per powertrain [absolut]

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023		CAGR 2010 - 2023	CAGR 2016 - 2019
BEV	63	2,568	8,300	11,228	27,720	126,551	284,556	457,059	766,099	833,494	995,706	2,723,652	5,929,211	6,238,365		142.3%	187.0%
FCEV	0	0	0	0	0	0	0	0	0	0	0	0	0	204			300
PHEV	417	613	1,201	1,147	14,747	72,156	186,480	110,533	265,138	226,108	246,733	600,150	1,530,479	2,774,768		96.8%	201.8%
Hybrid	1	0	14,851	12,686	11,874	33,806	123,116	192,288	202,949	252,305	530,099	764,329	1,734,433	774,433		183.8%	138.3%
Mild Hybrid	0	0	0	0	0	0	0	0	0	0	0	0	35,557	67,510			
ICE	16,537,843	17,113,548	18,100,174		20,584,546	22,115,109	23,296,655	26,284,080	26,576,942	25,275,616	22,930,838	21,809,630	20,568,055	18,545,460	18,947,881	1.1%	3.7%

B

Change in vehicle sales in China per powertrain [%]

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023		
BEV	0.0%	3976.2%	14027.0%	17722.2%	43914.3%	201409.5%	4511576.2%	725390.5%	1215930.2%	1322900.3%	1580417.5%	43231157.1%	7962774.6%	9902298.4%		
FCEV	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
PHEV	0.0%	47.0%	180.0%	175.1%	349.5%	17203.6%	40298.1%	26430.9%	63482.3%	54122.5%	59686.8%	143820.9%	366921.3%	66512.0%		
Hybrid	0.0%	-100.0%	148500.0%	126850.0%	0.0%	1187300.0%	1301200.0%	3380500.0%	11252900.0%	19209800.0%	20234800.0%	53009500.0%	76432800.0%	7744600.0%		
Mild Hybrid	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
ICE	0.0%	3.5%	9.5%	24.5%	33.7%	40.9%	59.0%	60.7%	52.8%	38.7%	31.9%	24.4%	12.1%	14.6%		

Analysis of historical vehicle sales

Sales analysis

[illegible]

Analysis of historical vehicle sales

Sales analysis

Total vehicle sales per powertrain per continent [absolut]

A.

Vehicle sales in Asia per powertrain [absolut]

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023		CAGR 2010 - 2023	CAGR 2010 - 2019
BEV	2,422	16,027	25,605	28,737	49,234	140,499	305,661	488,519	623,207	884,401	1,630,733	2,810,811	3,248,493	6,636,426	-	83.9%	92.6%
FCEV	2	0	1	4	7	411	1,135	910	1,319	4,838	6,503	910,949	11,213	0,048	-	82.7%	137.7%
PHEV	613	417	8,511	15,290	30,526	65,783	174,654	142,671	288,636	243,768	266,758	642,384	1,595,944	2,851,576	-	97.2%	103.0%
Hybrid	492,684	494,109	962,125	971,887	1,068,907	962,673	1,185,965	1,311,439	1,402,223	1,433,920	1,335,691	1,606,245	1,984,154	2,556,428	-	13.5%	12.6%
Mild Hybrid	0	0	0	352	861	962	732	343	1,036	896	779	663	588,889	597,552	-	-	-
ICE	30,656,387	31,193,927	33,967,896	36,753,520	37,294,451	39,650,530	41,893,680	41,469,914	40,225,747	37,243,122	34,143,689	33,942,297	32,812,304	33,687,632	-	0.6%	2.2%

B.

Vehicle sales in Europe per powertrain [absolut]

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023		CAGR 2010 - 2023	CAGR 2010 - 2019
BEV	321	11,210	20,439	31,449	42,729	60,158	95,046	137,962	205,655	357,916	712,618	1,162,851	1,553,625	2,630,919	-	96.1%	116.7%
FCEV	0	0	0	0	10	13	42	95	217	574	774	991	1,275	774	-	-	-
PHEV	0	363	8,432	22,536	17,421	46,987	103,991	132,093	158,332	177,484	548,573	994,991	952,019	905,217	-	-	-
Hybrid	57,157	70,389	86,633	72,923	60,035	51,913	51,813	347,834	425,948	479,944	489,948	647,498	915,633	1,166,952	-	26.1%	26.7%
Mild Hybrid	0	0	0	0	0	0	0	0	0	0	0	1,301,811	1,326,057	1,980,585	-	-	-
ICE	16,757,563	17,548,623	16,582,843	16,192,188	16,621,094	17,016,730	17,649,408	16,212,102	16,273,005	16,215,241	13,164,067	10,839,495	8,395,954	9,371,561	-	-4.4%	0.9%

C.

Vehicle sales in Americas per powertrain [absolut]

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023		CAGR 2010 - 2023	CAGR 2010 - 2019
BEV	19	10,336	15,111	43,201	65,599	78,409	89,878	111,335	254,832	258,723	285,254	545,333	887,865	1,310,911	-	139.7%	188.6%
FCEV	18	2	5	0	2	74	1,042	2,268	2,368	2,168	864	2,470	2,769	3,001	-	46.2%	70.3%
PHEV	326	7,946	39,873	50,186	57,005	44,475	78,458	94,440	124,880	86,263	71,159	178,552	186,528	289,347	-	68.6%	85.9%
Hybrid	282,825	276,062	446,433	505,223	464,549	391,506	360,153	382,194	367,549	436,731	442,432	628,963	783,907	1,192,411	-	11.7%	4.0%
Mild Hybrid	0	0	0	0	0	0	0	0	0	0	0	0	89	5,940	-	-	-
ICE	13,401,159	14,693,797	16,312,841	17,534,452	18,616,593	19,633,308	20,672,122	20,300,174	20,107,580	19,610,169	16,233,431	16,237,425	14,666,052	15,877,594	-	1.3%	4.3%

D.

Vehicle sales in ROW per powertrain [absolut]

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023		CAGR 2010 - 2023	CAGR 2010 - 2019
BEV	112	50	201	222	220	424	308	538	760	2,785	2,212	7,529	38,068	96,422	-	68.2%	42.9%
FCEV	0	0	0	0	0	0	0	0	0	0	0	38	16	38	-	-	-
PHEV	0	0	80	101	61	193	91	75	46	328	377	879	1,235	9,354	-	-	-
Hybrid	1,805	3,368	6,076	4,419	3,183	2,449	2,817	421	4,745	2,860	1,372	2,545	6,970	7,487	-	11.6%	5.1%
Mild Hybrid	0	0	0	0	0	0	0	0	0	0	0	1,014	603	603	-	-	-
ICE	6,181,346	6,702,507	7,055,617	7,240,552	6,797,516	5,780,643	5,201,656	5,633,132	5,929,351	5,610,752	4,301,638	4,876,127	4,885,373	4,920,500	-	-1.7%	-1.2%

Appendix

Appendix 8: MarkLines production data analysis (MarkLines 2024a)

Analysis of historical vehicle production
Production analysis

Date: 05.09.2024

I. Total vehicle production per continent															
A. Vehicle production per aggregated continent [absolut]															
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
Americas	11,920,482	13,101,278	15,403,615	16,119,055	16,973,390	17,457,127	17,729,404	17,016,980	16,871,688	16,231,476	12,952,595	12,959,069	14,266,074	15,643,146	CAGR 2010 - 2023
Europe	17,954,251	19,020,445	18,096,611	17,587,847	18,136,783	19,099,877	19,495,397	19,769,218	19,555,782	19,371,745	14,691,932	14,294,055	12,807,340	14,232,530	CAGR 2010 - 2019
Asia	36,460,820	37,095,646	40,832,182	43,022,160	44,510,785	45,135,427	48,586,422	51,644,783	50,921,810	47,344,444	42,090,564	44,551,211	48,721,473	52,672,258	
ROW	4,815,989	4,699,080	4,649,462	4,939,454	4,268,304	3,596,689	3,337,599	4,143,134	4,177,708	4,160,672	2,949,540	3,399,775	3,613,704	3,744,787	
China	16,749,627	17,150,878	18,215,792	20,842,941	22,494,091	23,518,516	26,904,293	27,392,887	26,282,435	24,155,658	23,174,552	24,362,312	26,142,213	28,902,419	
B. Change in vehicle production per aggregated continent [%]															
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
Americas	0.0%	9.9%	29.2%	35.2%	42.4%	46.4%	48.7%	42.8%	41.5%	36.2%	8.7%	8.7%	19.7%	31.2%	
Europe	0.0%	5.9%	0.8%	-2.0%	1.0%	6.4%	8.6%	10.1%	8.9%	7.9%	-18.2%	-20.4%	-28.7%	-20.7%	
Asia	0.0%	1.7%	12.0%	18.0%	22.1%	23.8%	33.3%	41.6%	39.7%	29.9%	15.4%	22.2%	33.6%	44.5%	
ROW	0.0%	-2.4%	-3.5%	2.6%	-11.4%	-25.3%	-30.7%	-14.0%	-13.3%	-13.6%	-38.8%	-29.4%	-25.0%	-22.2%	
China	0.0%	2.4%	8.8%	24.4%	34.3%	40.4%	60.6%	63.5%	56.9%	44.2%	38.4%	45.4%	56.1%	72.6%	

Appendix

Appendix 9: MarkLines sales market share analysis China (MarkLines 2024a)

Analysis of sales market share in China

China market analysis

Date: 05.09.2024

I. OEM sales shares in Chinese market			
A. BEV shares		B. ICE shares	
Row Labels	Sum of 2022	Sum of 2023	
BYD Auto	18.12%	25.02%	
China	18.12%	25.02%	
Tesla	14.13%	15.19%	
USA	14.13%	15.19%	
GAC Aion	5.39%	7.69%	
China	5.39%	7.69%	
Wuling	11.73%	6.08%	
China	11.73%	6.08%	
MG (2006-)	1.95%	3.49%	
UK	1.95%	3.49%	
Changan/Chana	3.84%	2.75%	
China	3.84%	2.75%	
VW	2.91%	2.55%	
Germany	2.91%	2.55%	
NIO	2.70%	2.52%	
China	2.70%	2.52%	
XPeng	2.40%	2.27%	
China	2.40%	2.27%	
BMW	1.50%	2.07%	
Germany	1.50%	2.07%	
Neta	3.02%	2.04%	
China	3.02%	2.04%	
Geely	0.00%	1.95%	
China	0.00%	1.95%	
ZEEKR	1.43%	1.90%	
China	1.43%	1.90%	
Chery	4.33%	1.82%	
China	4.33%	1.82%	
ORA	2.07%	1.74%	
China	2.07%	1.74%	
Leapmotor	2.21%	1.71%	
China	2.21%	1.71%	
Buick	0.51%	1.36%	
USA	0.51%	1.36%	
Hongqi	0.74%	1.28%	
China	0.74%	1.28%	
Geometry	2.41%	1.12%	
China	2.41%	1.12%	
smart (2022-)	0.21%	1.07%	
Germany	0.21%	1.07%	
Roewe	1.41%	1.00%	
China	1.41%	1.00%	
Country of sale	China		
Aggregated vehicle type	Car		
Aggregated powertrain	ICE		
Row Labels	Sum of 2022	Sum of 2023	
VW	11.69%	10.82%	
Germany	11.69%	10.82%	
Changan/Chana	7.61%	7.43%	
China	7.61%	7.43%	
Chery	3.73%	6.40%	
China	3.73%	6.40%	
Toyota	7.23%	6.12%	
Japan	7.23%	6.12%	
Honda	6.72%	5.80%	
Japan	6.72%	5.80%	
Geely	4.05%	4.51%	
China	4.05%	4.51%	
Wuling	4.24%	4.19%	
China	4.24%	4.19%	
Haval	3.30%	3.40%	
China	3.30%	3.40%	
Nissan	4.37%	3.39%	
Japan	4.37%	3.39%	
Audi	3.17%	3.29%	
Germany	3.17%	3.29%	
BMW	3.28%	3.25%	
Germany	3.28%	3.25%	
Mercedes-Benz (2022-)	3.19%	3.12%	
Germany	3.19%	3.12%	
MG (2006-)	2.30%	2.76%	
UK	2.30%	2.76%	
Buick	3.46%	2.65%	
USA	3.46%	2.65%	
Beiqi Foton Motor	1.72%	2.43%	
China	1.72%	2.43%	
Dongfeng Motor	1.86%	1.82%	
China	1.86%	1.82%	
GAC	1.77%	1.72%	
China	1.77%	1.72%	
JETOUR	0.90%	1.66%	
China	0.90%	1.66%	
Hongqi	1.45%	1.40%	
China	1.45%	1.40%	

Appendix

Appendix 10: Overview of interviewees (own table)

	Organization	Position	Academic Background	Total Work Experience	Work Experience with China	Date	Duration
E1	Oerlikon AG (Tier 1 Automotive Supplier)	Strategic Account Manager	Dipl. Ing. Plastics Technology	33 years	14 years	21.10.24	37 minutes
E2	Diconium GmbH (Global Digitalization Consultancy)	Director & Head of Consulting China	M. Sc. International Management & Engineering	8 years	1 year	28.10.24	51 minutes
E3	Daimler Truck AG (Commercial Vehicle OEM)	Former Member of the Board of Management & Responsible for China Business	Dipl. Ing. Mechanical Engineering	32 years	25 years	26.10.24	85 minutes
E4	<i>Anonymous</i> (European Premium OEM)	Manager Corporate Strategy & Development China	M. Sc. Management of Innovation and Business Development	12 years	2 years	25.10.24	48 minutes
E5	ChargeHere GmbH (Multinational Charging Infrastructure Provider)	Head of Sales	MA General Management	14 years	11 years	25.10.24	35 minutes
E6	Volkswagen AG (Multinational OEM)	Strategic Semiconductor Management	M. Sc. Electronic and Information Engineering	13 years	13 years	01.11.24	42 minutes
E7	Roland Berger (International Strategy Consultancy)	Principal at Chinese Subsidiary	B. Sc. Business Management	8 years	8 years	05.11.24	48 minutes
E8	Roland Berger (International Strategy Consultancy)	Senior Partner	M. Sc. Business Administration	17 years	7 years	07.11.24	54 minutes
E9	BASF SE (Multinational Chemical Group)	Product Manager Digital Solutions Battery Recycling	MBA Business Administration and General Management	8 years	1 year	08.11.24	47 minutes
E10	Volkswagen AG (Multinational OEM)	Strategic Semiconductor Management	M.Sc. Industrial Engineering & Management	7 years	6 years	10.11.24	51 minutes
E11	Valmet OYJ (European Vehicle Contract Manufacturer)	Member of the Board of Directors	MBA Finance, Logistics, and Operations Management	35 years	22 years	12.11.24	51 minutes
E12	<i>Anonymous</i> (Multinational Commercial Vehicle OEM)	Head of Quality Management, Former CEO of China Business	Dipl. Ing. Industrial Engineering	15 years	6 years	12.11.24	25 minutes
E13	Mercedes-Benz AG (European Premium OEM)	Senior Executive Vice President China	PhD Mechanical Engineering	29 years	9 years	18.11.24	48 minutes

Appendix 11: Guide for semi-structured expert interviews (Hornstein, Schallenberg, and Schauer 2024)

1 General Interview Information

Expert Name:	
Academic Background:	
Job Title:	
Date:	
Format:	
Duration:	

2 Introduction Part (5min)

Agenda	To-Dos
Greeting	- Short introduction of interviewer(s) - Thanking for participation in an expert interview and contribution to our academic research
Declaration of Consent and Confidentiality (if required)	- If not received yet, remind of pre-sent documents with need for signature
Recording Information	- Note that interview will be recorded and transcribed to enable result analysis
START OF RECORDING	
Formal Recording Permission	- Inform that recording has started - Ask for formal permission to record and transcribe the following interview
Research Target	- Brief introduction into the research question aimed to be answered - Overview over three focus areas on which structure of this interview is based

3 Main Interview Part – Questionnaire (30min)

A) Introductory Questions:

#	Question
A1	Could you very briefly describe the context and duration of the experience you have gathered with the Chinese electric vehicle industry?

Appendix

A2	Would you generally agree with the hypothesis that Chinese OEMs are ahead of Western companies in the BEV segment? (yes/no)
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B) Physical Resources and Labor Dynamics:

#	Question
B1	In what ways has the shift in material composition between BEV and ICE vehicles (e.g., the increased use of rare earths) influenced the global success of Chinese OEMs? How do you think their success would differ if the material composition between BEVs and ICE vehicles were more similar?
B2	How would you assess China's efforts in securing critical raw materials both domestically and internationally, and what impact has this had on its competitive position in the global BEV market? Do you foresee any future risks (e.g. countries such as Australia limiting China's involvement in critical mineral projects)?
B3	How important do you think China's role in the mineral refinement process has been to the success of its BEV industry? What potential risks or disruptions to this position do you see emerging in the near future?
B4	Has the skill level of China's workforce in the BEV sector changed over the past ten years, and how does their skill/training compare to that of other countries? Could you provide examples of how workforce training has contributed to China's success in BEV production?
B5	How do you evaluate the development of wage levels in China compared to Western countries and their impact on China's BEV industry? Do you anticipate any significant shifts in production strategy as a result?

C) Technological Innovation and Strategic Value Chain Integration:

#	Question
C1	Do you consider a high degree of vertical integration (i.e. development of in-house capabilities along the value chain) to be a key success factor for Chinese BEV manufacturers? If so, why?
C2	Do you believe the strategy of local sourcing (i.e., the use of primarily domestic suppliers) provided Chinese BEV OEMs with a competitive edge and fueled innovation in the Chinese BEV industry?
C3	Do you believe strategic alliances with foreign automakers played a crucial role in building the Chinese BEV industry and supporting their international expansion? Additionally, do you think the large domestic market gave Chinese BEV OEMs a competitive advantage?
C4	Do you believe Chinese BEV manufacturers had or have technological advantages compared to global competitors? If so, could you highlight specific technological areas along the BEV value chain where Chinese OEMs have gained a competitive advantage (e.g., battery technology, vehicle assembly, or software integration)?
C5	Looking ahead, from your point of view, which technological areas will be most critical for maintaining competitiveness in the next 5-10 years in the BEV market?

Appendix

	How can Chinese OEMs address this development?
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D) Government Support and Regulatory Frameworks:

#	Question
D1	Do you believe that the Chinese government was one of the central drivers for enabling the success of the local BEV industry? If so, which specific policies were from your perspective most impactful (e.g., direct purchasing subsidies, purchase tax exemptions, OEM Support Programs, charging infrastructure investments)?
D2	How did policies in China differ from competing nations? Was, in your opinion, their scope and extent unfair regarding international competition and why?
D3	Do you believe that the Chinese BEV industry is still heavily reliant on support from the government today? Are you aware of the “Dual-Credits System” and do you see this regulatory framework suitable for replacing financial incentives in the scaling of the industry?
D4	Are trade tariffs implied by the EU and U.S. an appropriate tool to protect their local companies when competing with Chinese BEVs? Which risks do you see and what kind of response do you expect from the Chinese government?
D5	What kind of developments do you expect regarding government policies for BEVs in the next five years in China and internationally?

4 Closing Part (5min)

Agenda	To-Dos
Summary	- Briefly summarize the insights gathered through the interview and ask for possible additions by the expert
Goodbye	- Thanking for the valuable insights and time - Offer to provide analysis of interview to expert when finalized
STOP OF RECORDING	

Appendix 12: Expert interview analysis according to Mayring (Hornstein, Schallenberg, and Schauer 2024)

Expert number	Interview language	Paraphrase	Generalization	ID	Reduction
7	English	I am not specific to particular Chinese OEMs or supplier processes. I work for a consultancy firm, and before joining Roland Berger, I worked for another consulting firm. I have accumulated nine years of experience in the consulting industry, primarily focused on the automotive sector. With the development of electric vehicles, I have been focusing on this topic for about five years. I have worked with several Chinese OEMs as well as some foreign brands to develop their overall electrification strategies. Recently, some of the Chinese OEMs have also been pursuing globalization strategies, where electrification is a key focus. That's a brief introduction to my experience.	The expert has extensive experience in the consulting industry, with a focus on the automotive sector, spanning nine years. For the past five years, their work has centered on the development of electric vehicles, with involvement in both Chinese OEMs and foreign brands. They have supported several Chinese OEMs in developing their electrification strategies and have observed a growing emphasis on electrification as part of their broader globalization strategies.	CL0.1: Interview Partner Background	<i>Reduction not relevant</i>
8	German	Yes, all right, so already several years ago for the first time, I believe. Previously, I don't know, five, six, seven years ago, I would have to check, there were the first projects with purely Chinese BEV manufacturers in the context of questions surrounding a possible market entry into Europe, and this has intensified since then; some have joined since then, but I cannot name them right now.	Several years ago, initial projects with purely Chinese BEV manufacturers began exploring potential market entry into Europe. Since then, this effort has intensified, with more companies joining, though specific names are not available at the moment.		
8	German	And the topic of market entry into Europe is something I have been working on for quite some time. At the same time, there are a whole series of projects with well-known or established automakers around the question of what can be expected from the new Chinese competitors. This is also the other part of my work on this topic. Most recently, over the turn of the year, I worked together with my Chinese colleagues on a major study at the C-level for customers for a large Asian manufacturer on a global scale, addressing questions about what to expect from the Chinese competitors. This is not only about the new EV startups but all Chinese players. The focus was on all markets worldwide, with the exception of North America due to the special customs or trade situation already present at that time, and with the exception of the domestic home market, China. But Europe, Rest of World markets, GCC, South America, and so on were grouped together.	Market entry into Europe has been a focus of my work for some time. Recently, I collaborated on a major global study with Chinese colleagues for a large Asian manufacturer, analyzing what to expect from Chinese competitors, including both new EV startups and established players. The study covered markets outside of North America and China, including Europe, the Rest of the World, GCC, and South America.		
8	German	I do think that was helpful, but I have to say that this would be a bit outside my area of expertise. Other colleagues are simply more knowledgeable on this topic, and I wouldn't want to give you incorrect information. So, perhaps check with the expert I connected you with to see if they can provide more insight.	This topic is somewhat outside my area of expertise, and I believe other colleagues are better suited to provide accurate information. It might be helpful to check with the expert I connected you with for further insights.		
4	German	I have been working with my employer since 2016, primarily in the area of Smart Mobility, as well as in product	The expert has extensive automotive knowledge as he has worked in Smart Mobility and product management		

Appendix

		and service management, which involves a lot of work on connectivity, charging, and vehicle product management. In the last two years, I was in China, where I led Business Development at our sales subsidiary. This involved several aspects, including political analyses. However, my main focus was on digital portfolio management and sustainability within the Corporate Strategy and Development department, meaning that a lot of things were addressed in a comprehensive strategic manner. This is my background, shaped by my work there, which gave me exposure to different aspects, not only to the products but also to what stands behind them, such as representatives, channels, and how everything operates. I also looked at the political dimension to understand what is being done to support the entire process, and of course, living in China for two years, I gained insights from the consumer perspective on what is currently happening in the market there.	since 2016. For the past two years, he led Business Development for a subsidiary in China, concentrating on digital portfolio management, sustainability, and political analysis within Corporate Strategy.		
6	English	I'm Yazhu, and my background is primarily in the semiconductor industry rather than automotive. I do have some background in the Chinese market, including the automotive sector, but my main focus has been on the semiconductor supply chain, especially in areas related to automotive electronics and local policies. I'm not as familiar with the overall automotive perspective, but I'll do my best to clearly explain my ideas and thoughts in response to your questions.	Yazhu has a background in the semiconductor industry, particularly focusing on automotive electronics and the semiconductor supply chain.		
10	German	I have been in the automotive industry since 2018, initially working with the supplier Robert Bosch GmbH for four to five years, where I was responsible for procuring electronic and semiconductor components, including ECUs used in electric vehicles. During the semiconductor crisis, I was heavily involved in a task force addressing the challenges of ensuring an adequate supply of subcomponents for EVs, which have particularly high demands for digitalization and connectivity. In 2022, I was recruited by Volkswagen AG, which also manufactures electric vehicles. I now lead a team in semiconductor management, a role that combines procurement functions with internal consulting on semiconductor-related issues for other departments. At Volkswagen, we focus on numerous topics related to electromobility, and since China remains VW's most important market, I have gained some experience there, having visited occasionally.	I've worked in the automotive industry since 2018, first at Bosch managing semiconductor procurement for EVs, then at Volkswagen, where I lead a semiconductor management team focused on electromobility and consulting on related issues, with experience in the Chinese market.		
11	German	I was the first plant manager of BMW Brilliance's plant in China from 2002 to 2006, and I set it up, including the entire supplier integration, commissioning, and production, so I know China inside out. I am also fluent in Mandarin, which makes a big difference for me, as many Westerners who have worked in China but cannot speak the language don't get to look behind the scenes and	The individual has extensive experience in the Chinese automotive industry, having been involved in the establishment of BMW Brilliance's plant and supplier network in the early 2000s, with a unique advantage in Mandarin fluency. This language proficiency facilitated		

Appendix

		don't get access, but I do. And I am a founding member of CATL; without me, it wouldn't have been established. They always call me the uncle of CATL, and overall, I lived and worked in China for 20 years	deeper access and insights into local business practices, which are often less accessible to non-Mandarin speakers. Additionally, the individual was instrumental in the founding of CATL and has a longstanding presence in the Chinese market, spanning two decades.		
1	German	Yes, I would say that Chinese OEMs are currently leading in the BEV segment. We in the West have somewhat missed the boat on this; it should have been managed more skillfully.	Chinese OEMs are ahead of Western companies in the BEV segment.	CL0.2: Other	<i>Reduction not relevant</i>
3	German	Yes and no. This might not be entirely helpful, but when it comes to cell technology—specifically produced cell technology—and cost positioning, particularly in relation to components like inverters, electric motors, and especially cells and batteries, they have a significant advantage. I would say that in terms of pure application continuity, they are ahead. However, on the side of cell chemistry, I'd say they are more or less on par.	I only partly agree that Chinese OEMs are ahead in the BEV segment, in some areas Western OEMs are definitely on par.		
2	German	Overall, I believe that Chinese OEMs hold an advantageous position in the BEV segment compared to Western OEMs.	Chinese OEMs lead the BEV segment.		
5	German	I don't think I would agree with that as a blanket statement. If you look at it more closely, there are different aspects that make a good car. As a Tesla driver myself, I know how often Tesla has been criticized for panel gaps. Of course, you could argue that's really important. But it comes down to whether the car's bodywork, suspension, and overall build are good. And specifically for electric cars, it's more critical to look at things like charging speed and optimized range. These factors are arguably much more important. So, you have the hard facts of the car—bodywork and product quality—then everything around charging and EV performance. Another area that has grown significantly is the digital platform of the car. I think, especially in terms of digital platforms, the Chinese approach is definitely far ahead, particularly with ecosystems and integration. But for other aspects, I'd raise some questions. For instance, I'd say that the platform for EVs from Hyundai, Genesis, and others is significantly better than what you see in many Chinese vehicles. When it comes to what makes a car truly enjoyable—everything beyond the bare minimum—I think European OEMs definitely still have a place. So, to say they are miles ahead in general? I'm not sure I'd agree with that.	I only partly agree that Chinese OEMs are ahead in the BEV segment, in some areas Western OEMs still have an advantage, for example in quality.		
9	German	Absolutely. Mainly from a historical perspective—they started building their value chain 10, 15, or even 20 years ago, not necessarily for electromobility but primarily for consumer electronics. As a result, they have completely different assets and experiences in place, especially when it comes to automation.	The Chinese OEMs for sure are ahead of Western OEMs in the BEV segment.		

Appendix

		This is something Europe needs to seriously consider—how to catch up in this area. Currently, they definitely have a significant competitive advantage.			
7	English	Yes, I definitely agree with that in terms of sales volume and competency, as you might already know. In general, I think Chinese OEMs are ahead of foreign OEMs.	Chinese OEMs are perceived to be ahead of foreign OEMs, particularly in terms of sales volume and overall competency.		
8	German	Yes, I believe that's basically correct. Can we affirm that? As for technological progress in this specific type of vehicle, they are now, in many aspects, the benchmark. If you look at individual details, you will certainly still find some non-Chinese players who lead in specific domains. But if we look at the overall system, then, yes, they have made progress in many areas, especially in the volume segment, but also in others.	Yes, that's correct. In many aspects, Chinese manufacturers are now the benchmark for technological progress in this type of vehicle. While some non-Chinese players may still lead in specific domains, overall, Chinese manufacturers have made significant advancements, particularly in the volume segment and beyond.		
8	German	As for the second point, there are certainly some aspects that may run counter to this dominance. Apart from the question of how electromobility will develop in regions outside of China, we could, from a climate policy perspective, face a worst-case scenario where China becomes the sole “island” of electromobility, and we would have to be grateful that at least they aren't emitting CO2 in transport. Hopefully, it won't come to that, but today, regions must be viewed much more separately. How other regions develop will, of course, be a key question in fully answering this.	While China's dominance in electromobility is clear, there are potential challenges, particularly if other regions lag behind. A worst-case scenario could see China as the sole leader in electromobility, offering benefits in terms of reduced CO2 emissions in transport, but global development will ultimately depend on how other regions progress.		
11	German	Yes, I for sure believe that Chinese OEMs are ahead of the West in the BEV segment. A topic you are not really covering is also the different business model they are following.	Chinese OEMs are ahead of Western companies in the BEV segment.		
13	German	The success of Chinese firms in the BEV industry depends heavily on the specific area being examined. Many Chinese customers associate BEVs with intelligent vehicles, which aligns with government initiatives focused on Intelligent Connected Vehicles. In terms of vehicle intelligence, Chinese companies, particularly the disruptor firms, are ahead. They have taken the lead for various reasons. However, in this area, there is notable progress being made to catch up. Regarding battery and drivetrain technology, the situation is more balanced; both sides use similar technologies and suppliers. For example, Mercedes is seen as a leader because it integrates these technologies with core values like safety and quality.	Chinese OEMs are only ahead in some areas, for example intelligent connected vehicles. In others, including safety and quality, Western OEMs still lead.		
3	German	The pure material switch in BEVs has not contributed significantly to the success of the Chinese, because German institutes or companies such as BASF have comparable expertise in, for example, cell chemistry.	European institutes and companies had similar knowledge regarding pure cell chemistry and the materials.	CL1.1: Green-field Opportunity driven by Material Transition	The distinct material composition of BEVs compared to ICEs has supported the rise of Chinese OEMs in a previously saturated automotive market. BEVs rely on materials like cobalt and
3	German	However, China has encouraged 20-40 institutes and universities to deal with the scaled application topic. This has given them advantages in terms of optimization, lifetime consideration and advantageous cell design.	China has gained advantages in the application, design and lifetime considerations of batteries.		
3	German	And, and that's because they no longer	The technological switch		

Appendix

		have these major preventive hurdles. ICE combustion engines, you can't do that off the cuff, you really need a structure or even a substructure, but they can jump over this second major preventive hurdle of electrical architecture, you they have learned that.	from ICE to BEV have decreased entry barriers for Chinese OEMs as they master in electronic architecture.		nickel, where China controls much of the supply chain, aligning with its strategic goal to reduce dependence on imported oil. China's integrated value chain from raw materials to battery production has enabled it to sidestep Western dominance in ICE technology, producing affordable BEVs that meet the needs of city drivers in Tier 3 and Tier 4 regions. This shift to BEV-specific materials, supported by China's focus on EV innovation, has allowed Chinese OEMs to establish a durable advantage, positioning them as leaders in the global electric vehicle industry. While traditional construction materials remain relevant, BEVs introduce unique structural demands, such as the "skateboard" design, requiring a rethinking of vehicle design and providing China a strategic edge that complements its consumer-centered approach.
2		Yes, I think so, mainly because BEVs are different—it gave them the chance to enter even though the general market was already extremely saturated with many different players. So, they used the chance of a new technological environment and executed well.	The different material composition of BEVs gave Chinese OEMs the opportunity to enter a before saturated market.		
5	German	Yes, I would say that this is a success factor. When we look at the complexity of an internal combustion vehicle and where the main value creation lies for an automotive manufacturer, in Germany, it's clearly in the engine and drivetrain, with much of it coming from suppliers. The OEMs are masters of supply chains. When you start to re-think the primary components of value creation, entirely new possibilities open up. You're also forced to re-evaluate and perhaps question other aspects. Anyone who has sat in a Tesla remembers it because it looks so radically different from any other car. I think the Chinese have similarly been able to cut ties in certain areas and say, "Alright, we'll do this ourselves," thereby gaining more freedom compared to internal combustion engines.	The different material composition of BEVs was a success factor as Chinese were able to re-think traditional approaches and integrate more aspects.		
9	German	The significantly different material composition of BEVs is only a secondary success factor for Chinese OEMs. The primary factor is their experience in battery technology, which they have accumulated over recent decades, giving them a cost advantage.	The different material composition of BEVs compared to ICEs is only a secondary success factor.		
7	English	I think the shift in material composition from ICE to electric vehicles has led to an increased reliance on rare earth metals, as you mentioned, such as dysprosium, cobalt, and nickel, which has significantly benefited Chinese OEMs. China has a certain advantage in some rare earth materials. Compared to ICE vehicles, which rely on oil, China is not as self-sufficient in oil production. Therefore, the transition to electric vehicles aligns with a national energy strategy to reduce reliance on imported oil in the future. I would say the shift in material composition has been beneficial for the development of Chinese electric vehicles.	The shift from ICE to EVs has increased reliance on rare earth metals like cobalt and nickel, benefiting Chinese OEMs. China's advantage in rare earth materials aligns with its energy strategy to reduce dependence on imported oil, supporting the growth of its EV industry.		
8	German	So, if I have a material, we need to distinguish between the material that ultimately goes into the battery, which is a necessary component for an electric vehicle, as the name suggests, and the materials used elsewhere in the vehicle. The topic of lightweight construction has, in principle, existed for a long time and is about, for instance, which steels are used, or whether carbon or other building materials are employed. These materials, all of this, have existed before. From my perspective, though I must note that I am not a technician or a vehicle builder, I would not see a fundamental advantage here.	The materials used in electric vehicles can be categorized into those essential for battery production and those applied in other areas of the vehicle. Lightweight construction, involving choices among different steels, carbon, and various building materials, has long been a focus in vehicle manufacturing and does not present a fundamental advantage specific to electric vehicles.		

Appendix

8	German	What makes the difference, or rather the advantage, is that an electric vehicle—a battery electric vehicle—is a completely differently structured and conceived vehicle, apart from the four wheels. This ultimately leads to a different material mix, but the comparison is even further removed than comparing apples to oranges. Therefore, perhaps focusing purely on the materials might be a bit of a stretch as a hypothesis, because the similarity of the vehicles isn't sufficient to support it.	The unique structure of battery electric vehicles results in a different material mix, making direct material comparisons with conventional vehicles insufficient due to their fundamental dissimilarities.		
8	German	The classic "skateboard" BEV with an SDV platform and body on top is a completely different vehicle compared to an internal combustion engine. This dramatic shift to a completely different product category, where prior experiences from the traditional industry were only partially applicable and new ones had to be developed, has had the greatest effect in connection with the domestic market, the long-term strategy, and many other aspects we will discuss shortly. Regarding the materials, as you just formulated it, I would disagree. And, as mentioned, the part involving the battery wasn't previously needed because we didn't have battery electric vehicles.	The "skateboard" design of battery electric vehicles marks a shift to a new product category, requiring new knowledge and impacting the domestic market and strategy. The battery introduces materials that were not needed in traditional vehicles.		
4	German	If you look at internal combustion engines (ICE) in China, for example, Western brands have dominated for years, creating a barrier that local players couldn't easily overcome. This change, driven in part by access to different raw materials and the ability to transform them into products—like building batteries—has allowed the Chinese to excel over recent years. They have secured control points across the entire value chain needed to build electric vehicles, from mining to technology, to manufacturing efficient, affordable batteries, and finally, producing vehicles that are durable and competitive.	China's control over the electric vehicle value chain, from raw materials to battery production, has enabled them to overcome Western dominance in traditional engines and excel in affordable, durable EVs.		
4	German	If China had attempted to compete in the same space with traditional materials, the competition with established players would have been too intense. I think, in Europe, we have essentially abandoned our core technology, which we excelled at and refined over decades, in favor of new technology, where China has a lead. China recognized 10 to 15 years ago that this shift was its best chance to establish itself in the industry, and they have built up the entire chain systematically. So, to answer your question, I believe materials have contributed to this, but the broader difference between BEV and ICE requirements has been a major advantage for China.	China's strategic focus on EV technology, unlike Europe's pivot away from established ICE expertise, allowed it to systematically build a competitive edge across the EV supply chain, capitalizing on the distinct material and technology requirements of BEVs.		
10	German	In terms of raw material management, I wouldn't consider it a major factor. Ultimately, they still need metals and other standard materials. While clever material choices can extend battery range, for the typical consumer driving in cities like Hamburg, Shanghai, or Shenzhen, who usually covers only 30 to 50 kilometers per day, extreme range	Raw material management isn't a major factor for Chinese BEV success; while clever material choices can extend battery range, it's less crucial for typical city driving, where daily distances are short.		

Appendix

		isn't crucial. Range becomes more relevant for longer trips, but from my experience, I wouldn't say construction materials have had a major impact, even though they may provide some advantages.			
13	German	The connection between the success of electromobility in China and rare earths is, in my view, rather indirect. I would not say that China has necessarily gained a competitive advantage from this. However, it will be important to observe how geopolitical tensions, which are likely to intensify, particularly between the U.S. and China, will unfold. For instance, if the U.S. starts intervening in Taiwanese chip manufacturing, China might eventually respond by restricting rare earths exclusively to its own use.	There is no direct connection between the shift to more rare earths in BEVs and the success of Chinese OEMs but with geopolitical tensions this can change, if China restricts access.		
13	German	China's strategy focused on technology and expertise, aiming for leadership in key sectors like automotive by 2049. They identified electromobility as an untapped opportunity, where no one had a significant lead, unlike internal combustion engines with 130 years of development. Heavy investment in battery research allowed China to gain a leadership position. The role of raw materials is secondary to their technological push.	China realized that in electromobility they have a chance to achieve technology leadership and invested early, which is more important than the shift in materials.		
1	German	Let's say that China already has significantly more raw materials than we do anyway, because you just have to see that for example for what is needed for battery production and they have, of course, made a corresponding plan with investments into Lithium in Africa.	China has better access to raw materials and made a strategic plan for securing battery materials through international investments.	CL1.2: Securing Critical Materials beyond the Borders of Mainland China	China's success in the BEV industry is closely tied to its strategic control over raw materials essential for battery production. Through domestic mining, extensive international investments, and government-led initiatives like the Belt and Road, China has secured stable access to resources such as lithium, cobalt, and rare earth elements. Key players like CATL, supported by favorable policies, have prioritized refining and recycling capabilities, reducing dependency on imports and bolstering supply chain independence. This proactive approach has given China a competitive edge, positioning it as a dominant force in the global battery
2	German	I think it was a very smart strategic decision, especially because the opportunity presented itself to enter the market and secure partnerships relatively early on. With raw materials, it often comes down to securing shares and quantities of resources that are simply limited on Earth. They secured resources within their own country—what they already had—and then invested wisely internationally.	Investing wisely in securing rare raw materials domestically and internationally was a strategically smart decision.		
2	German	Of course, there is a risk in the long term if other countries begin to limit investments and partnerships with China. However, I would somewhat relativate that, as we'll likely discuss further. I think the next step is particularly important—one must actually do something with those raw materials. In this case, they have also positioned themselves very strategically in terms of value chain, which is becoming evident now. Even if a country has certain raw materials in reserve, they still often need to go through China, given its capability to process these materials.	The risk of countries limiting partnerships for raw materials with China is low as they also depend on China regarding further processing steps.		
5	German	Chinese foreign policy is very direct when it comes to securing resources—they build roads in countries like Congo at their own expense, for instance. These roads go straight from the mine to the port. One might think these actions are driven by noble intentions, but access to these roads is sometimes even restricted for locals. This approach is	Chinese investments are viewed more and more critically in African countries but dependencies are high.		

Appendix

		therefore viewed increasingly critically in such countries, yet there remains a strong dependency.			value chain and creating a potential exclusion risk for other nations facing regulatory and trade challenges.
5	German	The Chinese are also smart—they invest heavily in battery recycling. From my perspective, this isn't driven primarily by a push for innovation; rather, they simply understand that it will be a competitive advantage in the future to rely less on mined rare earth elements.	China invests extensively in battery recycling to become less reliant on mined rare earths.		
9	German	Securing input materials is certainly a success factor. The Chinese have approached this very strategically; it's not a topic that emerged only in the past five years. Scaling the BEV industry also involves securing upstream materials.	China has strategically secured BEV input materials which is a success factor.		
9	German	I see a risk for China's dominance in input materials only if there is a significant shift in battery cell technology, such as a development toward LFP batteries.	China's dominance in input material access is only risked if there is a significant technological shift.		
9	German	However, it should also be noted that China generally faces lower regulatory requirements regarding material extraction, such as whether child labor was involved—an area where we in the EU are more vigilant.	China also has an advantage in material access due to lower regulatory requirements.		
7	English	Yes, I think Chinese OEMs, as well as some battery manufacturers like CATL, have heavily focused on securing domestic mining resources, including investments in mining operations. They've done their best to secure the supplies of upstream materials, including the necessary minerals for battery production.	Chinese OEMs and battery manufacturers, such as CATL, have focused on securing domestic mining resources and investing in mining operations to ensure a stable supply of upstream materials, including the minerals required for battery production.		
7	English	Some local OEMs and suppliers also focus on recycling materials from used batteries to reduce import dependency. As you might already know, even with these efforts, the supply of raw materials remains a critical factor for the industry.	Local OEMs and suppliers are recycling materials from used batteries to reduce import dependency, but raw material supply remains a critical challenge.		
7	English	Chinese lithium mining still relies on imports from Australia and other countries, even with the changing global relationships. However, China has started to focus on domestic mining for these resources. I would say that resource development and recycling initiatives are two key efforts that are already underway and being prioritized in China.	Despite China's focus on domestic mining, lithium mining still relies on imports from countries like Australia. However, resource development and recycling initiatives are key priorities in China.		
7	English	I think that, in general, even if you check the price of lithium mining, you'll see that the price peaked about two years ago, and after that, it decreased dramatically. This indicates that the supply of lithium and other resources is becoming more sufficient globally. Overall, production capacity is catching up, and in some cases, we could say there's a bit of oversupply now, which is why the price is quite low. So, I think the recycling initiative comes not only from the need for resource security but also from considerations about the sustainability of the environment, as recycling batteries in an environmentally friendly way is still a challenge.	The price of lithium peaked two years ago and has since decreased, indicating a global increase in supply and production capacity, leading to some oversupply. The recycling initiative is driven not only by resource security but also by environmental sustainability, as recycling batteries in an eco-friendly manner remains a challenge.		
7	English	That's why the Chinese government has also launched certain policies, stating that those who produce batteries must	The Chinese government has implemented policies requiring battery producers to take		

Appendix

		take responsibility for recycling the batteries once the vehicle is retired. As a result, many OEMs and battery suppliers are focusing on building their recycling capabilities. However, recycling is not a cost-efficient way to produce lithium; it costs much more compared to other methods.	responsibility for recycling batteries after a vehicle's retirement. As a result, many OEMs and battery suppliers are focusing on building recycling capabilities, though it remains a costlier method compared to other lithium production processes.		
7	English	To mitigate that risk, some Chinese battery manufacturers and mining companies are exploring alternatives. For example, lithium can not only come from traditional mining but also from certain lakes, which is another way to source rare earth elements. However, this process requires a very specialized method to refine the raw materials. While it is quite abundant in China, lake lithium is a very unique form of mining. Local players are also investigating new ways to source lithium to reduce reliance on traditional lithium mining. However, the process is still complex and less widespread compared to traditional methods.	To mitigate risks, some Chinese battery manufacturers and mining companies are exploring alternatives, such as sourcing lithium from lakes, a method that requires specialized refining techniques. While abundant in China, lake lithium mining is still complex and less widespread compared to traditional methods. Local players are also investigating new ways to source lithium to reduce reliance on traditional mining.		
8	German	All of this was planned with a long-term perspective, and with the strength of the domestic market, China decided to secure access to these raw materials. This is an important success factor to ensure that the part of the automotive value chain focused on the battery, particularly the cells, benefits from it. The situation has certainly arisen where it's practically impossible to bypass China or Chinese players in this area.	China's long-term planning, combined with the strength of its domestic market, has secured access to essential raw materials, positioning Chinese players as key beneficiaries in the battery value chain. This has made it nearly impossible to bypass China in the battery and cell production sector.		
8	German	This is not equivalent, and I just want to avoid making a direct leap from the battery to the assumption that the car automatically follows; that's not necessarily the case. However, when I look at a value chain, the battery is a very essential component, one that makes up a significant part of the future automotive value chain.	While the battery is a crucial component of the automotive value chain, it does not automatically imply that the entire car follows suit. However, the battery remains a key element in shaping the future of the automotive industry.		
4	German	I agree with your point: this probably wouldn't have been possible if the difference between ICE and BEV wasn't so pronounced. Materials play a role in this—raw materials are available within China, allowing them to cover the entire value chain domestically. This will likely be a major success factor for the Chinese automotive industry, especially since European OEMs could be quickly excluded if another country decides not to sell these materials or imposes high tariffs.	China's domestic access to essential raw materials for EVs, coupled with control over the entire value chain, positions its automotive industry strongly, especially as European OEMs risk exclusion due to potential trade restrictions.		
4	German	Yes, I think that's truly a fascinating question, not just for the automotive industry in China but for the entire world. How this develops over the next 10 years will be one of the major risk factors for the Chinese automotive industry—not only regarding product sales but also in terms of access to resources, technologies, and so on. What we've seen so far is that Chinese investments, especially in emerging markets, have been generally welcomed because they are primarily business transactions. Unlike in Europe, where investments are often tied to conditions,	China's straightforward, conditions-free investment approach has fostered strong ties in emerging markets compared to Europe's more regulated investments.		

Appendix

		such as human rights standards or education access, China's approach has typically been more straightforward. They say, "We can both benefit if we invest here in ports, mining projects, infrastructure, and so on." And, generally, these countries have accepted this approach because it doesn't come with additional requirements.			
6	English	You mention Australia limiting Chinese involvement in critical mineral projects, which I find particularly interesting. This effort by China to secure access to key resources isn't new; it's something that both the Chinese government and the industry learned from past experiences, like with iron ore imports from Australia. As prices surged yearly, China learned the importance of securing raw materials for stability. In the automotive sector, the same lesson applies. China is focused on securing critical raw materials for the industry's long-term growth, given the size of the automotive industry and its importance for China's development. I believe this is why we see measures led by the government or the industry to secure a reliable supply chain, particularly for critical resources. This approach to supply chain security isn't unique to China. Western countries have long understood the need to secure access to critical materials, especially for essential industries. So, in my view, China's focus on supply chain security for key raw materials in the automotive sector aligns with practices already established in the West. That's my perspective on it, though I don't have specific data to support this at the moment.	China's focus on securing critical raw materials for the automotive sector is a strategic move, much like Western practices, to ensure long-term supply chain stability and support industry growth.		
6	English	I think when it comes to raw materials, especially refining, it's similar to what I mentioned before. In China, there's a huge demand for refined materials, so they're working to build domestic capabilities to produce these materials themselves. This upstream segment of the supply chain is crucial, and by developing refining capacity in China, they aim to secure the supply needed for the rest of the supply chain. While I don't have extensive information on this topic, my understanding is that this effort aligns with China's overall strategy to ensure stability and independence in key resources for the industry. But I don't think this is very special if you're talking about why Chinese are securing this raw material or refine raw material.	In my view, China's push to build domestic refining capabilities for raw materials is part of their broader strategy to ensure supply chain stability and independence, which isn't unique for China but rather aligns with global practices of securing critical resources for industry.		
10	German	Yes, this is something that Europe and the United States do as well. If you need lithium, certain types of copper, or rare earth elements, for instance, it's a competitive landscape around natural deposits. For semiconductors, there's a high demand for materials like silicon and silicon carbide, so it becomes a geopolitical matter that goes beyond individual manufacturers.	The competition for materials like lithium, copper, and rare earth elements is global, and for semiconductors, materials like silicon and silicon carbide also make it a geopolitical issue, beyond just individual manufacturers.		
10	German	Governments have identified strategic industries, such as automotive and semiconductors, and work to secure resources through partnerships, agreements, and cooperation with resource-	Governments secure strategic resources for industries like automotive and semiconductors through partnerships, with Europe, China, and the		

Appendix

		rich countries. It's much like the old days with oil or specific types of steel and metals—scarce resources are strategically secured within a nation's sphere of influence. This approach is beneficial and is why Europe, China, and the United States each pursue it, albeit in different styles. The U.S., for example, focuses on security cooperation and stabilization efforts (like with the CHIPS Act), while China tends to invest heavily and incorporate these countries into its Belt and Road Initiative. Europe, meanwhile, tries to establish cooperative frameworks.	U.S. pursuing different approaches—China uses heavy investment and the Belt and Road Initiative, the U.S. focuses on security and stabilization (e.g., CHIPS Act), and Europe emphasizes cooperative frameworks.		
10	German	These efforts are not incidental but driven by the understanding that these materials will become even scarcer, so governments want to ensure their industries have access. However, this is largely beyond the control of OEMs, as it falls within the realm of geopolitics and government strategy.	Governments are strategically securing scarce resources to support their industries, but OEMs have little control over this, as it is driven by geopolitics and national policy.		
11	German	Let's put it this way, especially when it comes to rare earths, whatever they may have been or still are today. The Chinese always had availability, while we had to buy them at high prices. And by the time we set up the necessary contracts, determined where to buy them, and figured out how much we could get, they were already ahead.	Chinese manufacturers have consistently maintained access to rare earth materials, whereas others faced high costs and delays in securing supply contracts. This early and stable access gave Chinese companies a competitive advantage in resource availability.		
11	German	Over time, a certain delay occurs, and I'd also like to take a step back in the value chain, as there is a macroeconomic component behind this. The Chinese have their "One Belt, One Road" initiative, and what does One Belt, One Road mean? My friend Robinson, the chairman of CATL, for example—years ago, they invested in or participated in mines in the Congo, signed lithium contracts in Chile, and so on, and on a large scale. This happened as part of the One Belt, One Road initiative, where they traveled with government delegations, securing extremely high availability of rare materials.	Chinese companies, supported by the "One Belt, One Road" initiative, secured extensive access to rare materials through strategic investments and partnerships, often facilitated by government delegations. This proactive approach included investments in mines in the Congo and lithium contracts in Chile, providing a high level of resource availability in the global supply chain.		
11	German	And they essentially operate on a barter basis. The Chinese build infrastructure in these countries, which they then use to export these resources back to China. This approach extends beyond just China's mainland resources, as they have specifically developed logistical structures to connect with South America and Africa. Meanwhile, in the Western world, we spend a long time discussing human rights and whether we should even be doing this because of the presence of dictators, while they simply get things done decisively. For example, they have a cobalt mine deep in the Congo jungle, which no Western manufacturer has access to. Therefore, the availability of rare earths, in sufficient quantities, is undoubtedly a success factor in this development.	Chinese companies secure resources through infrastructure-for-materials exchanges, enabling efficient transport from regions like Africa and South America. This pragmatic approach, contrasted with Western ethical debates, grants them ample access to rare earths, a key success factor.		
12	German	I think it has certainly contributed to the success. I wouldn't necessarily say that it is the most important success factor, but it has contributed significantly. And especially looking towards the future, I believe it is an extremely powerful	Access to raw materials has contributed to China's success, though it may not be the most important. Looking ahead, it is seen as a significant lever for China's future		

Appendix

		lever that China as a whole holds.	development.		
12	German	You always have a dangerous situation when there is an unequal relationship, meaning when one side is significantly larger or holds much more power, either on the demand or supply side. In this case, the issue goes in two directions: one is towards the developing countries where the raw materials are mined. These countries are always dependent on China because China is the largest buyer and thus has a significant influence. If you think further along the supply chain, China quickly becomes not only the dominant force on the demand side of raw materials but also on the supply side of processed materials. And then, there is again a high level of dependence. So, sorry for the long answer, but the short answer is yes.	An unequal relationship, where one side holds significantly more power, creates a dangerous situation. In the case of China, it exerts significant influence both as the largest buyer of raw materials from developing countries and as a dominant force on the supply side of processed materials, leading to high levels of dependency at both ends of the supply chain.		
13	German	In my assessment, without going into all the details, the risks with raw materials are probably lower. China is in a relatively strong position, partly due to its own resources and its early securing of access. I believe raw materials will not become a bottleneck here.	There are no significant risks for China regarding raw material access as they have established a very strong strategic position.		
1	German	The Europeans are now gradually moving into battery production, but access to raw materials is not as secure as in China, and when it is, it is at higher prices. This ultimately also affects the prices of the vehicles.	Europe needs to buy raw materials at higher prices which influences vehicle prices.	CL1.3: Leading Authority in Material Refinement	China's dominance in BEV production is driven by low-cost mineral refinement, access to critical raw materials, and a willingness to innovate with composite materials, reducing production costs and enhancing efficiency. While Europe faces higher raw material costs that affect vehicle pricing, China maintains the largest battery production capacity, despite some risks of dependency. Technological advances, such as improved energy densities, faster charging, and increased recycling, are expected to gradually reduce raw material demands and reliance on rare earth elements. Although China's economic growth was supported by state policies in material processing, current challenges with
3	German	The risk of China losing its position in terms of raw materials is exorbitantly low. Once you have a virtually monopolistic position, you can play with pricing and push competition out of the market.	The risk of China losing its position in terms of raw materials is exorbitantly low.		
2	German	I think they're particularly successful because they can operate very cheaply, largely due to placing less emphasis on external factors like environmental standards compared to others, and also because they have access to a very affordable labor force.	China can operate cheaper in mineral refinement due to low labor costs and reduced emphasis of environmental factors.		
2	German	However, I also believe it presents both a risk and a strategic challenge for other countries to find ways to reduce their reliance on them, perhaps by securing market shares or through regulatory measures.	Other countries should reduce their reliance on China in mineral refinement, e.g., through regulatory measures.		
9	German	My gut feeling is that the refinement process in the value chain is not as crucial to China's success as, on one hand, access to upstream materials and, on the other, technological know-how in the field of battery cells.	China's standing in the refinement process is not as crucial as material access and know-how in cell technology.		
7	English	I think the mineral refinement process is crucial to the success of battery production, especially when the supply was limited over the past two years. However, I don't think the supply of mining resources is as constrained as it was before. So, I'm not sure whether China still plays as important a role in the mining process, but China does have the largest battery production capacity. In terms of production volume, I think China's role is still significant to some extent, and there could be risks involved.	The mineral refinement process is crucial for battery production, especially during periods of limited supply. While the supply of mining resources is no longer as constrained, China still holds the largest battery production capacity. Its role in production volume remains significant, though there are potential risks involved.		
8	German	Secondly, we continue to see signifi-	Advancements in battery technology are progressing		

Appendix

		cant advancements in battery technology, which are progressing very quickly, with considerable leaps every two to three years in terms of materials, leading to higher energy densities, and so on. This means that with these advancements, if we extrapolate further, we should reach a point where future electric vehicles achieve the same range with smaller batteries and, therefore, with fewer raw materials.	rapidly, with significant improvements in materials every few years, leading to higher energy densities. This suggests that, in the future, electric vehicles will achieve the same range with smaller batteries, requiring fewer raw materials.		global market monopolies are prompting other countries to invest in domestic production and regulatory measures to secure their supply chains independently.
8	German	What's important, also to further reduce prices, is enabling this ongoing technological development. That's one aspect to consider. Additionally, faster charging options are emerging—the faster I can charge a car, the less capacity the battery needs to have. These factors suggest that simply extrapolating current conditions by quantity may not be the right approach. Moreover, the use of more rare earth elements and other raw materials in batteries throughout their lifecycle will lead to progressive case developments for recycling these raw materials. This will only take effect in a few years, once there's a fleet old enough to recycle, but it should result in a scenario where, despite significant growth, the relative dependency on mines and deposits in certain countries could gradually reduce. This would be due to recycling and different battery compositions, lowering the demand for these materials per vehicle. The advantage remains, but all of this needs to be considered with some caution when projecting into the future.	Technological advancements, faster charging, and recycling will reduce battery costs and material demand. As EV fleets age, recycling will lessen reliance on raw materials, but future projections should remain cautious.		
10	German	Yes, the point is that Chinese BEV OEMs don't necessarily have exclusive access to raw materials that others lack. China does have its own reserves of rare earth elements, such as gallium and germanium, where they hold substantial deposits that we in Europe or even the Americans don't have as easily. However, the key difference is that they have access to the same resources as everyone else, but they have been more willing to use new composite materials or constructions that are unconventional in the traditional automotive industry.	Chinese BEV OEMs don't have exclusive access to raw materials but do benefit from having substantial reserves of rare earth elements like gallium and germanium. The key advantage is their willingness to use new composite materials and unconventional construction methods.		
10	German	It certainly didn't hurt China to have strong capabilities in the processing of raw materials, particularly rare earths, which gave them an advantage during the semiconductor crisis. In my view, China's economic progression follows a typical path for developing nations moving up the value chain. Initially, China was the world's manufacturing hub, focused on raw material extraction and exporting those materials to other countries, like Japan or Korea, for further processing before final products were shipped to places like Europe. Now, China has advanced to processing these materials itself, adding value and capturing more of the profit margins. This shift up the value chain allows them to apply more IP, create better jobs, and retain more value domestically.	China's economic progression mirrors the typical path of developing nations, starting as a manufacturing hub focused on raw material extraction and then moving to process those materials domestically.		
10	German	China's move into material processing was less about a specific government	China's move into material		

Appendix

		plan and more about natural economic progression, with the government likely supporting these shifts along the way. Has this helped them during crises? Certainly. However, in complex industries like semiconductors, simply having one part of the processing chain isn't enough. For example, if China can handle lithography but lacks the final steps, like cutting or testing, it still doesn't result in a finished chip. So, while having control over some processing steps offers advantages—particularly as others rely on them for further processing—it doesn't equate to full control without the other necessary steps to create a complete product.	processing was driven by natural economic progression, with government support along the way. While having control over some processing steps, like lithography, offers advantages, it doesn't provide full control without the ability to complete the entire value chain.		
11	German	I think it's a medium-term question of technology. You know that e-machines are now also working with copper coils, among other solutions, so it's not necessarily required to use cobalt or other rare earths. Whether it's in the motor or the battery, technology is advancing, and a major trend is to reduce dependence on rare earths. I think it's only a matter of time—it's a medium-term development. I learned at General Motors, where I previously worked, that this is indeed a challenge.	Reducing dependence on rare earths is becoming a medium-term goal, as advancements in battery technology allow alternatives like copper coils. This trend points to a gradual shift away from rare earth materials, addressing a known challenge in the industry.		
11	German	Only in the medium term, because our real task is to catch up. We rested on our laurels and now need to return to focusing on technology and, above all, on developing the capability to produce these things ourselves. Previously, we didn't consider this; we took it for granted that everything could be bought on globally connected markets without encountering oligopolies or monopolies. Today, solutions must be found for this, and I believe it's a matter for policymakers.	In the medium term, the priority is to close the technological gap, with a renewed focus on developing in-house production capabilities. Previously, reliance on global markets was assumed to be sufficient, but current challenges with oligopolies and monopolies call for policy-driven solutions.		
1	German	Looking at the age pyramid of China and walking through the streets, you realize that there is a high proportion of young people. These are highly motivated to achieve something, while workers in western countries are somewhat saturated as our living standards have been high for a long time.	China's workforce is young and highly motivated in comparison to that in western countries.	CL1.4: Proficiency and Work Ethic of Chinese Labor Force	China's BEV industry benefits from a young, motivated, and highly specialized workforce, distinguished by longer working hours, targeted job-specific training, and efficient skill development through industry-driven programs. While government-led initiatives are limited, collaborations between top OEMs and universities have significantly advanced workforce expertise, particularly in areas like AI and software engineering. Rising academic wages in major cities
1	German	They are also more productive per hour or are prepared to work 10-12 hours per day and have significantly less vacation, I mean, you have to look at it all in terms of working hours, what kind of commitment there is and I think there is definitely a need for action here at the moment.	Chinese talents work more hours and have less vacation.		
1	German	European OEMs have invested in Chinese talent through internal development programs, for example sending them to Germany or the USA as expats. Many of them were then poached by local companies.	Chinese OEMs have invested in Chinese talent trained by western companies.		
1	German	So of course the salaries will rise as a percentage, as they do here, but the level will not reach the same level as here, I think. The cost of living is also different, depending on which region you are in in China, and a lot is also paid for by the state.	Chinese salary levels will never reach those of western countries.		
3	German	For me, there is actually no significant	Educated Chinese workforce		

Appendix

		difference in qualifications in many functions. There are a lot of engineers where I would say they are at eye level today and then there are manager level people who work in the independent Chinese industry. They are definitely on an equal footing and are much faster in their approach, contributing to R&D advantages.	is at least on the same level as their Western peers and much faster in their approach, contributing to R&D advantages.		
3	German	In terms of training, the Chinese do a lot of on-the-job training of untrained workers. You can't expect too much, but it is often sufficient and much cheaper.	Chinese do a lot of training-on-the-job for blue collar workers.		
3	German	Training in China is often more specific for explicit jobs and their requirements while in Europe we have a dual system where the workforce is usually educated more on a broad scale. That is why in China they are often much faster and efficient.	Chinese train workforce more specifically for required jobs, supporting efficiency in training.		
3	German	You have a huge amount of highly trained coders, highly trained software engineers and also from other areas, look at this huge mobile phone scene. Xiaomi, why is it suddenly building a top car and this thing is the burner par excellence for Chinese customers? They can simply build a lot of technology quickly from scratch.	Chinese OEMs have access to a great pool of top-educated software engineers, also from other industries like mobile phone.		
2	German	Especially in highly specialized fields, the Chinese have an advantage and a lead—for example, the AI engineer for voice recognition in a specific vehicle model. They have these experts, and they are extremely skilled. You can also see that salaries and costs for these individuals are rising significantly because there's such limited availability, and more and more companies want to tap into that expertise.	China's workforce is more skilled in very specialized areas like AI engineering.		
2	German	In-depth, certain roles, profiles, and competencies are extremely well-represented here. But when it comes to combining multiple aspects, that's not necessarily the case, and this becomes apparent, especially when looking at people's educational paths and so on. Few have broad management knowledge. I also think this is a risk in such a large market—that they might lose the ability to combine and integrate different elements.	China's workforce often misses broad management knowledge as they focus on specialized skill profiles.		
2	German	China often provides its researchers and talents with budgets for very specific future technologies, allowing them to tackle topics through a trial-and-error approach. There is more motivation behind this than in other nations, which also enhances workforce training. This approach enables them to develop deep expertise in future-oriented fields.	China provides more funds for future-oriented research projects, enabling enhanced training of its workforce.		
2	German	When it comes to wage costs in China, we need to differentiate between various regions. In Tier 1 cities, wage levels have risen immensely, especially for specialized engineering roles, where they can sometimes be even higher than in Europe. On the other hand, there are many simple production tasks with a large pool of affordable workers. Therefore, I don't think production will be entirely outsourced to other countries—certain services may move to	Wage levels have increased for academics in tier 1 regions but access to cheap labor in production is still high. Hence, domestic production volumes will not decrease.		

contrast with affordable production labor, supporting high domestic output and cost-effectiveness. Initial reliance on foreign trainers has diminished, with Chinese teams now independently managing complex production processes and quality standards. Cultural factors, like the value placed on "saving face," reinforce a strong commitment to quality, adaptability, and efficient performance, making China's BEV workforce a strategic advantage in driving the sector's rapid growth and innovation.

Appendix

		Southeast Asia, but I don't believe production volumes will decrease, especially with many OEMs expanding into new markets.			
5	German	The Chinese have a highly competitive work culture. They work many more hours per week and are highly motivated. There are many young, highly educated individuals who don't mind sitting in meetings until 2 a.m. I also see a higher turnover rate; employees come in quickly and leave just as quickly when a better opportunity arises.	China's workforce is young and highly motivated and well-educated. They work more hours than Western workers.		
7	English	I think the recent developments in the overall industry have significantly enhanced skill levels. CATL, for example, should be considered the number one player in terms of production volume and technological advantage, even when compared to LG or other leading battery manufacturers. As a result, we can imagine that the workforce in these areas must be quite skilled. The workforce's skill set has indeed been enhanced alongside the development of the industry as a whole.	Industry developments have boosted skill levels, with CATL leading in production and technology. The workforce has become highly skilled as the industry has advanced.		
7	English	I think we haven't seen much in terms of government initiatives for workforce training. However, we do see some industry and academic collaborations, such as companies like BYD and CATL partnering with top universities in China to explore the latest technologies in battery development. I believe the most significant training initiatives should be driven by local battery suppliers or OEMs, as they are the ones most directly involved in advancing the industry.	There have been few government-led workforce training initiatives, but industry and academic collaborations, like those between BYD, CATL, and top Chinese universities, are common. The most significant training efforts are likely driven by local battery suppliers and OEMs, who are directly advancing the industry.		
8	German	I'm not sure if I can answer that precisely, but as we're talking about a product category that's changing so dramatically, prior knowledge becomes less applicable and, therefore, less of an advantage. If you take a 3D cross-section or an exploded view of a modern BEV compared to an internal combustion engine, you immediately see the stark differences—the number of parts, the complexity, all the other elements involved. The simplicity of the skateboard design, the rigor of software-defined vehicles, and the overall architecture are completely different. As this vehicle type becomes so dramatically different, everyone starts with a relatively low level of relevant knowledge for this new domain compared to what they have now and will have in the future, and then it's a matter of the learning curve.	As BEVs evolve, prior knowledge becomes less relevant due to significant differences in design and complexity. The learning curve is crucial as this new vehicle type develops.		
8	German	It's naturally the case that in a rapidly growing economy, you typically find a higher willingness to work, to perform, and so on. Societally, in European industries, there is generally a higher level of saturation. This is the classic effect—why did Germany recover after the war, or how did Korea achieve success, for example? It also has something to do with work attitude, willingness to work, and perhaps a sense of no alternatives. But you find this drive in all emerging, non-saturated industries.	In growing economies, there is often a stronger work ethic driven by opportunity, as seen in examples like Germany's post-war recovery and Korea's success. Emerging industries tend to have more drive than saturated ones.		

Appendix

8	German	In China, you also have a very stable, long-term industrial plan behind it, which provides assurance that the path being followed will ultimately be viable. This, of course, makes it easier to commit fully, allowing for a faster and steeper learning curve, and these advantages have materialized relatively quickly. When you consider organizations fully focused on battery electric vehicles and confident about the future, they approach these topics differently than if you imagine being an automaker 10 years ago, where there was constant debate—still ongoing in some cases—about whether electric vehicles could even succeed, and where some mocked Tesla along the way.	China's long-term industrial plan boosts confidence and accelerates progress. Today's BEV-focused companies approach the market with certainty, unlike automakers a decade ago who doubted EV success and mocked Tesla.		
8	German	This is, of course, a different environment, along with all the other factors I mentioned. So, in short, to answer your question, the starting point at a certain time probably wasn't all that different, but the steepness of the learning curve, due to various factors, was dramatically different.	The starting point may not have been that different, but the learning curve was much steeper due to various factors, creating a dramatically different environment.		
4	German	I think this is one of the most underestimated factors. There's often a perception, at least among my friends and acquaintances when I mentioned going to China, where they immediately thought, "Oh, wow!" There's a common image that China has a low education level, only produces cheap goods, and that everything from China is essentially cheap junk, but that's absolutely no longer the case. The education level is extremely high. The Chinese government has invested a lot in producing a large number of graduates. This has even led to challenges, as there are now more young graduates than available jobs, resulting in significant youth unemployment. China has invested heavily in manufacturing capability and in adapting production capacities. The quality of what they produce is comparable to what we can achieve in Germany, yet at a fraction of the cost, with a work ethic and working conditions that are also very different.	The perception of China as a producer of cheap goods is outdated, as the country has significantly advanced in education, manufacturing, and production quality, now rivaling Germany's standards at a fraction of the cost, despite facing challenges like youth unemployment.		
4	German	China has managed to lift hundreds of millions of people out of poverty over the past 10-15 years. This transformation was achieved by educating people well, providing them with incentives to become proactive, and offering them a path to wealth. There are still hundreds of millions who aspire to reach the level that millions have already attained, meaning a high level of education can be achieved there. Of course, there are people who don't have this education, but overall, there's a massive drive among people to advance, along with a strong pressure to succeed. With 1.5 billion people, if you don't do it, someone else certainly will. As a result, people there work six days a week, even in corporate jobs, at a wage level that can't be compared to what an industrial worker in Germany would earn. So, considering wage costs and qualification level, the value for money in China is better, I'd say.	China's rapid poverty reduction, driven by widespread education, strong work ethic, and a culture of ambition, has resulted in a workforce that offers high qualifications at lower wage costs, making it a more cost-effective option compared to places like Germany.		

Appendix

10	German	I don't think Chinese BEV OEMs were at a high level from the start, and I would differentiate between roles. My experience in China has mostly been with academics rather than the actual assembly workers. Many assembly tasks are often subcontracted, and I doubt a typical Chinese mechanic would be on par with a German master mechanic with five years of training. However, in terms of their R&D, product development, and marketing teams, they have certainly improved. Cars are complex products, with around a hundred control units that need to communicate, many of which involve thousands of chips. Chinese OEMs have now acquired the skill to manage this complexity.	While assembly tasks are often subcontracted, and Chinese mechanics may not match their German counterparts in skill, Chinese OEMs have mastered managing the complexity of modern cars		
10	German	Moreover, while technical expertise from ex-BMW or ex-JV employees is a factor, they also have a better understanding of local consumer preferences, which Western OEMs often miss. For example, while German consumers might prioritize precise manufacturing details, Chinese consumers appreciate features like seamless connectivity, gamification, and user-friendly interfaces. This combination of local market knowledge and acquired technical skills has undoubtedly contributed to the success of Chinese BEV OEMs.	Chinese BEV OEMs benefit from a combination of technical expertise gained from former JV employees and a better understanding of local consumer preferences		
11	German	I can only say that, in the beginning, it's always about learning, but the Chinese learn seven days a week, three shifts. The Chinese worker doesn't have a detached house in the suburbs where they want to spend Friday afternoon playing with their kids. They also have family and children, but their work attitude is entirely different, and their willingness to learn is extremely high. You can assume that within half a year, you can bring someone to a level where they can work in an assembly plant significantly well without quality issues.	Chinese workers exhibit a strong commitment to continuous learning, often working in three shifts across seven days a week. Their high learning motivation and work focus enable them to reach a proficient level in assembly plant roles within six months, maintaining quality standards.		
11	German	In this regard, you can't simply say one is better than the other; one might not be quite as good as the other. The issue is more about the commitment and focus on essentials, which is more the Chinese way. While Western companies tend to strive for perfection, the Chinese also want that.	The difference lies in commitment and focus on essentials, a characteristic approach in Chinese industry. While both Chinese and Western companies aim for quality, Western firms often pursue perfection, whereas the Chinese prioritize practical outcomes.		
11	German	The Chinese cannot tolerate being confronted with evidence of mistakes; this concept of "losing face" is an absolute no-go for them—culturally, it's deeply ingrained. We can only dream of reaching that level again, as we, too, once built up with massive effort and a drive for performance. However, we've become too comfortable, accustomed to convenience, and focused on a good life. Just look at the current discussions where young people graduating from university say they want a job with a four-day work week. The Chinese would never ask for that. If you tell them on Friday night at 10 p.m. that, even though they were scheduled to	The cultural value of "saving face" means Chinese workers avoid mistakes and handle them with great sensitivity, reflecting a strong commitment to performance. In contrast, Western work culture has shifted toward comfort and work-life balance, with preferences like a four-day work week. Chinese workers, however, display remarkable flexibility and dedication, willingly adjusting schedules to meet demands, even with minimal notice.		

Appendix

		have the next day off, you need them at 5 a.m., they'll show up at 5.			
11	German	For us, it was, of course, mostly foreign trainers. We brought in teams from BMW plants in South Africa and primarily from the German plant in Munich as a support plant to assist on the production line. They went through every step with the local workers and trained them thoroughly. Now, however, we're already in the third generation of vehicle production. If we consider a generation as ten years, we're in the third decade, while Volkswagen and Audi are in their fifth decade of production. By now, they can train people themselves; those who have been there for 15 to 20 years know it inside out.	Initially, foreign trainers, mainly from BMW plants in Germany and South Africa, were essential for guiding local Chinese workers through production processes. Now, after three decades, Chinese plants have developed internal expertise, with experienced workers capable of training new employees independently, paralleling the longer-established practices of Volkswagen and Audi.		
11	German	We integrated some of them into training programs in Munich or the USA to establish connections when they have a platform produced at the same locations, allowing technicians and assembly workers to exchange knowledge. You can largely say that they no longer need us as enablers and trainers because they have built up sufficient know-how themselves. This also applies to engineering, particularly when it comes to technology development today.	Chinese automotive production teams have gained substantial expertise, no longer relying on foreign trainers. Training programs in Munich and the USA helped facilitate knowledge exchange on shared platforms, but today, Chinese technicians and engineers possess the know-how to handle production and technology development independently.		
11	German	How many PhDs were in the USA or in Germany—in Darmstadt, Karlsruhe, Aachen, Munich—who received a top-level technical education? And then, after maybe five or six years at Siemens, Bosch, or ZF, they return to China because they're very well paid there. You won't find a Chinese OEM without Western advisors at the top, but in execution, it's all Chinese, with a large portion locally led by people with international experience.	Chinese automotive firms leverage a skilled workforce of Chinese nationals educated and experienced abroad, with local leaders handling operations, supported by Western advisors at senior levels.		
12	German	I believe the key success factor regarding the workforce in China is sheer volume. And then, you have an incredibly broad spread. I would almost say that the average level of education or knowledge in China is lower than in our countries.	The key success factor of the Chinese workforce lies in its sheer volume and broad spread. However, the average level of education or knowledge in China is perceived to be lower compared to Western countries.		
12	German	But the spread is much wider. For example, graduates from a Tier 3 university—it's clear what their degree is, and it's not that impressive. At the same time, you have the absolute elite universities, like Tsinghua in Beijing or universities in Shanghai for automotive studies, where you find incredibly well-trained individuals. Additionally, there is a huge number of Chinese who get educated abroad, and it's not that they're inherently less capable or anything. On the contrary, they are incredibly eager and ambitious, which means that a small percentage of Chinese skilled workers, despite being a small portion, is still a huge absolute number due to the population size. As a result, China has a strong, highly skilled workforce, and that's why more and more companies—not just in the automotive sector but across other industries—are becoming leaders.	China has a broad educational range, with both less prestigious graduates and highly skilled individuals from elite universities. Many are educated abroad, and their ambition contributes to a large, skilled workforce, enabling Chinese companies to lead across industries.		
12	German	Both, really—you need to look at it	In China, the education level		

Appendix

		from both angles. When you focus on the manual workers, the level of education is more basic, but there are certainly many initiatives to address this. In the automotive sector, there are many programs that offer training similar to vocational education, helping to raise the skill levels of workers in the industry.	of manual workers is generally basic, but there are numerous initiatives, particularly in the automotive sector, offering training programs similar to vocational education to improve skill levels.		
13	German	The skill level in China has developed at an extremely rapid pace. Twenty-five years ago, factories like wheel and aluminum casting plants were in their early stages. Today, the industry, including vehicle technology, is completely self-sufficient, with high-quality local suppliers, even those unknown to us. The steep gradient in skill development applies not only to workers but also to production technologies. When I arrived almost ten years ago, the skill level, including that of my employees, was not very high. However, this rapid learning curve has made organizations in China fully functional and highly capable.	While Chinese workers were not as skilled in automotive 10-20 years ago, the rapid learning pace made them fully functional as of today.		
13	German	Autonomous driving, as well as software and hardware development, particularly in infotainment, are areas where we have fallen behind. The assumption that good software professionals must come from the U.S. or Germany is entirely outdated—not just in terms of skill level but also sheer volume. Universities in China produce significantly more well-trained talents annually compared to other parts of the world.	In areas like software development and autonomous driving, Chinese workers are even more skilled than Western ones, enabled by good programs in universities.		
13	German	Universities in China have recognized the need to integrate more practical elements into their programs, sending students to internships or establishing research collaborations, such as those we have with Jinger University. This ensures that students are not only trained theoretically but also gain practical experience.	Universities in China strategically increased the practical aspects of their programs, also in cooperation with OEMs.		
3	German	Chinese OEMs will probably in the future not re-locate their productions to other Asian countries mainly due to two reasons: a) they still have a large offer of cheap labor and b) Chinese factories are often much more automated than Western ones, making them more independent from salary increases.	Chinese OEMs are more independent from salary increases due to higher degrees of automation.	CL1.5: Relocation of Production Capacity from China	Chinese BEV OEMs strategically balance cost and market access by leveraging automation, maintaining advanced manufacturing within China, and selectively expanding to lower-cost regions for simpler tasks. Despite rising wages, China's robust supply chain, skilled workforce, and large market keep it a central production hub. The "Dual Circulation" strategy encourages domestic focus and
5	German	You can see that the Chinese are now also considering labor costs and are starting to produce certain components in other locations like Vietnam or Thailand, which aren't far from them. They're taking a page from our European playbook and are acting smartly by outsourcing certain components.	Chinese OEMs also start producing specific components in lower-cost countries.		
7	English	Yeah, I think it's a good question. As you might have seen in the news, some production plants are shifting from China to Southeast Asia, like Vietnam, Indonesia, or other low-cost countries. However, in general, battery production or vehicle manufacturing involves long value chains. It's not easy to produce these components quickly, as the process is quite lengthy. This means that a strong manufacturing and supply chain	Some production plants are shifting from China to Southeast Asia, such as Vietnam and Indonesia, due to lower costs. However, battery production and vehicle manufacturing involve long value chains, making it difficult to quickly produce components. A strong manufacturing and		

Appendix

		foundation is essential.	supply chain foundation is essential for success.		careful international expansions, while automakers target lower-cost areas within China and international sites like Morocco, Hungary, and Turkey for European market access. These moves optimize production efficiency and competitiveness, with significant relocation of production out of China unlikely in the near term due to sustained advantages in automation and labor flexibility.
7	English	As a basis to produce a vehicle, you need a highly integrated supply chain, including industries like chemicals, metals, mining, mechanical components, and many others. It's challenging to shift such complex manufacturing processes to low-cost countries. While it's easier to move industries like clothing or shoe manufacturing to places like Vietnam, which are labor-intensive and relatively low-tech, the automotive industry is different. It's not as labor-intensive; it's highly technological and involves a lot of automation. Therefore, it's much harder to transfer this type of high-tech, automated manufacturing to another country.	Vehicle production requires a complex, integrated supply chain, making it challenging to shift high-tech, automated manufacturing to low-cost countries. Unlike labor-intensive industries, automotive manufacturing relies on advanced technology, which is harder to transfer.		
7	English	China's costs are increasing, but it remains the largest single market in the world. To offset the rising costs, suppliers and OEMs will likely continue to prioritize staying in China, as it offers significant market opportunities. I believe that most suppliers and OEMs will stay in China in both the near future and the long term. That's my view.	Despite rising costs, China remains the largest market, and suppliers and OEMs will likely continue prioritizing operations there due to its significant market opportunities. Most are expected to stay in China both in the near and long term.		
8	German	The country is so large and diverse; when I look at the individual regions, all the way up to the northwest, for example, there are entirely different economic zones, different resources, and different economic conditions. There is certainly still plenty of potential to gradually develop these internal low-cost areas in a step-by-step progression of the country before there would be any need to expand beyond its borders.	China's large size and regional diversity offer varying economic zones, resources, and conditions. There is significant potential to further develop internal low-cost areas before expansion beyond its borders becomes necessary.		
8	German	This is my assumption: within China, the localization of production is driven more by other factors, primarily import regulations, tariffs, and similar considerations. The reason why Chinese manufacturers are now discussing localization in Europe is not because there's any issue with loading vehicles onto large ships and bringing them to Europe, but because tariffs make it necessary to establish a certain level of local value creation or localization. That's why BYD, for example, is building a factory in Hungary, among other developments you might read about in the press. This is shaped by these regulations and is also very dependent on the high dynamics we currently see in global trade and geopolitics.	Localization of production in China is primarily driven by import regulations, tariffs, and similar factors rather than logistical challenges. Chinese manufacturers, like BYD, are increasingly setting up production in regions like Europe to meet local value creation requirements and navigate trade and geopolitical dynamics.		
8	German	In general, production in China will continue to grow simply because domestic demand is rising so sharply, both in terms of the market share of Chinese automakers and the overall demand for vehicles in the country. This will definitely result in a significant increase in production capacity. However, some production will also take place outside of China to participate in those markets.	Production in China will continue to grow due to rising domestic demand and increasing market share of Chinese automakers. This will lead to a significant expansion of production capacity, while some production will also occur outside China to serve international markets.		
4	German	I think my answer has two parts. First, there are certainly tasks that even China might no longer want to handle if they can be done more cheaply elsewhere, but these are typically simpler tasks that you don't necessarily see in automotive manufacturing. For example, those low-	China may shift simpler, lower-cost tasks to other regions if it becomes more economical, but this mainly applies to less complex products, not the advanced manufacturing seen in industries		

Appendix

		cost plastic products that used to come from China might eventually come from somewhere else if it's cheaper. I would completely agree with that point.	like automotive.		
4	German	For highly skilled jobs, however, I can imagine that these will remain in China, even if costs rise, as the quality of output generally increases alongside wages. And maybe my answer actually has three parts: the second component is that you still have a large pool of people willing to work for low wages, as they are still at or near the poverty threshold, meaning their wage expectations are different. This allows for a lot of flexibility.	Highly skilled jobs are likely to remain in China even as wages rise, due to the increasing quality of output, while the availability of a large, low-wage workforce, still near the poverty threshold, offers significant flexibility in labor costs.		
4	German	The third point is that I believe the Chinese government is fully aware of this dynamic. They recognize the importance of both their massive domestic market and the potential of exporting products globally, which opens up enormous sales potential. They also understand that things could develop differently. This is reflected in the "Dual Circulation" principle, which prioritizes production for the domestic market first, but also focuses on selling outside of China. Both are extremely important. I believe that offshoring key parts of the value chain to save a few dollars isn't China's primary interest; rather, there's a strong interest in retaining the value chain they've developed domestically. So, I don't think we'll see production moving abroad in the next few years just to save on labor costs. Given the current geopolitical uncertainties, I believe they will prioritize keeping production within their own borders.	The Chinese government's "Dual Circulation" strategy emphasizes strengthening the domestic market while maintaining global export potential, prioritizing control over the value chain rather than offshoring production to save labor costs, especially amidst geopolitical uncertainties.		
6	English	I'm not a specialist in the BEV industry, but in general, I think some production might shift out of China to other Asian countries or regions globally where costs are lower. However, a substantial portion of production will likely stay in mainland China. One reason is the presence of skilled and experienced workers. Additionally, culturally, Chinese workers—and workers in many East Asian countries—often accept longer working hours, which contributes to productivity.	While some BEV production may move to lower-cost regions, a significant portion will likely remain in China due to its skilled workforce and the cultural norm of longer working hours, which enhance productivity.		
6	English	That said, as wages rise, there's a difference when we compare China with the West. For experienced engineers and experts, salaries in China can sometimes even exceed those in Western countries. However, for production workers, the salaries remain much lower than in the West. This wage difference still makes China competitive for production, especially in labor-intensive areas.	As wages rise in China, experienced engineers may earn more than in the West, but production workers still earn significantly less, keeping China competitive in labor-intensive production.		
10	German	The natural course of globalization would suggest that as China moves up the value chain and labor costs rise, it would eventually become unprofitable to focus on raw material extraction or basic manufacturing. This would logically lead to shifting these activities to lower-cost countries in Southeast Asia, like Vietnam or Laos. However, a major geopolitical issue complicates this.	As China moves up the value chain and labor costs rise, it would make sense for basic manufacturing and raw material extraction to shift to lower-cost countries. While shifting the value chain to lower-cost countries would be natural, it depends on how much the Chinese government intervenes to prevent		

Appendix

		The Chinese government may resist allowing strategic capacities to move abroad, particularly because, if production moves to a place like Vietnam, the U.S. could impose sanctions there, potentially targeting China indirectly. This dynamic is especially interesting because the automotive industry has been a major beneficiary of globalization, yet it's now facing a rollback due to trade conflicts and systemic rivalry between the U.S. and China. In principle, this shift in the value chain would be natural, but it ultimately depends on how much the Chinese government intervenes to prevent these shifts as a safeguard against sanctions.	these shifts, aiming to safeguard against potential sanctions.		
11	German	Due to political will, they are now moving into less developed regions of China, like Anhui province, and have set up a new EV plant there. At the same time, they've also established a development center in that area with 3,500 engineers. This approach expands development into peripheral areas beyond Shanghai or Beijing, which still hold significant potential. In terms of costs, it's also quite favorable for assembling and designing products there.	China is expanding EV production to regions like Anhui, establishing new plants and a 3,500-engineer development center, leveraging lower costs and new growth potential beyond major cities.		
11	German	The Chinese companies I see at the moment—those entering Europe—are negotiating with Morocco when discussing potential locations. Morocco has an extended trade agreement with the EU, allowing duty-free entry by sea into Spain, and then further into countries like Spain, France, Germany, and so on.	Chinese automakers entering Europe are exploring Morocco for production due to its trade agreement with the EU, enabling duty-free entry into Spain and broader European access.		
11	German	They are also negotiating with Turkey; however, Turkey lacks funds for subsidies. If someone comes in saying, "I want to invest 2 billion, how much will you contribute?" Turkey's response is limited. I spoke with the Turkish Minister of Economy about six months ago, and they said they couldn't offer direct funds but could provide tax incentives over eight years. So Turkey is more challenging. The third option is Hungary, as they are the third-largest recipient of EU funds and tend to play their own game. Hungary also directly provides subsidies for investments in technology and manufacturing.	Chinese automakers are also considering Turkey and Hungary for European production. Turkey, however, faces financial limitations, offering only tax incentives over eight years rather than direct subsidies. Hungary, on the other hand, provides direct subsidies for technology and manufacturing investments, supported by substantial EU funding, making it a more favorable option.		
11	German	In the end, within China, the Chinese are moving to peripheral regions. Domestically, they aim to improve cost efficiency through automation. Abroad, they seek locations that offer the best subsidies, with a focus on reaching a strong nearby market.	In China, companies are expanding to peripheral regions and enhancing cost efficiency through automation. Internationally, they target locations with favorable subsidies and proximity to major markets.		
12	German	No, I don't think so in the near future—let's say in the next 5 to 7 years. I believe the wages and salaries in China won't rise drastically enough for it to become attractive to move back.	In the next 5 to 7 years, wages and salaries in China are not expected to rise drastically enough to make it attractive to move production volume out of China		
13	German	If production or development moves outside of China, it could be a mistake. There is no guarantee that vehicles can be imported back into China. For example, there is ongoing discussion about imposing tariffs on cars with engines larger than 2.5 liters. This would create a major problem for high-margin vehicles, as they are mostly imported.	Moving production away from China would pose a risk due to discussed import tariffs.		

Appendix

13	German	Secondly, the cost level, particularly for material costs, makes it essential to further localize procurement in China beyond the current level. Moving away from China would result in higher logistics and overall material costs.	Moving production away from China would imply higher material costs.		
13	German	In China, wage levels vary significantly depending on the region. In cities like Beijing and Shanghai, where most top talents are located, costs are higher. However, for areas like app and software development, Tier 2 or 3 cities offer much lower costs while remaining highly competitive. Therefore, there is no reason to leave China due to wage costs.	In China itself there is a high variance of wage levels, depending on the region. Hence, salary costs can also be decreased by moving domestically for some tasks.		
13	German	The working conditions at suppliers, disruptor companies, and Chinese OEMs are intense, often referred to as the "996" work culture, meaning employees work from 9 a.m. to 9 p.m., six days a week. However, this is an understatement. In companies like Xiaopeng or Li Auto, employees often return to work after dinner and do not leave before midnight. This means wage costs must be considered relative to the significantly higher output per employee, who often work at least double the hours compared to other regions, assuming they are skilled.	Chinese worker can create substantial output due to their work ethic if they are skilled.		
3	German	Not all EV manufacturers in China have a fully integrated vertical value chain, the same thing happens there as in the West, there are a few, they are just gluing together, buying components everywhere and there are a few like BYD who act significantly in the value chain from A to Z and almost perfectly from my point of view.	Only some Chinese players like BYD are vertically fully integrated, mastering all parts of the value chain.	CL2.1: Vertical Integration	Vertical integration is regarded as a success factor for Chinese BEV manufacturers, particularly in critical areas like battery technology and software. It provides advantages such as cost control, high product quality, reduced supplier dependence, and smoother component integration. Government support, particularly for state-owned OEMs, has also played a key role in fostering integrated supply chains by aligning resources with strategic goals. However, while manufacturers like BYD and GAC achieve high levels of integration, other Chinese OEMs rely on traditional sourcing and contract manufacturing. Vertical integration is
3	German	But apart from that, I have to say that the Chinese in principle, i.e. the successful ones, have a less division of labor and therefore a more highly integrated value chain than the classic Western manufacturer.	Chinese OEMs are on average more vertically integrated than Western ones.		
3	German	Chinese OEMs are not afraid to venture into new areas. For example, many companies there have invested in their own chip development in order to become less dependent on Taiwan, the USA and the like. There is greater willingness on the part of companies and government willingness to promote such projects. Because if you understand your chip, if you understand your self-written software, if you understand your integrated powertrain, then that's a huge competitive advantage.	The willingness to venture into new areas of the value chain is higher in China, promoted by the government. Companies understanding all parts of their vehicles have a competitive edge.		
2	German	In my opinion, the market has shifted from a seller's market to a buyer's market, where you have to offer everything at the lowest prices with high quality. This means OEMs need to source parts at cost prices—and higher quality parts than the competition. And how do you achieve that? Well, through vertical integration. So yes, this is a success factor for me.	Vertical integration enables offering high quality products at lower prices which is essential in the buyers market the automotive sector has become.		
5	German	The vertical integration of Chinese OEMs is definitely a huge competitive advantage. If we look at BYD, it's a massive company with a range of com-	Vertical integration is a central success factor of Chinese OEMs as they excel in areas where Western companies		

Appendix

		petencies, such as in battery technology, where they simply have more expertise than European companies. We're also seeing non-traditional industry players like Dyson and Huawei entering the market. European OEMs may have initially chuckled at this, but these companies often excel in areas like software and electrical platforms, making them less dependent on suppliers.	struggle and are not dependent on suppliers.		noted to have emerged partly from necessity, as the limited supplier infrastructure in China initially encouraged manufacturers to bring more processes in-house. This approach has allowed companies to differentiate through control over key components like batteries, which account for a significant portion of vehicle costs. However, some believe this trend may shift as the industry matures, potentially mirroring the combustion engine era where broader supplier networks optimized cost and flexibility. Vertical integration is thus recognized as a critical factor for many, but not all, Chinese OEMs, with its importance possibly evolving as the market stabilizes.
9	German	Vertical integration is 100% a central success factor of Chinese OEMs.	Vertical integration is a success factor for Chinese OEMs.		
7	English	I think we can take BYD as an example, as it has the highest level of vertical integration in China. BYD can almost manufacture every component of a vehicle, including the battery and even the cells. Some OEMs like GAC or Great Wall Motors might have the capability to manufacture a battery pack but still need to purchase battery cells from CATL. So, I think the level of vertical integration is crucial for securing both cost control and supply security. However, not every OEM can achieve such a high level of vertical integration.	BYD, with its high level of vertical integration, manufactures almost every vehicle component, including batteries and cells. In contrast, some OEMs like GAC and Great Wall Motors can produce battery packs but still rely on CATL for battery cells. Vertical integration is key for cost control and supply security, though not all OEMs can achieve this level of integration.		
7	English	Vertical integration is definitely a trend because every OEM wants to capture the most valuable parts of the value chain. As you know, the battery accounts for about 30 to 40% of the overall vehicle cost, which is why many OEMs are looking to integrate some part of the battery, even if it's just the pack. Some capable OEMs might even aim to expand into battery cell production, but that's more challenging. I think BYD could be the only one that has successfully integrated everything while maintaining economies of scale.	Vertical integration is a growing trend as OEMs seek to capture the most valuable parts of the value chain. With batteries accounting for 30-40% of vehicle costs, many OEMs aim to integrate at least the battery pack, while some may expand into battery cell production, though that's more challenging. BYD stands out as the only OEM to have successfully integrated all components while maintaining economies of scale.		
8	German	Exactly, the business question is fascinating. In the old world of combustion engines, the degree of vertical integration, or depth of manufacturing, was also a key to success. However, over the last few decades, the trend has generally been that the lower, the better. For instance, Porsche was known for having a relatively low depth of manufacturing, which many found confusing given the nature of its vehicles. They were able to operate with a lower vertical integration compared to others.	In the past, vertical integration was important, but companies like Porsche thrived with lower integration, operating effectively despite the complexity of their vehicles.		
8	German	Why was this an advantage? Because many of the components that go into a vehicle could ultimately be sourced from a pool of suppliers. One could almost always assume that, with multiple potential suppliers, it was possible to create a competitive bidding process. This allowed for an optimized result, either in terms of quality or price, by leveraging the market in one way or another—except in areas that were truly critical, such as the overall vehicle design, the development of essential parts (though not necessarily all of them), or the powertrain and engines. For instance, even the development of a door could be outsourced, and engines and vehicles operate on separate cycles,	Lower vertical integration allowed sourcing from multiple suppliers, fostering competition for better quality and price. This approach worked well for most parts, except critical areas like design and powertrains.		

Appendix

		meaning it's not one engine per vehicle but rather shared across various models. This is the basic thinking of the traditional approach, which was also effective under those conditions.			
8	German	In the design of battery electric vehicles, we initially have fundamentally different components, with larger aspects of these—especially in the early stages of development—falling into the category where it's critical and differentiating to develop in-house expertise. For this reason, at least in the early years, we often see a comparatively higher degree of value creation in battery electric vehicles. Looking ahead, as these components continue to mature, I could envision a situation where, within the supplier structure, this process somewhat reverses. This would allow for a return to the same approach as before, leveraging a network of suppliers for optimized outcomes.	In the early stages of BEV development, in-house expertise is critical, leading to higher value creation. As components mature, the supplier structure may shift back to leveraging suppliers for optimized outcomes.		
8	German	I have components that are partially interchangeable, and I'm also utilizing my supplier structures again. However, due to the reduced number of components, this may still result in a somewhat smaller scale. So, it remains very important right now to pursue vertical integration, particularly in areas that are truly differentiating and value-creating. Identifying where this lies for each manufacturer is something that many automakers are currently working on, and the answer varies depending on the strategy, the market in which they operate, and, in some cases, how late they have entered. There's also the question of whether they can even catch up in some areas, or if that ship has already sailed.	Vertical integration is key for differentiating areas, with automakers identifying these based on strategy, market, and timing. Some may struggle to catch up in certain aspects.		
4	German	Yes, I think vertical integration is indeed a key factor—though I'm not entirely sure if it was a deliberate strategy aimed at success or simply a necessity, given that there wasn't much existing infrastructure to rely on. Starting from scratch to build a car essentially meant that they didn't have a huge supplier industry to outsource everything to, so they may not have had much choice. In this way, they simply began building cars. I'm not entirely sure, but I believe that vertical integration in their development process is quite substantial. However, even among Chinese OEMs, there's a lot of contract manufacturing, meaning not every new Chinese OEM builds the cars themselves. They often go to a company and request that the vehicles be produced according to their specifications.	China's strong vertical integration in automotive manufacturing may stem less from intentional strategy than from necessity, as limited existing infrastructure for BEVs required OEMs to develop capabilities in-house; however, many Chinese OEMs still rely on contract manufacturing, outsourcing production to specialized companies that build vehicles to their specifications.		
4	German	The advantage is that they can control a lot of the process themselves, which they're able to do because they started from a blank slate. With a clean sheet of paper, they began designing cars, allowing them to determine almost everything themselves. When you try to work with many partners, you end up needing to specify a lot and lose some control, along with the need to commit to large quantities. I think this approach to vertical integration is somewhat inherent to	Starting from scratch enabled Chinese automakers to maintain control through vertical integration, designing processes independently without extensive supplier commitments—an approach common among startups, which often integrate more vertically than established firms; while this likely aids control, its direct		

Appendix

		startups—most startups, in general, have a higher level of vertical integration than established companies. So, while I believe vertical integration offers advantages in allowing them to control more, I can't definitively say if it's directly correlated with their success.	impact on their success remains uncertain.		
6	English	Personally, I don't think vertical integration is the most critical factor in the success of Chinese BEV manufacturers, although it certainly provides benefits. For instance, it allows companies to secure their supply chain since they control a larger portion of it. BYD is an excellent example of this approach, as they initially focused on battery manufacturing and then expanded into vehicles, thus managing much of the value chain.	Vertical integration isn't the most critical factor in the success of Chinese BEV manufacturers, but it offers benefits like securing the supply chain.		
6	English	However, I believe BYD is unique in its ability to achieve such a high degree of vertical integration. This approach requires substantial resources and a strong foundation across different sectors, which BYD had from its history in volume production and its capacity in the automotive industry. Vertical integration demands a lot of additional resources, and not every Chinese BEV manufacturer has the same capacity to pursue it at such a scale.	BYD's high degree of vertical integration is unique, as it requires substantial resources and a strong foundation but not every Chinese BEV manufacturer has the same capacity to pursue integration at such a scale.		
6	English	While vertical integration plays a role in the success of some companies, I don't see it as the key factor for the overall success of the Chinese BEV industry. It's one contributing factor but not the primary reason for the strong development we're seeing in the industry.	Vertical integration is a contributing factor to the success of some companies, but it's not the primary reason behind the overall strong development of the Chinese BEV industry.		
10	German	That's a tough question to answer, but I'd say yes. As I mentioned, there are all these systems in a car that have to communicate with each other. You have the vehicle itself, then different zones, and within these zones are control units, and so on. When you design as much of that in-house as possible, you can align everything to work together smoothly. When another OEM buys components from various suppliers, it can mean that you end up with, say, a control unit from Bosch, another from Conti, and perhaps a zone controller from Nvidia or some other well-known supplier like ZF. Integrating all of that requires effort because you're trying to get products that aren't necessarily built to work together to communicate effectively. You do the best you can, but it's still a challenge.	Yes, designing systems in-house offers a smoother integration because all components are aligned from the start. When an OEM sources parts from multiple suppliers—like Bosch, Conti, or Nvidia—integrating them into a cohesive system is challenging since each part isn't necessarily built to work seamlessly with the others.		
10	German	When you design everything in-house from the start to communicate and function ideally with the rest of your vehicle, it gives you a technical advantage. But the more you handle in-house and the deeper your manufacturing integration, the more expensive the car becomes. That's why it's interesting to look at why Chinese manufacturers still have a pricing advantage despite handling so much production themselves. Normally, in-house production raises costs because it's like creating a custom suit rather than buying one off	While in-house design offers integration benefits, Chinese OEMs likely partner with suppliers for tailored adjustments rather than fully producing everything themselves, which keeps costs lower despite their integration advantage.		

Appendix

		the rack. That's why I'm a bit skeptical about how much vertical integration they actually do in-house. I could imagine that they might have entered partnerships with suppliers, asking them to make slight adjustments to fit their needs, which would be much cheaper than producing everything themselves.			
11	German	It's widespread, and keep in mind that BYD is owned by the city of Beijing—it's a state-owned company, not a private one. I'll give you another example: Great Wall Motors. The chairman, Wei Jianjun, a very good friend of mine, has 80% of their production in-house. The in-house company that handles this for them is called "Nobel." They follow the Japanese Kaizen model—if you look at Toyota, surrounding Toyota are all subsidiaries that supply it. Whether it's called Aisin or something else, it all belongs to Toyota and is essentially family-controlled. Chinese OEMs are doing the same thing.	Chinese automakers, such as state-owned BYD and Great Wall Motors, are adopting integrated production models similar to Toyota's, with subsidiaries handling much of the manufacturing in-house to enhance control and efficiency.		
11	German	With certain applications, they can't get around using products from companies like Bosch or Continental. These are simply standards that must be in cars—highly, highly precise components like steering and electronics in the steering system, and so on. They continue to source these mainly from European companies. However, it's true that a large part of these Chinese OEMs, particularly the larger ones—BYD, which has grown significantly, Great Wall, Geely, Chery, Guangzhou Auto, and others, including those in Chongqing whose name escapes me at the moment—have integrated supply chains. These are the major players that previously produced conventional combustion vehicles and are now competing heavily in the Western market.	Chinese OEMs, including major players like BYD, Great Wall, Geely, Chery, and Guangzhou Auto, have integrated supply chains. However, they still rely on precise components from European suppliers like Bosch and Continental for essential systems such as steering and electronics. These established manufacturers are now strong competitors in the Western market.		
13	German	BYD is an exceptional case regarding vertical integration, largely due to its origins in the battery business, which facilitated this approach. Other Chinese manufacturers, such as Geely, do not follow this model. For instance, Geely, a significant shareholder in our company, operates similarly to us. Through our joint venture with them, known as Smart, we observe that Geely collaborates with suppliers who provide development or component production services, maintaining a level of in-house manufacturing depth comparable to Mercedes.	Most Chinese OEMs have similar degrees of vertical integration to Western OEMs, BYD is more of an exception.		
13	German	I see a focus strategy as a key success factor among disruptors. They concentrate deeply on areas that are ultimately important to the customer, such as intelligent vehicles and software, while outsourcing everything else as much as possible. This gives them a similar level of vertical integration to Western OEMs but with greater emphasis on areas that customers value.	Chinese disruptors focus more on areas important to the consumers like software, giving them a competitive edge. Everything else, they buy from suppliers.		
1	German	Yes well, I say the know-how in the value chain is locally, you can see that quite clearly. Otherwise a company like CATL wouldn't be the market leader in batteries. And they also have, let's say,	The local sourcing for BEVs has contributed to significant local know-how in the value chain.	CL2.2: Local Sourcing	Local sourcing is recognized as a success factor for Chinese BEV

Appendix

		a supplier industry behind them and that was certainly also a huge advantage that it could all happen locally.			OEMs by all experts, enabling cost efficiency, faster development cycles, and resilient supply chains. The proximity of suppliers to OEMs reduces shipping times, facilitates rapid market responsiveness, and leverages concentrated local expertise. This industrial ecosystem fosters innovation and competition, as seen in battery leaders like CATL, which thrive on the localized knowledge and close collaboration with OEMs. Local sourcing has also proven advantageous in mitigating geopolitical risks and supply chain disruptions, such as during the pandemic, where Chinese OEMs maintained smoother operations compared to global competitors. The collaborative and flexible nature of Chinese suppliers allows for iterative R&D processes, faster decision-making, and seamless integration, contrasting with the rigid systems of international suppliers. Moreover, the dense local supplier network promotes innovation, similar to Germany's historical automotive success. While traditional OEMs rely on mature systems, Chinese manufacturers benefit from new supply chain technologies, driving agility and innovation. However,
3	German	Local sourcing is 100% a success factor. The new big suppliers in China, who we all don't even know by name, they are already damn good, now always the benchmark in terms of cost position and if they can't do something, they acquire themselves.	Local sourcing is a success factor as Chinese suppliers perform very good at benchmark costs.		
3	German	The suppliers are on site, they speak the same language, they don't have to ask in Stuttgart or Friedrichshafen whether they are allowed to release something for development or pull something over the stretch with risk. They take much more risk because they are on site in the market and can immediately see what happens to the prototypes. A special structure has developed among suppliers that has undoubtedly helped to cement the success of today's electric vehicles in China.	Local sourcing is a success factor as Chinese suppliers take much more risk because they are on site, speak the same language, and directly see what happens with prototypes.		
2	German	It was very smart to focus on local sourcing. We also have to consider it from the demand perspective. This approach has fostered a sense of local pride among talents, making them more likely to buy Chinese cars. Additionally, this may increase motivation to innovate.	Local sourcing has also fostered a local pride of workers, buying more Chinese vehicles.		
5	German	Local sourcing is definitely important for Chinese OEMs. In a way, European OEMs paved the way for this. They invested in local production, which led suppliers to set up operations there as well—providing a learning opportunity for the Chinese. Now, they don't need 10 weeks to ship urgent parts across the world. This, in turn, helps them achieve these low price points.	Local sourcing is a success factor and was enabled by Western OEMs bringing suppliers to China with their local productions.		
9	German	When it comes to labor, China is certainly not a leader in terms of wage costs compared to other Asian countries. The primary reason they can produce so cheaply is more about the industrial network and ecosystem on-site, which is highly concentrated. This is an advantage that cannot easily be replicated in other countries.	Chinese OEMs can produce so cheap due to their extensive industrial eco systems that can hardly be replicated abroad.		
9		Local sourcing also by Western manufacturers in China has enabled immense know-how over the past decades and provides massive cost advantages. Where else would you source if they're simply cheaper there, especially in such a fiercely price-competitive market?	Chinese suppliers are cheaper due to experience gathered because of local sourcing by OEMs.		
7	English	I think the local supply chains are definitely a key success factor for the overall industry. There are two main reasons for this. First, local supply chains help Chinese OEMs achieve cost efficiency and improve resilience, particularly during disruptions like the pandemic. Even during the pandemic, Chinese OEMs were able to maintain operations smoothly, and everything continued to run well, showcasing the strength and adaptability of the local supply chain.	Local supply chains are a key success factor for the industry, as they help Chinese OEMs achieve cost efficiency and improve resilience, especially during disruptions like the pandemic. During the pandemic, Chinese OEMs were able to maintain smooth operations, highlighting the strength and adaptability of their local supply chains.		
7	English	Additionally, leveraging local suppliers allows for faster adaptation to market demands. Chinese OEMs can launch a new vehicle in just about three years, while foreign OEMs often take around four years to launch a new model. This	Leveraging local suppliers enables faster adaptation to market demands. Chinese OEMs can launch a new vehicle in about three years, while foreign OEMs typically		

Appendix

		rapid pace of development means that local suppliers are better equipped to keep up with the speed at which the Chinese OEMs are moving.	take around four. This quicker development cycle allows local suppliers to keep pace with the fast-moving Chinese OEMs.	the lack of long-standing supplier relationships can sometimes challenge stability, such as unsupported digital features from newer suppliers. Government policies have been pivotal in shaping the local sourcing strategy, ensuring suppliers can support the entire domestic value chain. Looking ahead, Chinese suppliers are expected to gain importance in the global market, particularly in battery manufacturing.
7	English	From another perspective, with the overall development of the industry, China's supply chain has become quite robust and even more mature compared to those in foreign countries. Given the current market environment, local supply chains in China are now the best choice for OEMs looking to stay competitive.	China's supply chain has become more robust and mature compared to those in foreign countries. Given the current market environment, local supply chains in China are the best choice for OEMs aiming to remain competitive.	
7	English	Local suppliers work in a more iterative way, whereas traditional global suppliers like Bosch or Continental often operate in a more waterfall model with strict processes and quality gates. Their systems tend to be more rigid and slower compared to local suppliers.	Local suppliers work in a more iterative manner, while traditional global suppliers like Bosch or Continental follow a waterfall model with strict processes and quality gates. Their systems are more rigid and slower compared to the flexibility of local suppliers.	
7	English	Local suppliers, on the other hand, are more flexible in the R&D process and are often willing to share data with OEMs, enabling them to quickly integrate it into their own development. In contrast, when working with global suppliers, many parts are considered black boxes for the OEMs, so they rely heavily on engineering teams to integrate them. This leads to a lot of wasted time in communication and coordination. Overall, local suppliers offer more flexibility and faster adaptation.	Local suppliers are more flexible and share data with OEMs for quicker integration, while global suppliers treat parts as black boxes, causing delays in communication and coordination. Local suppliers enable faster adaptation.	
8	German	Absolutely, exactly, in addition to the reasons you just mentioned. Having this exchange, this access, and competition among suppliers, along with the flexibility—because when it comes to vertical integration, one can always say that one of the competitors is the OEM itself, which can decide either to do it in-house or outsource it to two or three suitable suppliers. This is exactly the kind of dynamic that such an ecosystem around vehicle development needs, and it is what makes it so effective.	The exchange, access, and competition among suppliers, along with flexibility, are key to an effective ecosystem in vehicle development. OEMs can choose between in-house production or outsourcing to multiple suppliers, fostering a dynamic that drives efficiency and innovation.	
8	German	If we look back and try to explain why Germany was such an automotive powerhouse for so long, it has a lot to do with having a dense cluster, an ecosystem of diverse suppliers and OEMs in regular exchange. This ecosystem fostered competitiveness, whether on cost, quality, or development. If you rely on a smaller, less efficient ecosystem, the overall outcome tends to be weaker products. This was undoubtedly a key ingredient that helped Germany succeed in the past.	Germany's automotive success stemmed from a dense ecosystem of suppliers and OEMs, fostering competitiveness and innovation. A smaller ecosystem tends to produce weaker products.	
8	German	Due to China's long-term industrial plan and the assurance that its vast domestic market will eventually be open for this industry, there is absolute planning security—an entirely different situation than if the home market were Korea or Germany, which would never be large enough on its own. China's market is actually sufficient, and this has allowed the local supply base to develop, becoming a key success factor. When we consider why, for example,	China's long-term industrial plan and large domestic market provide planning security, unlike smaller markets like Korea or Germany. This has allowed the development of a local supply base, which is a key success factor. Chinese companies can offer competitive prices due to access to this cost-effective, domestically focused supply base,	

Appendix

		Chinese companies can offer products at such competitive prices, it's partly because they have access to a Chinese supply base that provides this technology more affordably, under Chinese conditions and prices. This base is not mixed with the older, more western suppliers.	distinct from older, Western suppliers.		
4	German	When I look at the prices in China and the types of products being offered, it's quite easy to conclude that they're ahead. From a management perspective, this is something serious that we can't ignore. Of course, we've built large structures here in Europe, as have the Americans, and while this can slow us down because of our size, it also provides a certain stability. In my organization, I often share stories about the incredibly competitive and exciting developments happening in China at such competitive prices. But we shouldn't forget that Europe has assets that China doesn't have, like long-standing supplier relationships. These relationships may sometimes slow us down, but they can also be an advantage. For instance, customers of Fisker now face problems because their backends are no longer supported, which means that all the digital features in their cars have stopped working. That kind of issue is more likely to affect a small OEM that's just entered the market than a company like Volkswagen. So, I fully agree with your hypothesis.	Yes, China is ahead looking at BEVs especially due to their competitive pricing and product innovation, but Europe's established infrastructure and long-standing supplier relationships provide stability and advantages that newer markets lack.		
4	German	That's an interesting question. I wouldn't call myself an expert on the materials specifically, but I think the main advantage in the Western world is that you have a mature product and technology that people rely on. The Chinese, however, have benefited from a technology shift that requires different raw materials and completely new supply chains. This has given them the advantage of starting fresh, so to speak, without having to compete with well-established players.	While the West benefits from mature, reliable technology, China's advantage lies in leveraging new technologies and supply chains, allowing them to innovate without competing against entrenched systems.		
4	German	Now, of course, other powers are also seeking to intervene and draw these nations to their side, which is intensifying the geopolitical conflict. How China positions itself in this context is a very intriguing question, but one that I can't fully answer. However, I think China is prepared to handle it. In my opinion, the Chinese automotive industry could likely manage production and domestic sales without substantial external help. I'm not an absolute expert on whether they could source 100% of components domestically, but I believe they're close to it. That's unique in the world. Sure, it might be cheaper to source some things from outside, and I expect there will continue to be countries interested in Chinese investment, even if it means becoming somewhat dependent on them, given the realities of today's world.	China's automotive industry is uniquely positioned to maintain self-sufficiency in production and domestic sales, with near-complete sourcing of components, while its straightforward investment approach continues to attract nations open to Chinese partnership.		
4	German	Yes, I think it's simply the strategy. As I mentioned earlier, they want to keep production in China and to have the en-	China's industrial strategy emphasizes a complete domestic EV value chain by fostering local suppliers to		

Appendix

		tire value chain domestically. This approach has certainly been heavily supported, perhaps not exactly in a way that warrants calling it "subsidized" in the traditional sense, but rather as part of broader industrial policy. The goal has been to encourage local suppliers to establish themselves, creating a robust supply chain within the country. Many parts used in electric vehicles, like batteries or electric motors, weren't invented specifically for electric cars—they are established technologies that have been adapted from other applications. For instance, BYD initially focused on battery production, which is now a core competency that they've extended to automotive batteries. This has provided a certain expertise, combined with a clear government strategy to keep the entire production chain within China.	build a robust internal supply chain; established technologies like batteries and motors were adapted for EVs, with companies like BYD leveraging pre-existing expertise to reinforce this national objective.		
4	German	Moreover, there's little incentive to look further afield when everything is available locally. They have the technology, they can produce components at a quality level comparable to European manufacturers, but at unmatched costs, without the need for transportation or tariffs. And if borders close due to geopolitical issues, they still have control over production. So, I would say that the local supplier network has definitely been a success factor. This industrial strategy allowed them to avoid relying on external suppliers, which, from a pragmatic and strategic perspective, has proven advantageous.	With a comprehensive local supplier network providing high-quality, cost-effective components, China's industrial strategy minimizes reliance on external sources, avoiding transportation and tariff costs, and securing production control amid potential geopolitical tensions		
6	English	It's not entirely clear whether local sourcing specifically fuels innovation in the Chinese ecosystem, but it does provide certain benefits. Local suppliers can react quickly to requirements and have a shared understanding of market needs, which helps streamline processes. However, I believe the main reason Chinese OEMs source locally is that they find high-quality suppliers with competitive pricing within China. Many Chinese OEMs still source from major international suppliers, but sometimes these suppliers either can't meet specific requirements or aren't as cost-effective. Both local and international suppliers compete in China's automotive supply chain, but local suppliers often have advantages that make them a more practical choice. In my view, local sourcing isn't a unique strategy for Chinese OEMs; they're simply weighing local and international options to select the best supplier for their needs.	Local sourcing in China offers benefits like quicker reactions to market needs and competitive pricing, but it's not necessarily a unique strategy for Chinese OEMs—it's about choosing the best supplier, whether local or international, based on cost-effectiveness and specific requirements.		
10	German	It can certainly help, and there are probably several factors at play. It's interesting because there's this ecosystem that's developed, where everyone knows each other and has a very strong connection. You see something similar in the German automotive industry, where a large national industry also leads to the growth of local suppliers. I	Local sourcing in China not only strengthens the BEV ecosystem through close-knit collaboration and shared growth among domestic suppliers but also acts as a safeguard, reducing reliance on foreign suppliers that could be affected by geopolitical risks, like sanctions.		

Appendix

		believe it helps when they're compatriots; communication might be easier, there could be better influence, and they essentially grow together, developing the car collectively. But there's also the geopolitical factor—if you rely on, say, airbag control units from Conti or another specific supplier, and then they become unavailable due to sanctions or something similar, you suddenly can't build cars anymore. So, I think this local sourcing is more of a risk mitigation strategy for the Chinese, ensuring that their supply chain isn't vulnerable to external pressures.			
12	German	Definitely, and I was just shaking my head a bit because you can see it: the large Western OEMs, yes, the suppliers, they also supply Chinese manufacturers. However, even there, it's becoming more of a struggle because the number of Western suppliers is decreasing. Why? Because Chinese companies are simply getting better at sourcing suppliers, and we're also helping them build up their capabilities. This creates an evolutionary shift—initially, there were many Western suppliers, then more local ones joined, and now it's primarily local suppliers, some of whom have even gone a step further technologically, especially with new technologies.	Chinese companies are increasingly sourcing from local suppliers, reducing reliance on Western ones. Many local suppliers have advanced technologically, especially in new technologies, shifting the balance from Western to local expertise.		
13	German	Chinese OEMs primarily rely on Chinese suppliers for standard components. While this does not necessarily provide a technological advantage, it offers a significant cost advantage. Western OEMs often reject such parts, claiming they do not meet their standards, even though customers may not notice the difference. As a result, Chinese manufacturers release vehicles that look and perform almost like a Porsche Taycan but cost only a quarter as much.	The focus on Chinese suppliers especially for standard components provide domestic OEMs with a cost advantage.		
13	German	Chinese OEMs often use Western suppliers and technology for image reasons; this is our explanation, as otherwise, they would not prominently display them in their foyers and offices. However, in areas less visible to customers, they rely on solid, though not necessarily superior, Chinese suppliers. This benefits Chinese suppliers, as they gain experience and recognition. These suppliers are also beginning to see opportunities with Western OEMs due to their strong cost position and the ability to demonstrate their technology's reliability through partnerships with disruptors and Chinese OEMs.	Chinese suppliers benefit from domestic OEMs showcasing their products and might also acquire Western OEMs as customers.		
1	German	Demand in China is also stagnating a little at the moment, so it's no longer the same growth that has almost always been 10-12% per year over the last few years and I can already see that they are now being forced to move into other markets, which they are already trying to do with more or less success.	The domestic market in China is also suffering, forcing OEMs to expand internationally.	CL2.3: Strategic Alliances and Domestic Market	Strategic alliances with foreign automakers and the large domestic market are acknowledged as contributors to the rise of the Chinese BEV industry. Joint ventures played a key role
3	German	Why did all the Westerners go to China? Scale yes, you have a development and you might sell a hundred thousand of them in Europe. And the	The size of the Chinese market is a success factor because it motivated Western OEMs to enter with their		

Appendix

		factor is big if you sell five times more in China alone and then you have other needs, you suddenly invest in technologies that you wouldn't even make for the Western market and assemble everything, so the size of the market is 100% a success factor.	technologies and know-how.		in facilitating knowledge transfer, technological advancement, and supply chain integration, allowing Chinese firms to rapidly develop capabilities. These partnerships provided local talent with experience and enabled Chinese firms to refine processes through shared leadership and technology optimization. However, some experts argue that joint ventures laid the groundwork but were not the primary driver of China's recent BEV progress. Multiple experts also highlight the mutual benefits of JVs. Foreign automakers gained access to China's market, while Chinese firms acquired technology and expertise. The dynamic of these alliances has shifted, with Chinese OEMs leading in EV technology and scalable manufacturing, while foreign firms offer global market access and brand recognition. The Chinese domestic market also played a pivotal role by providing the scale and stability needed for innovation. Its underrepresentation in car ownership compared to Western markets suggests ongoing opportunities for growth, reinforcing its importance in sustaining the industry's development.
3	German	Secondly, partnerships with traditional OEMs from Europe, Japan, and Korea have made an exorbitant contribution to establishing the automotive industry in China. These capabilities, both on the OEM side and on the supplier side, are now the capabilities that we are of course seeing in all the full Chinese companies today. Yes, because there are qualifications, there are development process logics et cetera, which have all been very charmingly optimized after adapting from traditional OEMs.	Full Chinese companies have adapted and subsequently optimized qualifications, process logics, etc. from traditional players which was only enabled by partnerships.		
3	German	Today I would say that collaboration is no longer so important, so to speak. Only slightly important, yes, with Robert Bosch or with ZF for electric motors in China. But then you tend to learn from each other. The know-how has certainly been brought along very strongly. But the Chinese are now at least as good as traditional players.	Today partnerships are on a more equal level with both parties profiting.		
2	German	Strategic alliances certainly contributed to their success. In these arrangements, they often had shared leadership roles—one Chinese leader and one Western leader. Through this, they acquired a great deal of knowledge. They didn't simply copy; rather, they typically adopted technologies and then optimized them.	Strategic alliances were a central success factor - Chinese firms have adapted technologies and optimized them.		
2	German	It was certainly advantageous in the first step that the Chinese domestic market is the largest in the world and has continued to grow. However, the topic of electromobility still had to be put on the agenda—you had to "force" people towards it through regulations and subsidies.	The large domestic market supported the success of local OEMs.		
9	German	The forced joint ventures between Western OEMs and Chinese companies in the past undoubtedly helped the Chinese learn how to build cars over the decades. This still benefits them greatly in the BEV sector today.	Strategic alliances with Western companies were a central driver of success for Chinese OEMs.		
7	English	I think strategic alliances with foreign OEMs can help Chinese OEMs expand into global markets, particularly in developing regions in Europe. For example, the partnership between Leapmotor and Stellantis has allowed Leapmotor to leverage Stellantis' facilities to produce vehicles. This kind of collaboration enables Chinese OEMs to tap into foreign manufacturing capabilities and distribution networks, accelerating their expansion into new markets.	Strategic alliances, like the one between Leapmotor and Stellantis, help Chinese OEMs expand into global markets by leveraging foreign manufacturing and distribution networks.		
7	English	In Europe, this partnership approach is particularly important because, as you might know, Europe has increased tariffs on Chinese BEVs, which means some Chinese vehicles need to localize their production in Europe to maintain their cost advantage. By partnering with local manufacturers, Chinese OEMs can lower production costs and navigate these tariff barriers more effectively.	In Europe, where tariffs on Chinese BEVs have increased, localizing production through partnerships helps Chinese OEMs maintain their cost advantage. By working with local manufacturers, they can lower production costs, navigate tariff barriers,		

Appendix

		This strategy not only helps them stay competitive in Europe but also enables them to scale production locally, further expanding their market presence.	and scale production, boosting their market presence in Europe.		
7	English	Additionally, some Chinese OEMs can leverage the networks and data systems of their foreign OEM partners to promote their products more quickly. By utilizing these established networks, they can expand their market reach and accelerate product promotion. Furthermore, foreign automakers are also keen to learn from Chinese OEMs, especially in terms of technology. Chinese manufacturers are often at the forefront of certain innovations, particularly in electric vehicle technology and production efficiency, making them valuable partners for foreign companies looking to improve their own capabilities.	Chinese OEMs can leverage the networks and data systems of foreign partners to accelerate product promotion and expand market reach. Additionally, foreign automakers benefit from learning from Chinese OEMs, especially in electric vehicle technology and production efficiency.		
7	English	Yes, it's a mutual exchange of technology and market access. At this stage, it's similar to what happened 20 or 30 years ago when foreign OEMs entered China: Chinese firms gained technology and expertise from foreign automakers, while foreign companies gained access to China's channels and market. Now, in the EV sector, the roles are somewhat reversed. Chinese OEMs are offering advanced electric vehicle technology, and foreign automakers are benefiting from the Chinese firms' strong market presence and manufacturing capabilities. This exchange is helping both sides expand and strengthen their positions in the global automotive market.	The relationship between Chinese and foreign OEMs has reversed: Chinese firms now offer advanced EV technology, while foreign automakers benefit from Chinese market presence and manufacturing capabilities, strengthening both sides globally.		
4	German	Yes, I think those early strategic alliances with foreign automakers played a big role in establishing the local market. It was one of the main ways China learned how to build cars—by partnering with foreign companies. There's even a well-known story about how the Santana became the first car to take hold in China, marking the beginning of the industry there. Through these partnerships, they not only learned technology but also developed a market that they now capitalize on. There's often a debate about whether foreign automakers should have done this, with some suggesting that it allowed the Chinese to take away their competitive edge. But I think that's an exaggeration; the industry would have developed there sooner or later. These partnerships provided valuable knowledge, and I believe the European automotive industry still benefits from them today.	Early strategic alliances with foreign automakers were crucial for China's automotive development, enabling technology transfer and market establishment. The debate over whether foreign automakers should have formed partnerships with China is often overstated; the industry would have developed in China eventually, and these collaborations still benefit the European automotive industry.		
6	English	Yes, joint ventures were indeed important for China's automotive industry. Through these alliances, Chinese companies learned a lot, building a skilled workforce and gaining engineering expertise and supply chain connections. However, I wouldn't consider joint ventures the primary reason for Chinese OEMs' progress. For most of the 40 years of joint ventures in China, local OEMs had only limited success, holding minor shares in the market, even within China. While the goal was to learn and develop advanced skills,	While joint ventures were important for building a skilled workforce and gaining expertise, they laid the foundation but weren't the primary driver of the rapid progress in China's automotive industry, which only began to accelerate in the last five years.		

Appendix

		this approach alone didn't lead to the rapid progress we see today. It's only in the last five years or so that Chinese OEMs have started making significant strides. This suggests that, while joint ventures contributed to building the foundation, other factors—perhaps more recent and impactful—were crucial in driving the strong growth of the Chinese automotive industry.			
10	German	If you look back, Japan and Germany rebuilt their automotive industries post-WWII and eventually challenged the U.S., which had initially dominated. Similarly, China's progress is not uniquely Chinese but follows a familiar pattern. Additionally, China has benefited from joint ventures. Local talent in these ventures gained experience and knowledge from foreign firms, partly due to policies that required such partnerships for market access. Many Chinese engineers and managers today were trained at foreign OEMs or Western universities, bringing valuable skills back to local firms.	China's automotive progress follows a familiar pattern seen in Japan and Germany post-WWII. China's joint ventures have been key, allowing local talent to gain experience and knowledge from foreign firms, with many Chinese engineers and managers trained at foreign OEMs or Western universities.		
11	German	You see, these Chinese suppliers learned from us. We had a requirement to achieve 40% localization in the car, so you look at what can be produced locally in China. This requirement was in place even before the 2001 Automotive Policy, where the 40% local content rule was formally established. They tested it thoroughly; it wasn't just about final assembly and claiming it was local while all subcomponents were imported. They disassembled everything completely. Naturally, this led to situations where they found a Chinese supplier who had been doing something similar for Volkswagen or Audi for ten years and thought, "Let's have them build prototypes for us and see how it goes."	Chinese suppliers developed by meeting a 40% localization requirement, even before the 2001 Automotive Policy formalized this rule. This involved thorough testing and complete disassembly of components to identify viable local suppliers, often those with experience supplying Volkswagen or Audi, who then built prototypes to match standards.		
11	German	We increasingly integrated Chinese suppliers into our supply chain and aimed to bring them to Europe and the USA, which was also part of my responsibility. Today, we even have some of these suppliers in Europe and the USA. The purely Chinese OEMs, or those that had joint ventures with companies like ZF or Bosch, later established their own companies, fully independently controlled, and developed their own solutions. They learned massively from us, which is why they are now at a quality level where you can say, "Well done, hats off!"	Chinese suppliers were gradually integrated into global supply chains, with some now operating in Europe and the USA. Initially working with joint ventures like ZF or Bosch, these OEMs later became fully independent, developing their own solutions. Their significant learning from Western companies has elevated them to a level of quality that commands respect.		
11	German	The domestic market naturally provides economies of scale, the volume needed. And this market isn't affected by whether, for instance, someone in Italy suddenly doesn't like my car. It operates on a massive scale, and let's not forget that 30 years ago, there were mostly cyclists and far fewer cars compared to today. Even now, car ownership is still underrepresented compared to Western countries, so the market still has growth potential—not in huge leaps, but it will continue to grow. The volume behind each of these vehicle	Chinese suppliers, initially integrated through joint ventures, have since become independent, developing their own solutions. Their growth and learning from Western companies have brought them to a high-quality level.		

Appendix

		manufacturers also makes it economically sensible to produce locally and integrate local suppliers.			
12	German	Absolutely, a foundation has definitely been laid, but one also has to be honest with oneself. As a Western observer or participant in the automotive industry, they have certainly benefited a lot in terms of profits. So, I wouldn't say it was a mistake in hindsight.	The foundation for success has certainly been laid by Joint Ventures, and Western participants in the automotive industry have benefited significantly in terms of profits. In hindsight, it cannot be considered a mistake.		
1	German	I think we will be lagging behind in lithium batteries for the time being, but the next topic will be solid-state batteries when that comes, then perhaps the cards will be reshuffled again.	Chinese OEMs have an advantage in lithium batteries. Solid-state batteries may provide a chance for western OEMs.	CL2.4: Specific Value Chain Advantages	Experts identified mainly three main technological areas where Chinese BEV OEMs have gained a competitive edge: software integration, battery technology, and time-to-market efficiency. - Software Integration: The majority of experts highlighted Chinese OEMs' ability to integrate advanced software into vehicles, focusing on innovative, user-centric features such as smart cockpits, voice interaction, and entertainment systems. These innovations prioritize passenger experience over traditional performance metrics, reflecting a modern consumer focus. China's lead in autonomous driving, supported by state initiatives and lower regulatory barriers, was also often emphasized. - Battery Technology: China dominates battery cell manufacturing and cost-efficient application, with companies like CATL and BYD leading globally. This expertise extends across industries, benefiting from years of experience. Experts noted China's control
1	German	I think software is the key point at the moment, where the Germans simply have problems. As far as the software is concerned, I always say the cell phone on 4 wheels, which is now actually more and more emerging and at the moment the Chinese are simply leading and are closer to what the customer wants in his car.	Chinese OEMs are leading in software and understand better what the customers want.		
1	German	In the future, AI will be more and more relevant, especially in the context of autonomous driving. There is a lot left to achieve here in terms of autonomous levels but China is far ahead for sure compared to traditional OEMs.	Chinese OEMs are ahead in autonomous driving.		
3	German	When it comes to cell technology, namely manufactured cell technology and cost positions, especially with regard to the components, whether it's inverters, electric motors, cells and batteries in particular, they have a major advantage.	Chinese OEMs have an advantage in produced cell technology and drivetrain component costs.		
3	German	The most relevant issue is the end-to-end value chain that the Chinese can offer, which means they have insane experience in the application of cell technology and also the consistency of efficiencies when it comes to the entire power train componentry.	The vast experience in cell technology application is enabled through the end-to-end value chain the Chinese can offer.		
3	German	Tesla has worked with Korean and Japanese companies on their batteries. And if you look their components, especially Korean components are at least on a par in terms of performance and costs, even though they don't own the sources and refineries.	Korean competitors can keep up with Chinese battery technologies in terms of performance and costs.		
3	German	Software is 100% a success factor. You realize that a lot of things are happening in the field of autonomous driving over there, which is also state-supported or state-wanted. Autonomous driving has very much led to sensor technology entering the development phase in China with its own manufacturers.	Software is a central technological advantage of Chinese OEMs, also in the field of autonomous driving which additionally contributed to local sensor development.		
3	German	Why are Western OEMs now entering into emergency joint ventures with young micro-manufacturers from China? Because the colleagues in China are much fresher and think in a new way when it comes to electronics architecture. They have central computer structures that cannot even be integrated into Western vehicles in the same way. Because they come from scratch and don't have this heritage.	Western OEMs are forced to enter JVs with small start-ups from China due to their technological advantages for example in electronics architectures.		
2	German	A huge advantage for Chinese OEMs was that they reimagined the vehicle from scratch. They moved away from	Chinese OEMs lead the field in entertainment and connec-		

Appendix

		the idea that the experience must be best for the driver and instead focused on enhancing it for all passengers. This gave them a significant lead in entertainment and connectivity.	tivity due to a passenger-centric approach.	over the entire battery value chain, from material sourcing to production. - Time-to-Market Efficiency: Chinese OEMs excel in reducing development cycles, launching vehicles in 1.5 to 2 years compared to the 4 years typical for traditional OEMs. This efficiency is driven by simplified vehicle architectures, reduced product complexity, and flexible organizational structures that embrace higher risks. Additional factors include a highly motivated workforce and government-backed initiatives that rapidly establish new supplier industries.
2	German	Autonomous driving is also a key area—they simply dare to do more here, and there's less regulation holding them back.	Chinese OEMs lead in autonomous driving due to higher risk aversion and lower regulatory hurdles.	
2	German	Additionally, Chinese vehicles come with numerous exciting features tailored to customer needs—from a screen in camper vans to pet mode and a baby cam in the car. These are precisely the features that matter more to customers today than performance.	Chinese OEMs understand which features excite customers.	
5	German	I see the main technological advantage in the fact that the Chinese can bring a similar product to market much faster and at significantly lower price points. This is based on their radical streamlining and optimization of the vehicle's resource requirements.	Chinese OEMs can bring similar products to market at much higher pace and lower costs.	
5	German	Another key area is, of course, batteries, where they have invested heavily in research. As a result, they can provide high-performance batteries at significantly lower costs—perhaps only Musk with Tesla can compete with that. In China, this is also rooted in years of experience—a laptop battery cell isn't all that different from one in an electric vehicle.	China's experience in R&D of battery cells for other sectors has contributed to better batteries for lower prices.	
9	German	Another crucial factor is China's experience with automation, which significantly reduces costs and is hard to replicate elsewhere, including in the West. Developing this in Europe would require substantial investment, which I don't see happening, as Western companies are easing off due to slower-than-expected market growth.	China's experience with automation is a central success factor.	
9	German	Another success factor is the innovative strength of Chinese OEMs. China is the largest automotive market, meaning they are closer to customers and understand better than Western OEMs what matters to them. This includes areas like connectivity and exciting features. They also form smart partnerships with smartphone manufacturers, for example. In fact, they are much faster at bringing new features to market.	Chinese OEMs have an advantage in innovation power, enabled by their closeness to customers and development pace.	
9	German	It's almost reversed now. Thirty years ago, German engineers went to China to teach automation and industrialization. Today, we almost need Chinese engineers to show us how to scale and automate battery technology in Europe, as we can't do it alone—and we don't have the time to figure it out ourselves.	The West depends on learning from Chinese engineers in battery technology and production.	
7	English	I think the first key factor is the battery. The battery plays a crucial role in the success of electric vehicles.	The battery is the key factor in the success of electric vehicles.	
7	English	As you might already know, the second key factor is the software, particularly in areas like autonomous driving and smart cockpit systems. In China, many OEMs have made significant progress in developing autonomous driving capabilities, with some already implementing autopilot features in urban areas or city highways. Several Chinese OEMs are now able to offer L3 or L2+	The second key factor is software, especially in autonomous driving. Chinese OEMs have made significant progress, with some offering L3 or L2+ technology, strengthening their competitive position in the global EV market.	

Appendix

		autonomous driving technology, showcasing the country's advancements in both the software and hardware needed for intelligent driving systems. This technological edge has become a strong competitive factor in the global EV market.			
7	English	The third key factor, as I mentioned, is the smart cockpit, which includes voice interaction and advanced apps in the central panels. Chinese OEMs are leading the way in integrating these sophisticated digital features into their vehicles. While some foreign OEMs have concerns about data privacy and security, Chinese manufacturers have been more aggressive in adopting and implementing these advanced digital functions. This gives them a competitive edge, especially in terms of providing a more personalized and connected user experience. These innovations in smart cockpit systems are becoming a major differentiator in the EV market.	The third key factor is the smart cockpit, including voice interaction and advanced apps. Chinese OEMs lead in integrating these features, offering a more personalized and connected user experience. While foreign OEMs are cautious about data privacy, Chinese manufacturers have aggressively adopted these digital functions, giving them a competitive edge in the EV market.		
7	English	The product itself has become more appealing compared to traditional internal combustion engine models, with electric vehicles offering more advanced features. Additionally, with the decrease in the cost of batteries, the price of electric vehicles has become much lower than before.	Electric vehicles have become more appealing than traditional internal combustion engine models, offering advanced features. Additionally, with the decrease in battery costs, EV prices have significantly dropped.		
7	English	The local OEMs are quite active in launching the latest and most innovative models, offering a lot of new technologies. Companies like XPeng Motors, NIO, and many others are constantly pushing forward, and the competition in the market is fierce. This has resulted in a supply that can sometimes be overwhelming for customers, as there are so many new options to choose from.	Local Chinese OEMs, like XPeng Motors and NIO, are actively launching innovative models with advanced technologies, fueling fierce market competition and creating an abundance of choices for consumers.		
8	German	If I look at a typical electric vehicle, I basically have the "skateboard" concept, a skateboard with a "hat," and then we probably also have what we could later call a coincidence, a non-directly causal overlap. This trend toward the software-defined vehicle isn't necessarily related to it being electrically powered. It has advantages in this context, but as I continue to change the vehicle architecture and reduce components, I gain an advantage.	The "skateboard" design concept of electric vehicles, involving a flat base with a top structure, aligns with the trend toward software-defined vehicles. However, this trend is not inherently linked to electric power but rather to evolving vehicle architecture and component reduction, which provide additional advantages.		
8	German	As an example, we see that in the top 20 suppliers of the year 2040, there will likely be at least four Chinese battery manufacturers, whereas today, you don't actually see any Chinese companies in the top 20. So in the future, there will be four, and several of them will also come from the battery sector. This reflects how the additional efforts made in China support the development of electric vehicles beyond just the battery. The battery is one building block, but it's not the sole explanation; beyond the battery, there still needs to be a car built around it.	By 2040, at least four Chinese battery manufacturers are expected to be in the top 20 suppliers, reflecting China's broader efforts in advancing electric vehicles. While the battery is crucial, the complete vehicle design remains essential.		
8	German	An example in this context is development time—the time to market that Chinese manufacturers demonstrate to fully develop a vehicle up to production	Chinese manufacturers have a significantly shorter development time to market, allowing them to bring products to production faster. This early-		

Appendix

		is significantly shorter. This is essentially an earlier stage in the process, but it's crucial and impacts all other elements. It allows them to develop products more quickly and closer to the current state of technology, incorporating both new manufacturing technologies and components.	stage advantage impacts all other elements, enabling them to incorporate new technologies and components more quickly.		
8	German	I think there are still areas where advantages can be seen with others, but China has caught up extremely quickly. Priorities have been set differently, so it would be hard to single out just one area—it would likely be wrong to focus on only a few. The Chinese industry is so vast that narrowing it down would probably overlook many important aspects. Speaking from my perspective, and this is just my view, there may still be areas where advantages remain or where there is potential for further improvement.	China has caught up quickly across many areas, and its vast industry makes it difficult to single out just a few. While there may still be areas where advantages or potential for improvement exist, focusing on only a few would likely overlook key aspects.		
8	German	Where I see perhaps more learning needs for Chinese companies is in establishing and serving international markets. I often observe that various manufacturers attempt to enter these markets with the same mindset, "China Speed," and the same view of the consumer as in their domestic market. Almost all, with few exceptions, face significant challenges in establishing themselves outside of China. In some cases, it works, and we can examine why—it often comes down to being open to local distribution partners early on. Where they work with dealerships and retailers in a more traditional model, effectively allowing third parties from local markets to serve the customer, it tends to be more successful. This model is applied in many countries, but otherwise, they often struggle in this area.	Chinese companies often struggle in international markets when applying the "China Speed" mindset. Success tends to come from collaborating with local distribution partners and using traditional models, allowing third parties to serve customers.		
8	German	The Chinese customer is much more digital, faster-paced, and convinced by different arguments—they might even purchase a car digitally through WeChat. These aspects are sometimes hard to convey, and internally, there can be a culture where "killing the messenger" happens, or people play to the emperor's preferences, among other things. I believe they may still need to go through some mistakes to painfully learn how things work abroad. It's only a matter of time, but if I compare all domains from my perspective, the learning potential in sales outside of their home country is perhaps still a bit greater compared to other, more technical areas.	Chinese companies face a steeper learning curve in international sales compared to technical areas, as they need to adapt to different customer behaviors and overcome cultural challenges.		
4	German	Yes, I think batteries are certainly an area where Chinese manufacturers have a significant share of the value chain and substantial expertise. That's definitely a strength. In terms of technology and digitalization, China is also well ahead, perhaps 10 to 20 years ahead in some areas. They have developed digital business models and tech solutions that may only become common in Europe in a decade. And it's not limited to the automotive sector; it spans across many areas. Their tech and e-commerce	Chinese manufacturers hold significant expertise and dominance in battery production and in digitalization with advanced digital business models and a vast tech ecosystem across sectors		

Appendix

		industries are massive, and no other country is likely to catch up anytime soon. Additionally, they have a highly skilled workforce that works long hours for much lower wages than in the West. So, in these two areas—battery technology and digitalization—it will be challenging for others to catch up.			
4	German	Manufacturing is different, though. There were early criticisms of Tesla, for instance, regarding panel gaps and build quality, which some took as a sign they'd never produce quality vehicles. But I think the Chinese manufacturers have now reached a similar quality level. This may not be a decisive competitive factor, but it's no longer a weakness.	In manufacturing, Chinese automakers have achieved quality levels comparable to Western standards, addressing early criticisms		
4	German	Another critical advantage China has is flexibility and speed. They can move incredibly fast in all areas. Here, you might spend months on approvals or strategic planning, but in China, they act pragmatically. If there's a business opportunity, someone will seize it, and it will be supported. New supplier industries can appear overnight because the government backs initiatives that generate profit. This kind of support and the pragmatic, business-oriented mindset are often underestimated. For example, in Shanghai, the top tax contributors are awarded. The tax authority representative even thanks companies for their contributions and asks how they can help increase their revenue the following year. Instead of focusing on extracting more taxes, the approach is, "If you succeed, the economy succeeds, so let's work together to make that happen." This pragmatism, both in the government and among people, is a major competitive advantage that's often overlooked. The people in China are truly focused on business.	Another competitive edge lies in China's flexibility and speed, with a pragmatically supportive government-business relationship where profitable opportunities are rapidly seized and backed, exemplified by practices like rewarding top tax contributors to encourage mutual economic success — an often overlooked advantage.		
6	English	Yes, I think Chinese OEMs have a competitive advantage in application technology. Many Chinese companies focus heavily on applying existing technologies effectively, adapting them directly to meet industry requirements. For instance, in battery technology, China may not be inventing completely new technologies, but they excel in applying and refining existing solutions to meet specific demands.	Chinese OEMs have a competitive advantage in effectively adapting and refining existing technologies, like in battery technology		
6	English	Another area where Chinese OEMs stand out is software integration. Since they lack deep-rooted experience in traditional combustion vehicles, they're less constrained by legacy structures. This gives them more freedom to adopt entirely new structures and optimize them for advanced software integration, creating more intelligent and connected systems in their BEVs. This flexibility and focus on application and software integration give them an edge in certain parts of the value chain.	Chinese OEMs excel in software integration due to their lack of legacy combustion vehicle structures, allowing them greater flexibility to adopt new, optimized systems for advanced software and intelligent, connected BEVs.		
10	German	That depends a bit on how you define "ahead." If we're talking about the number of models and development cycles, Chinese OEMs might indeed be ahead of Western companies, particularly German OEMs, because they have	Chinese OEMs may be ahead in terms of the number of models and shorter development cycles, but when it comes to technical quality like range, efficiency, and		

Appendix

		a much shorter time-to-market. However, in terms of individual technical quality—like range, efficiency, and battery management systems—I wouldn't necessarily say they're automatically ahead. It depends on the specific factor.	battery management systems, it depends on the specific factor.		
10	German	Where they likely do have an edge is in time-to-market, particularly in developing new models and achieving market penetration, especially in their home market in China. They currently hold the top spots there, with Tesla being the first Western brand in the rankings, while traditionally dominant Western brands, such as Volkswagen, have fallen lower in the sales rankings. So, they certainly have an advantage in that regard, though individual vehicle technology would need a more detailed comparison.	Chinese OEMs likely have an edge in time-to-market and market penetration, especially in China, where they dominate sales.		
10	German	In the West, there are often reasons for sticking to certain materials—for example, structural requirements for chassis or body quality. The Chinese manufacturers, however, seemed more willing to take risks and innovate with new approaches. So, while the materials themselves may not be a primary success factor, I think it's more about the deeper architectural aspects, like connectivity within the car, the user interface design, and how these provide a different customer experience.	Chinese BEV manufacturers are more willing to innovate with materials and design, focusing on architectural aspects like car connectivity, user interface design, and overall customer experience		
10	German	A common stereotype is that Chinese OEMs just copy, but they've evolved to create original developments, especially in terms of speed. Western OEMs take much longer to develop, homologate, and launch a product, partly because larger firms have more complex approval processes. Chinese OEMs might not have "better" people, but they organize them more flexibly and accept higher risks, allowing them to bring products to market faster.	Chinese OEMs have evolved from copying to creating original developments, particularly excelling in speed. While they may not have "better" people, their flexible organization and willingness to take higher risks allow them to bring products to market faster.		
10	German	Well, they're not exactly without competition. But honestly, where I think they have an edge is in the shift happening in the automotive industry from a domain architecture to a zone architecture. Do you know what that is? Basically, with a domain architecture, you have a lot of control units in a car that communicate with each other. The idea with the next step in innovation is to switch to zones—meaning you'd have a left zone, a right zone, a rear zone, and a central zone. Instead of numerous control units communicating across the car, each zone handles its own controls and then consolidates everything in a supercomputer.	They have an edge in zone architecture. Switching to zone architecture centralizes controls by having each car zone manage its functions, reducing wiring and enhancing coordination through a central supercomputer, ideal for connected and autonomous vehicles.		
10	German	The Chinese are relatively advanced with this, but not just them—the Americans, like Tesla, are as well. From my perspective, the German automotive industry is struggling to implement this change because they would need to overhaul many existing concepts that don't align with it. As incumbents, they tend to focus on iterative innovation, which makes adopting this semi-disruptive innovation, like the zone shift, more challenging. This gives an advantage because, with	Chinese and American companies like Tesla are leading in adopting zone architecture, while German OEMs face challenges due to entrenched designs favoring incremental innovation. This architecture reduces control units, parts, weight, and costs, allowing for better optimization—an advantage that positions Chinese BEV makers and Tesla competitively.		

Appendix

		fewer control units, you need fewer parts, less weight, and fewer materials—all of which reduce costs and improve alignment. You can better optimize your product. This is likely an area where they are technically more advanced, or at least on par with companies like Tesla, and it certainly helps them in direct competition.			
10	German	Cars are rolling computers now. In my own master's thesis a few years back, I wrote that a BMW X5 has more lines of code than an F-16 fighter jet. This means you need a lot of software and powerful chip hardware to process everything, which is something many companies—not just German ones—struggle with, integrating software into the vehicle and producing chips capable of running it. This is also why we see so many recalls, often because a software update didn't work and needs to be re-flashed. You can see this in the media too, with certain German automakers and their current struggles with software development.	Modern cars are like rolling computers, packed with more code than an F-16, as shown by examples like the BMW X5. This demands advanced software and chip hardware, which many automakers, including German ones, find challenging. Frequent recalls often stem from software issues, highlighting ongoing struggles in integrating and updating vehicle software reliably.		
11	German	Our business model in the past was always to sell a basic car, and for every additional option, customers had to pay extra. With Chinese companies, however, everything is included; they don't charge for options. There are a few small markups if you want something very special and expensive, but otherwise, it's an all-in price. In the past, I'll give you examples. BMW charged €4,500 for the business package, which included navigation, HiFi, and so on, for a 5 Series or 7 Series. The cost for BMW to provide this was maybe €350, so there was a huge margin in it. And today, with the Chinese, all of this is included.	Chinese automakers generally offer an all-inclusive pricing model, with most features standard and minimal extra costs for special customizations. This differs from traditional models, like BMW's, which charged high markups for optional packages, generating substantial margins.		
11	German	For every model, I had to have derivatives—I needed a station wagon, I needed a convertible, I had to produce SUVs on one platform in different sizes. I needed diesel, I needed regular models; I had a huge spread across all the technology, which also made development slow because everything had to be fully tested and approved before it could hit the road. The Chinese don't have that.	Traditional automotive models required a wide range of derivatives—different body styles, engine types, and multiple SUV sizes—leading to slower development due to extensive testing and approvals. In contrast, Chinese manufacturers typically avoid this broad product spread, streamlining development.		
11	German	The approach of focusing on the essentials means it doesn't matter if there's an automatically dimming rearview mirror that adjusts when high beams come from behind—you won't find that in any Chinese car, but you will in ours. And this complexity—simply put, the complexity of the product—is at least half as much with the Chinese as it is with us, and that makes a massive difference in terms of costs. This allows them to reach entirely different price levels for customers.	Chinese automakers focus on essential features, often omitting complex extras, like auto-dimming rearview mirrors, found in Western vehicles. This reduced product complexity significantly lowers costs, enabling Chinese manufacturers to offer vehicles at much lower price points.		
11	German	The Chinese have now reached the point where they are significantly automating their own manufacturing. Why did China acquire KUKA robots? They made targeted technology acquisitions because they already knew what steps two and three would be. In this sense, they have a far-reaching strategic view	China has strategically advanced its manufacturing automation, exemplified by acquiring KUKA robots, aligning with a long-term development vision.		

Appendix

		on how they want to develop these areas, and automation is one aspect of their manufacturing processes. You can now see this approach in companies like Volkswagen.			
11	German	Another important aspect is time-to-market when developing new products. We used to aim for rapid prototyping, trying to reduce prototype management from six months to three months—they do it in two weeks. Their ability to use time effectively, with people willing to work seven days a week, in three shifts if necessary, is unique to China. This isn't Europe, and it's not the USA. Fortunately, we have labor laws that provide protections; China's labor laws also offer some protections, but they aren't as strict as ours. In the end, it also comes down to the willingness of the people—they don't have to negotiate with unions that might push back or demand more compensation. People simply show up.	China's rapid time-to-market is driven by efficient prototyping, completing what took six months in the past within just two weeks. This is made possible by a highly dedicated workforce willing to work long hours, including weekends and multiple shifts, without the labor union negotiations common in Europe and the USA.		
11	German	So, back to your question. Artificial intelligence and smart software are key topics. Then, in product development, there's the goal of achieving the shortest possible time-to-market while still bringing a sufficiently well-tested product to the road. The third factor is in manufacturing. They follow Kaizen strictly, but unlike us, they don't have a unique Bill of Materials for every car or a highly specific customer order. Instead, they produce in batches, with Kaizen applied as the Japanese do. Automation is also a success factor, implemented to the right extent—only where it makes sense.	The key factors for success are artificial intelligence and smart software, rapid time-to-market with well-tested products, and efficient manufacturing. Chinese manufacturers follow Kaizen principles, producing in batches rather than custom orders, and apply automation where it adds value.		
11	German	Yes, no—they build on a push basis, not pull. For us, pull means having a specific customer order. They bundle customer orders into batches and run those batches through production. Since the scale is large enough, they can do this without issues. The smallest batch might be 20 units, but it could also be 300 or 500, depending on the order volume for a specific model. And, as you mentioned earlier with Tesla, there are fewer derivatives—there aren't 300 different combinable options. This, in turn, allows for larger batches in production.	Chinese manufacturers operate on a push basis, grouping customer orders into batches rather than producing based on individual orders. The batch size can range from 20 to several hundred units, depending on demand. Fewer product derivatives, similar to Tesla's approach, enable larger batches, streamlining production.		
11	German	Of course, there are systems and organizational structures—what kind of systems do they rely on? When working on a new product within a fairly complex project plan, they need to synchronize and integrate everything. In the past, this might have been done on paper or with Excel. Today, there are systems that manage it instantly, highlighting critical milestones and showing where timelines can be shortened. Issues like six weeks of summer vacation, three weeks at Easter, or three weeks for Christmas simply don't come into play; the project just moves forward continuously.	Chinese companies use advanced systems to manage complex projects in real time, optimizing timelines and ensuring continuous progress without holiday disruptions.		
11	German	Yes, and I think the Chinese benefit from reduced complexity in vehicle development. For instance, the drivetrain is about 35 to 40% less complex than a	The reduced complexity in Chinese vehicle development, including simpler drivetrains		

Appendix

		conventional combustion engine. Then, if you add the reduction in interior variants and options, this further simplifies that part of the vehicle by around 50%. In the end, they can have a fully tested vehicle ready in about one and a half to two years, while we need four to five years.	and fewer interior options, allows for faster product development. This enables them to bring a fully tested vehicle to market in 1.5 to 2 years, compared to 4 to 5 years in the West.		
12	German	Especially when it comes to the first and third technologies mentioned, specifically battery cell technology, that stands out. You can't produce a battery without technological support from China, especially when only companies like CATL and BYD are leading the field, and they are the largest globally. Software-driven advancements are also very strong, definitely. As for manufacturing, I'm not familiar enough with the details to comment on that, but I do think we're still a bit ahead in that area, though not infinitely so.	China leads in battery cell technology, with companies like CATL and BYD dominating globally, and software-driven advancements are also strong. While manufacturing in China is competitive, the West still has a slight edge in this area, though not by a large margin.		
13	German	Chinese OEMs, particularly the disruptors, approach development processes completely differently due to their lack of historical legacy. Most of these companies come from the internet business, having previously developed apps or internet platforms like consumer magazines. Their approach is rooted in rapid iteration, where they test and launch new features within days and continuously improve them. While this doesn't mean they release beta versions of cars to customers, their vehicles are highly mature. However, their approach involves very deliberate and effective risk management.	Chinese disruptors are much faster in their development cycles than Western OEMs as they originate in the internet business.		
13	German	Another aspect relevant to your question is the focus on fewer products. For example, Xiaomi has concentrated on a single car model, completing development in just three years. Remarkably, within that time, they also built a factory dedicated to producing this one model in a manageable variety. In contrast, we have 30 projects in progress worldwide, needing to meet the demands of all markets, with new launches happening almost monthly in different regions. This gives these companies a clear advantage in speed and focus.	Another advantage is the lower product variety, reducing the complexity for Chinese OEMs.		
13	German	NIO's unique selling proposition lies in its exceptional service model. Through their app, each customer has access to a dedicated team of advisors available 24/7, providing personalized support for both the customer and their vehicle. Additionally, NIO offers a battery-swapping concept that many customers find appealing. In contrast, companies like Xiaomi focus on integrating a wide range of accessories into their vehicles and emphasize performance and power. Each company identifies its niche and concentrates on it, aligning closely with their overall strategy.	Different OEMs focus on different areas where they try to create a USP, for example in service model, battery-swapping or accessories.		
2	German	I believe there will be a consolidation in the Chinese BEV market in the coming years. It won't be about individual vehicle features but rather about who can best manage the entire value chain, including after-sales, and successfully	There will be a consolidation in the Chinese BEV market. OEMs that can best manage the entire value chain will be winners.	CL2.5: Critical Technologies Outlook	Experts identified three technological priorities for maintaining competitiveness in the BEV

Appendix

		handle high production volumes. I currently see an advantage for Western OEMs in this area, as they have been optimizing this for a long time.			
5	German	I think a very important area is definitely after-sales service and how companies can differentiate themselves there. There's sure to be a lot of development, like how maintenance will be handled in the future—will the car schedule its own appointments, for example? This is also an area where companies can really excite customers.	A very important area for the future will be everything around after sales service.		
9	German	In my opinion, the focus remains on the battery, as it's still the biggest cost driver. The Chinese will likely serve the mass market sooner or later, while Western companies focus more on the premium segment. Since the battery is the largest cost block, I expect further cost reductions in this area to build more affordable and efficient electric cars, enabling them to flood markets and mitigate risks like tariffs.	Battery technology will remain the focus in the next year with expected cost reductions.		
7	English	I think that technology, including the battery, autonomous driving, and smart cockpit software, will continue to be the main areas that Chinese OEMs need to focus on. These technologies are key to staying competitive and increasing the perceived value for customers.	Technology, including the battery, autonomous driving, and smart cockpit software, will remain the key focus for Chinese OEMs.		
7	English	I think Chinese OEMs also need to catch up in traditional areas like reliability, quality, and the mechanical aspects of the vehicle. While they have made significant investments in these areas, there is still a gap or disadvantage compared to traditional OEMs like Volkswagen, Toyota, or other large brands. These companies have a long history of manufacturing high-quality, reliable vehicles, and Chinese OEMs need to focus on improving in these areas to compete at the same level. While staying on the leading edge of innovation is important, it's equally crucial to close the gap in traditional areas to offer a well-rounded, competitive product.	Chinese OEMs must improve in reliability, quality, and mechanical aspects to compete with established brands. While innovation is important, closing this gap is crucial for a competitive product.		
8	German	In this sense, it's a consideration for some western OEMs to not only develop and produce in China for the local market (Local for Local) but also for export, in order to access the Chinese supply base. This would allow them to enhance their competitiveness, either through cost position or technology. If they succeed in integrating the Chinese supply base into their European vehicle production, they close part of the gap with their Chinese competitors. However, this strategy becomes unfeasible if these vehicles are subject to import tariffs, as tariffs are based not on the company's country of origin but on the production location, as seen with some German manufacturers.	Western OEMs may produce in China for export to leverage the cost-effective supply base, improving competitiveness. However, import tariffs on vehicles produced in China could hinder this strategy.		
8	German	I am quite certain in saying that there isn't just one area to focus on, but rather that it's almost the entire value chain that may need attention.	It's not just one area, but rather the entire value chain that may require attention.		
10	German	Range helps up to a certain point, but eventually, you'll reach a mileage where it's no longer as relevant. At	Range remains relevant up to a certain limit, around 700-800 km, beyond which cost		

market: Battery technology, software and AI integration, and evolving sales and after-sales models.

- Battery Technology: Batteries remain the foundation of BEV competitiveness, with experts emphasizing the need for continued cost reductions to enable mass-market adoption. Beyond cost, improving battery efficiency and capacity is critical for advancing performance and range.
- Software and AI Integration: Advanced software and AI solutions are seen as crucial for future success. AI-driven systems that manage vehicle maintenance, communicate with service providers, and integrate seamlessly with users' schedules were highlighted. Smart cockpit technologies and autonomous driving capabilities are also expected to remain key differentiators.
- Sales and After-Sales Models: Changes in sales strategies and enhanced after-sales services are expected to play a significant role in sustaining competitiveness. The traditional dealership model may shift toward smaller displays in malls, supermarkets, or online platforms, reducing reliance on large dealership networks. After-sales service is becoming

Appendix

		some point, a range of 700-800 kilometers will become standard, and very few people drive more than 800 kilometers in one go, except maybe once a year on vacation. Beyond 800 kilometers, many people will just fly. So range will still be important for a while, but eventually, vehicle costs will take center stage because, currently, there's still the issue—though I'm not sure exactly about China—that many car manufacturers make little profit on EVs. They often have to artificially lower prices for the market to accept them, so they don't have the same margins as traditional combustion vehicles.	will likely become the primary focus, especially as EV makers often face low profit margins and must adjust prices to stay competitive		a key differentiator, while improvements in reliability, quality, and mechanical design are necessary to match traditional automotive strengths.
10	German	Costs, costs, and more costs will be a huge factor. You can always have cool technology and innovations, but if they don't succeed commercially, it's a loss. Take VHS tapes as an example; they succeeded over the technically superior Japanese competitor simply because the competitor was too expensive. So, producing an affordable vehicle around €20,000 is the aim, as we see in the news, targeting €25,000 or so. Other OEMs are trying to do this as well, and this will be decisive. Then, who can secure their supply chain will matter—who can source rare earth materials to build these vehicles and has the know-how for the complex electronics that lie beneath the control units?	Costs are crucial: even the best technology fails if it's not commercially viable.		
11	German	In China, they have a comprehensive 5G infrastructure nationwide, with network systems that ensure constant communication between objects. The only thing they currently lack is their own satellite system, which would allow them to control this independently. Instead, they have to rely on GPS, BeiDou, or other sources. However, I believe it will take another 2 to 3 years for them to complete this, which will then connect seamlessly with advancements in artificial intelligence.	China has built a comprehensive 5G infrastructure enabling constant communication between objects. While they currently rely on GPS for navigation, they are expected to develop their own satellite system in 2-3 years, which will integrate seamlessly with advancements in artificial intelligence.		
11	German	For me, artificial intelligence and smart software are central factors that will determine the success or failure of a product in the future. Let me explain why: if, in the future, you order a car and a technical defect is detected during operation, the system would give you a quick notification, inform the service partner to order the necessary replacement part, and reserve an appointment. Then, you'd simply check your smartphone and say, "I can't come on Monday; I'll come on Friday." You wouldn't have to do anything else. That's the role of artificial intelligence in smart software. The starting point, however, was the surveillance of everyone living in the country for security reasons. Now, these existing systems can be leveraged to make products more convenient and beneficial in terms of user experience.	AI and smart software will drive product success by enabling seamless experiences, like automatically managing car repairs and appointments. Originally developed for security, these systems now enhance convenience and user satisfaction.		
11	German	There's something else I wanted to add: when you look at Chinese EV manufacturers, many of the 200 or 250 brands are smaller, so they don't have the resources to build large dealer networks. The whole sales and service system in	Many Chinese EV brands, especially the smaller ones, lack the resources for large dealership networks. The future sales and service model		

Appendix

		the future will also look different. Traditionally, large manufacturers have dealership contracts, with main dealers in a region and smaller ones authorized for repairs or maintenance. In China, you see small displays in shopping malls or supermarkets, or you can buy a car online. Dealership networks are shrinking.	will differ from the traditional one, with fewer dealership contracts and a shift toward small displays in malls, supermarkets, or online sales, reducing the reliance on extensive dealership networks.		
11	German	If you consider how many dealerships and service stations we have in Europe—thousands, supporting hundreds of thousands of jobs—these won't be needed as much in the future. With a simple, IT-supported solution, I can buy a car right in the supermarket, just like grabbing a bundle of carrots. The Chinese already have this, and not having to maintain and pay for a large dealer network alone saves a significant amount of money.	In the future, the need for extensive dealership and service networks in Europe will decline. With IT-supported solutions, cars could be purchased easily in places like supermarkets, similar to buying groceries. Chinese manufacturers already use this model, saving significant costs by avoiding large dealer networks.		
11	German	They need to focus on technologies where they are already leading, particularly in artificial intelligence and software. In battery technology, they will continue to excel, and we will catch up, so I believe it will become a race on equal footing. Another important area to consider is research and development and collaboration with universities and PhDs. They place massive emphasis on this, and we must be careful not to neglect it. We need to prioritize excellence in education at the highest technical level—it has to be a top priority for us.	China will continue leading in areas like artificial intelligence, software, and battery technology, with competition eventually becoming more balanced. Research, development, and collaboration with universities are crucial, and Europe must prioritize excellence in education at the highest technical levels to remain competitive.		
12	German	Batteries, simply because they will soon represent an even larger share of the vehicle's cost than they do today. A battery will have a bigger proportion of a vehicle's cost than, for example, the motor or other components. And then, it quickly leads into topics like Jonas's work on raw materials, and so on. So, when it comes to a key topic, from my perspective, it's definitely the battery.	Batteries will soon represent an even larger share of a vehicle's cost than components like the motor, making them a key focus. This ties into topics such as raw materials, making the battery a critical area of attention.		
1	German	Everything is planned centrally, they have their 5-year plan and they said 20 years ago that we would follow the rest of the world when it comes to the automotive industry. Because of their centralized system, they can also make decisions quickly or even correct decisions if they have made the wrong ones, because it doesn't take like it does here where you have a new government every 4 years and everything is discussed, but there is just the party and it then decides we go in the direction and they can react much faster	China has a pace and stringency advantage in political decision-making and correction. 20 years ago, they decided to invest heavily in the automotive sector.	CL3.1: Government Initiatives as a Success Factor	The hypothesis that the system of government support and regulations has been a central success factor for the emergence of the BEV industry in China is supported by all experts. The interviewees posit that the federal government adheres to a long-term oriented approach, as evidenced by the strategic formulation of five-year industrial plans. Expert 3 emphasizes that the extensive technological and economic
3	German	When the 5-year plan is adopted, the next one is already in the head and the one after that in the draft and accordingly there is a very long-term industrial policy, long-term strategy and this is, as I said, installed very pragmatically and they are simply insanely ahead of us.	The Chinese government thinks very long-term oriented and introduces measures pragmatically.		
3	German	China has strategically invested in several 5-year plans in sources, refineries and processing industries for relevant raw materials in order to achieve a kind of monopolistic state. It is important to note that the government financed this	The Chinese government mainly is responsible for achieving a nearly monopolistic state in relevant raw materials through strategically planned investments.		

Appendix

		approach and not private companies, thereby creating the current conditions. And we don't have this leverage to the same extent in the West.		expertise of Chinese ministers has enabled the country to act as an early mover in the BEV segment, with substantial investments already initiated in the early 2000s. The characteristics of the Chinese single-party political system and its data-driven approach facilitate the implementation of rapid, stringent, and pragmatic decisions, thereby providing OEMs with enhanced planning security, as emphasized by Experts 4 and 8. However, Expert 10 brings up the missing corrective mechanism in this political system due to the absence of opposition as a disadvantage. Experts 4 and 11 mention the competitive atmosphere between provinces regarding the achievement of NEV penetration goals set by the central government as a success factor. Most experts concur that it is not feasible to prioritize specific policies, given that it was the comprehensive system of measures that facilitated the success of the domestic industry. During the interviews, several experts highlighted the role of the government in enabling the transfer of critical general automotive know-how from Western OEMs through the establishment of
3	German	For a long time, electromobility was not a core element for Western companies operating in the normal economy due to the higher costs and therefore low demand. This is also due to the fact that the states have not provided such significant benefits on the acquisition side and investments in infrastructure as in China.	The Chinese government has created more benefits on the acquisition side and investments in infrastructure, leading to a higher focus on electromobility of OEMs.	
3	German	I believe that in the early years, the strategic partnerships with European, and US and Japanese suppliers, brought a lot of know-how into the country. And of course this was also strategically controlled by import tariffs, but also by the maximum 50% share in joint ventures for foreigners, so there was enormous potential that flowed into the country.	The Chinese government strategically steered know-how transfer from international suppliers through import tariffs and 50% share limit of JVs.	
3	German	Thanks to the entire chain of subsidies, BEV vehicles are competitive with ICE cars in China in terms of price and performance. I can't really give you a prioritization of individual policies. They have strategically planned well and introduced very broad subsidies.	The entire incentive scheme has contributed to the success of the BEV industry, a prioritization of single policies is not possible.	
3	German	Subsidies were given to cell research and cell production, and then of course they provided extensive hidden subsidies to manufacturers by promoting certain development programs. This created a better supply than in the West. And then suddenly you have a subsidy system on the purchasing side and for the dealers.	The Chinese government first created attractive supply compared to Western countries through development support and then also incentivized purchases of BEVs.	
3	German	Additionally, there are local incentives that might not be as apparent to us in the West. For example, ICE vehicles are only allowed to drive into Beijing on specific days, with license plates automatically scanned for enforcement, while electric vehicles always have access. In some cases, it's not even possible to obtain a license plate for ICE vehicles anymore.	Local incentives like ICE city entry restrictions are relevant in addition to federal policies.	
2	German	China has demonstrated extremely strategic foresight in its automotive industry plan. Generally speaking, these Five-Year Plans that they continuously roll out—like the new one expected by February, which I believe will extend to 2030—are extremely well thought out. When you look at everything they establish within these plans, such as targets for high recognition rates in speech and facial recognition, I can't help but think, "OK, maybe we could tell the German government about this—they probably don't even know what that is."	China's government's five year plans are long-term oriented and strategically well-crafted from a technological and economical perspective.	
2	German	China decided that foreign manufacturers could only enter the market through joint ventures. This allowed them to secure a great deal of know-how, which has certainly been of great importance.	The know-how transfer through JVs was essential for the success of Chinese OEMs.	
2	German	For me, the foundation for everything was the regulation regarding foreign investments and strategic alliances. This allowed them to acquire all that knowledge. Many Western OEMs are now trying to do the same through partnerships. The difference is that they	Regulations for foreign investments with strategic partnerships built the foundation for the success of domestic companies due to know-how transfer.	

Appendix

		have to pay a lot for it, whereas the Chinese obtained it for free, with investments even flowing into their market.			JV regulations for foreign companies entering the Chinese market. Subsequently, with an intensified emphasis on the NEV segment, an attractive supply of electrical vehicles was enabled through extensive development support programs (e.g. for battery cells), targeted subsidies for manufacturers, low regulatory entry barriers, and strategic investments in raw materials, as emphasized by Experts 3, 4, 6, and 10. Concurrently, vast funding for charging infrastructure was made available to establish an appropriate operational environment for consumers, according to Expert 4. Furthermore, the Chinese government introduced extensive demand-side incentives for electric vehicles at an early stage. While direct purchasing subsidies and tax exemptions are the most prominent policies discussed in literature, city entry restrictions for ICE vehicles and license plate access advantages for NEVs are very important to Chinese consumers, as mentioned by Experts 3, 6, 7, and 11.
2	German	Government policies were definitely a central driver for the success of the industry as China took the strategic decision to invest in NEVs and then derived a whole set of suitable measures.	The holistic system of strategic policy measures were a central success factor of the industry.		
5	German	Government support is a very complex construct, but it has certainly helped. For example, consider the level of bureaucracy involved in Europe. In China, it's much quicker to register a company because the government promotes BEVs, whereas in Europe, there are often still many hurdles in the way.	One positive regulatory factor in China is that bureaucracy is much faster as the BEV topic is supported by the government.		
5	German	In the West, there are also government incentives, but it must be said that in China they were simply much more extensive and strategically planned. This is also due to the system, as there are no competition regulators there.	Government policies in China were more extensive and strategically planned.		
9	German	Government support in China was certainly a crucial success factor. For example, in securing raw materials, I see the central initiative coming from the government, as companies did not act independently in this regard.	The Chinese government was a central driver of the success, also if we look at securing raw materials.		
9	German	It's important to highlight the technological openness of the Chinese government. While they set the guidelines, they didn't push solely toward BEVs. Companies themselves chose this technology, seeing it as the most promising.	The Chinese government was very technologically open, leaving the decision towards BEVs to the OEMs.		
7	English	I think the Chinese government plays a very important role in enabling the success of the overall market, and that's true. However, I don't think it's overly surprising, because in most countries and industries, if you want to foster or boost a certain sector, you typically need to offer a lot of incentives. This is quite common.	The Chinese government plays a crucial role in the success of the market by offering incentives, which is common in many countries and industries to boost specific sectors.		
7	English	I think it's a very minor one, and so, as you want to know the specific example, I think the tax exemptions are still valid. The purchase tax is around 10%, so you can still get the tax relief when you purchase an electric vehicle.	The tax exemptions, particularly the 10% purchase tax relief, are still valid, but overall, the impact is minor compared to previous incentives.		
7	English	I also want to highlight that in higher-tier cities like Shanghai and Beijing, for example, in Shanghai, if you want to get an ICE car plate, you need to pay around 80,000 RMB, which is about 10,000 euros. It's a very high cost for normal people.	In higher-tier cities like Shanghai and Beijing, the cost of obtaining an ICE car plate is very high, with fees around 80,000 RMB (about 10,000 euros), making it expensive for most people.		
7	English	But if you choose an electric vehicle, you can apply for the plate for free. For example, a Tesla in Shanghai costs around 200,000 RMB, which is significantly lower than the 80,000 RMB cost for an ICE car plate. So, in this case, the cost of the car plate accounts for about 50% of the Tesla Model 3's price. This clearly shows that in higher-tier cities, the electric vehicle penetration rate is much higher compared to lower-tier cities, like Tier 3 or Tier 4 cities. The plate or city-related restrictions are crucial in promoting electric vehicles overall.	In cities like Shanghai, electric vehicle buyers get free plates, lowering the total cost compared to ICE vehicles, where plates cost around 80,000 RMB. This encourages higher EV adoption in Tier 1 cities.		
7	English	I don't have the data to compare the intensity of government support, but I	The Chinese government strongly supports the new energy industry. China likely		

Appendix

		think the Chinese government emphasizes a lot on the overall new energy industry. So I can imagine, I'm not sure whether China gives the largest or highest level of incentives to the market, but I think China should be at the top, at the 1st tier of governments supporting this industry.	ranks at the top tier in terms of government incentives and support for this sector.		
8	German	That's a very far-reaching question. I believe I mentioned earlier in the interview that the foundational industrial policy, the planning security, and the way in which it can be effectively guided are definitely success factors for the progress achieved and the market position secured. Such a system certainly has more possibilities to leverage industrial policy than other, more pluralistic systems. On the other hand, I think there are few countries that could even develop such a detailed industrial policy.	The effectiveness of China's industrial policy, planning security, and government guidance are key success factors in its market progress. Such a system offers more opportunities to leverage industrial policy than pluralistic systems, though few countries could develop such a detailed approach.		
8	German	Then the question is how they can enforce it and separate it out, so to speak. But here, I think they have both, which is certainly a success factor. China wouldn't be where it is in this field without this industrial policy. For individual economic and investment decisions, this planning security is essential, and I think we can see the importance of planning security even in our own country. If we look at Germany, much of the recent discussions, such as with Volkswagen and others, reflect this. Since the end of last year, German automakers have increasingly approached the government, largely to demand the return of the planning security they have lost—particularly since the abrupt end of EV subsidies in Germany without replacement, leading to mixed signals under the term "technological openness." Planning security alone is extremely important.	China's industrial policy, with its strong planning security and government guidance, has been crucial to its success. For economic and investment decisions, this planning security is essential, a point also highlighted by recent discussions in Germany. The abrupt end of EV subsidies there, without a replacement, has caused uncertainty, prompting automakers to seek the return of planning security.		
8	German	They have been able to develop and enforce a long-term strategy that provides planning security. Other countries have done this to some extent, for example, through setting CO2 thresholds and penalties, as in the European Union. However, the planning security they were able to provide is of a different nature.	China's long-term strategy provides strong planning security, unlike other countries like in the EU, which offer different types of planning security through measures like CO2 thresholds and penalties.		
4	German	Yes, I think the Chinese government, along with local governments, has made a significant contribution to the success of their automotive industry. It's quite interesting to observe how this is discussed in Europe, as China has pursued extensive industrial policy. One of the key factors is the long-term nature of their decision-making, which is closely tied to China's political system. With their relatively stable political environment, they don't have the frequent election cycles that require satisfying different interest groups. This stability enables them to make long-term decisions that benefit many, which is part of why there's broad acceptance, even if people lack the level of input seen in Europe. They can set clear goals, like the five-year plans where specific	The Chinese government's ability to make long-term, stable decisions without the influence of frequent election cycles has been key to the success of their automotive industry, with clear, consistent goals in initiatives like five-year plans		

Appendix

		targets are laid out, such as BEV quotas. If you look back at past five-year plans, the Chinese government has consistently met or even exceeded its goals, showing their commitment to achieving them. This level of long-term decision-making isn't as extensive here in Europe, especially when it comes to industrial policy.			
4	German	Secondly, they are extremely data-driven, closely tracking progress toward their 10- or 20-year goals and making adjustments as needed. For instance, during COVID-19, they lifted restrictions relatively quickly once it became clear that economic growth targets were at risk. This pragmatic approach shows their focus on results and constant assessment.	China's data-driven, pragmatic approach allows for constant tracking of long-term goals, with quick adjustments when necessary		
4	German	Thirdly, they use targeted incentives, especially for customers. In Shanghai, for example, internal combustion vehicles require a blue license plate, which is expensive and requires entering a lottery, with wait times often lasting years. In contrast, BEVs get a green license plate instantly and at no cost, making them a very appealing choice. These incentives encourage consumers to choose BEVs and help drive demand for new industries, which in turn encourages the rise of many new OEMs in China.	China's targeted incentives, such as offering free and immediate green license plates for BEVs while making internal combustion vehicles more costly and restrictive, effectively drive consumer demand for electric vehicles and foster the growth of new OEMs.		
4	German	Local governments play a significant role too, often competing to attract new businesses. If you want to start a serious company, you'll quickly find several government officials keen to persuade you to set up in their region, knowing it will generate local revenue. This competition helps create favorable conditions for companies to establish themselves and succeed.	Local governments in China actively compete to attract new businesses, offering favorable conditions and incentives to encourage companies to establish themselves in their regions.		
4	German	Another interesting point is China's innovation strategy, which is often misunderstood in Europe. There's a tendency to view the frequent bankruptcies among Chinese OEMs as failures. But in reality, this is part of China's innovation strategy: they allow a large number of companies to enter the market with low barriers to entry, creating intense competition. As they gradually increase requirements, such as tax obligations or reduced subsidies, the weaker players fall away. What remains are the strongest companies, which have survived and thrived in a highly competitive environment. This approach to fostering competition and allowing the market to self-regulate is not common in the West.	China's innovation strategy involves low barriers to entry, allowing many companies to enter the market, fostering intense competition. As requirements increase and subsidies decrease, weaker players exit, leaving behind the strongest companies.		
4	German	So, in short, the government has carried out incredibly smart industrial policy, not only supporting OEMs but also building up suppliers and infrastructure over the past 15 years. China has built a complete industry, including all suppliers and raw material access, in a relatively short time, by leveraging market-based principles within a centrally planned framework. It's really impressive, and I'd say it's definitely been one of the core success factors.	China's smart industrial policy has supported OEMs, suppliers, and infrastructure through a blend of market-based principles and central planning—an impressive strategy and a core factor in their success.		
6	English	Yes, government support and policy	Government support has been		

Appendix

		can indeed be a strong factor in stimulating the industry. However, it's important to consider whether these policies align with the right conditions to make an impact. For example, about 10 years ago, there were similar incentive policies in China, but they didn't lead to significant development in the industry. Now, over the past three to five years, there's been a rise in demand for vehicles, coupled with an increase in people's incomes compared to a decade ago. This has created the right environment for these policies to be more effective.	crucial, but its impact depends on the right conditions. While similar policies existed a decade ago, it's only in the past three to five years, with rising demand and higher incomes, that these policies have effectively stimulated the industry.		
6	English	Direct subsidies, tax reductions, and incentives help lower the final price for consumers, which is particularly effective in China, where people tend to be more price-sensitive than brand-sensitive. If they can get a similar product at a lower price, they're more likely to choose it.	Direct subsidies, tax reductions, and incentives are effective in China because they lower the final price, which appeals to the Chinese price-sensitive consumers who prioritize affordability over brand.		
6	English	In addition to purchasing subsidies, infrastructure investments like charging stations are also helpful. China has a lower electricity cost compared to Western countries, so not only is charging more accessible, but it's also cheaper. Another factor is license plate regulation in big cities, where traditional combustion vehicles face restrictions and high costs for plates, often requiring a lottery. In contrast, BEVs receive plates without extra cost or restrictions. All these factors together lower the perceived cost for BEV buyers, which supports the growth of the industry by making BEVs more attractive to consumers.	In addition to subsidies, investments in charging infrastructure, lower electricity costs, and favorable license plate regulations in major cities make BEVs more affordable and accessible in China, driving consumer adoption and supporting industry growth.		
10	German	I do think the Chinese government has an advantage because it doesn't have the same transparency requirements as a democracy. It can decide to support certain industries long-term and commit substantial funds, whereas in a democracy, taxpayers or opposition parties might question the wisdom of such spending, or a change in government could lead to a shift in priorities. In China, that kind of policy continuity is more likely, but it's also less transparent, so companies don't always know what's coming next, even if they're state-owned.	China's government can provide long-term support to industries with more stability and fewer transparency requirements than democracies, but this also leads to uncertainty for companies.		
10	German	In my view, while the Chinese government has created a framework and done what other governments do to support their industries, including securing resources through international agreements, I don't see this as the primary reason for the success of Chinese companies. In the end, a company has to develop a good product. If they manage that and it's a superior product, then that's the achievement of the company, not the government. Sorry for the lengthy response.	The success of Chinese companies, in my view, comes down to their ability to develop superior products, not just government support or resources.		
10	German	However, their disadvantage is that they lack a corrective mechanism. When a government in our system makes a poor decision, or one that voters view as poor, it can be replaced. Perhaps supporting certain industries, like promoting a technology that	The lack of a corrective mechanism in China, where poor decisions can't be easily overturned through electoral processes, can be both an advantage and a disadvantage depending on the situation.		

Appendix

		doesn't work out, was indeed a poor choice, and that decision is then corrected. In China, you don't have that corrective mechanism, as there's no electoral change. Whether this is an advantage or disadvantage is up for debate.			
11	German	This was indeed an absolute factor in their strategy. The People's Republic of China operates through Five-Year Plans, starting with the first, second, and third plans as an entry phase. Then, they realized that with conventional combustion technology, they would always be trailing behind the Europeans and Americans, never able to fully catch up. At some point, they decided to shift their focus, exploring alternative propulsion systems and specifically concentrating on new energy vehicles, with a particular emphasis on electric power.	China's strategy shifted with the realization that they would always lag behind Europe and the U.S. in conventional combustion technology. Through their Five-Year Plans, they refocused on alternative propulsion systems, prioritizing new energy vehicles, especially electric power, to leapfrog traditional automotive development.		
11	German	Then something happens: the government establishes 45 strategic initiatives, integrating them into its master plan. An example of such a master plan? About 12 years ago, they set a goal to build 50 new nuclear power plants, distributed across various provinces—clear plan. Five years later, another 50 were added, and these are actually built; no one can back out. It was similar for electric vehicles: each province was directed to focus on the development of EVs, not only for passenger cars but also for buses, agricultural machinery, excavators, and other large construction equipment. And they all got to work.	The Chinese government set clear strategic goals, like building 50 nuclear power plants and promoting electric vehicles across multiple sectors. Provinces were directed to focus on these initiatives, ensuring widespread commitment and implementation.		
11	German	And they all received funding from a central pool. Those who applied and committed to the development automatically got money from this decentralized fund, providing them with sufficient start-up capital. Whenever there were supply issues, they received more funding. So, these initiatives were heavily supported financially by the provinces. You could even compare it to a kind of competition, like a league—Province A competing with Province B, C against D, and so on. Who performs better, and who delivers results?	The Chinese government provided financial support through a centralized fund, with provinces receiving funding for their initiatives based on commitment and performance. This created a competitive environment, where provinces vied against each other to deliver results and overcome challenges, ensuring progress across various sectors.		
11	German	And at the end of the year, they must present impressive results to showcase what they have achieved, again with the emphasis on not losing face. The provinces played a massive role in this, but it's also a problem today. There are now over 200 registered NEV brands, many of which will either disappear partially or entirely. They won't all survive.	At the end of each year, provinces must present strong results to avoid losing face, playing a crucial role in driving progress. However, this has led to over 200 registered NEV brands in China, many of which will not survive as the market consolidates.		
11	German	And then there's another crucial factor: if I want to register a car in the city, I need a license plate. For a combustion engine vehicle, the current wait time for a license plate is 10 years from application to allocation. For an EV, until 5 or 6 years ago, the wait was only 2 months; now it's also around 2 years, but still significantly shorter than for a combustion vehicle. So, simply being allowed to register my car and drive it on the road is the main limiting factor.	The shorter wait time for EV license plates—around 2 years compared to up to 10 years for combustion vehicles—has been a major factor in the rapid growth of EVs in China.		

Appendix

		This is a major reason why EVs are advancing so rapidly today.			
12	German	Yes, actually for everything. Definitely, the government plays a very strong role. One huge asset of the Chinese approach, from my perspective, is their long-term strategy. Unlike the two largest Western countries, which tend to change direction every few years, China has had consistency. It's intense, and at the same time, they have incredibly talented people working on it—it's been very cleverly done. So, the long-term strategy is in place, and it has helped immensely because the conditions for success have been created. For example, the joint venture requirement, which existed for decades. Even though it's no longer in place, it's still not so easy to take over the majority; you still need the government's approval. Additionally, there are frameworks like subsidies that support the entire system.	China's long-term strategy, supported by the government, has created stable conditions for success. Consistency, talented individuals, and frameworks like joint ventures and subsidies have been key to their approach.		
12	German	In my view, there was an early realization that Chinese manufacturers would probably not be able to fully catch up with the Western companies in terms of combustion engines. So, if you can't catch up, you think about how you can transform the industry instead. And that quickly brings us to the topic of zero emissions—battery electric, but also increasingly hydrogen fuel cells.	Unable to fully catch up in combustion engines, Chinese manufacturers focused on transforming the industry with a shift to zero emissions, including electric and hydrogen fuel cell vehicles.		
13		Over the nine years I have been here, I have observed the development of regulations as part of a vast, holistic framework. The Chinese government operates with a long-term agenda, planning up to 2049 and beyond. Using this roadmap, they have refined the system into a tightly woven regulatory network. For example, the Dual Credit Policy and other measures either force manufacturers to increase the share of BEVs in the market or provide incentives, support, and investment for OEMs and research. It is a comprehensive system where the government has set a clear goal and built everything around it.	The Chinese government plans very long-term oriented and has implemented a stable, holistic system of measures, supporting the BEV industry.		
13		In key positions, China has placed, or previously had, experts who deeply understand the field. For instance, former Minister of Science Wang Gang studied in Braunschweig, Germany, about 25–30 years ago and completed a PhD on electric vehicles—long before their importance was evident. He worked at Audi and VW, speaks fluent German, and thoroughly understands the subject. As a minister, he was the visionary behind setting up this system, working with ministries and authorities. Although now retired, he remains active, frequently seen at conferences, and was once the Dean of Vehicle Engineering at Tongji University. It is hard to imagine a more competent person for the role, knowing exactly what is needed and what to regulate to ensure success. This is part of the system: placing experts in key positions, driving political decisions with a long-term agenda, and building a comprehensive framework. It's not just about regulations and laws	A central factor of success is that Chinese ministers are usually highly skilled and experts in their areas of influence.		

Appendix

		but also other supporting measures, which contribute significantly to the overall success.			
13		In Beijing, you cannot drive a combustion vehicle in the city every day, and obtaining a license plate requires participating in a lottery. If you're lucky, you might get one after 15 years. You cannot simply buy and register a car here. Even for electric vehicles, there is no lottery system, but the waiting time for a license plate is now nearly 10 years. This means that the probability of obtaining a license plate in Beijing is significantly higher for an electric vehicle, a plug-in hybrid, or a range extender. Other cities have different systems, but the chances of owning a car are generally higher with an electric vehicle. These are entirely different mechanisms—not financial incentives but, in a way, indirect encouragement, because without a license plate, buying a car is not an option. This is just one example among many similar measures.	Non-financial incentives like license plate restrictions are very effective with Chinese consumers in the transition to BEVs.		
1	German	To a certain extent, European OEMs have overslept the development towards electromobility. The automotive lobby should have exerted influence on political guidelines from Brussels earlier so as not to lag behind the Chinese in terms of development.	The European automotive lobby has realized the trend towards BEVs too late and should have taken active influence on policies.	CL3.2: Differences and Fairness of Chinese Policies	Expert 5 underscores that China functions as a unified entity with a vast population, which gives rise to more stringent policies than those observed in the EU, where the interests of multiple nations must be harmonized. Furthermore, Experts 8 and 10 highlight the challenge of volatile policies in the West due to the frequent changes in government, in contrast to the non-pluralistic system in China where a more long-term oriented approach to industrial policy can be pursued. A further key distinction between China and the West is the nature of the incentives offered to OEMs, according to Expert 3. In the West, regulatory restrictions were the primary driver, with lower financial support. This re-
3	German	So, I don't see anything unfair about it initially, because if a country decides not to allocate its resources to pensions or social projects, but instead invests them in an industry they believe will create substantial, long-term prosperity—especially since the rest of the world isn't moving as quickly—then it's not unfair; it's actually quite fair. They are simply better positioned in terms of their government structure and perhaps also ministerial organization than many other countries.	The government policies were not unfair as a state can decide to invest in an industry that they believe will create long-term prosperity. It just shows that the government was better positioned.		
3	German	A huge advantage in China is that the ministers are experts in their fields, having received strong education and training in their respective areas. This is not always the case in Europe, which is a major point of criticism. Decisions in China are usually more long-term oriented and strategically sound.	Chinese ministers can take better decisions as they are experts in their fields in comparison to those in Europe.		
3	German	Western customers traditionally have very high expectations. To meet this demand, you need to invest two generations into battery vehicles upfront. However, if these vehicles don't sell, it's billions down the drain. At the same time, if you're expected to push a vehicle into the market solely through regulatory measures, as is happening in Europe, but without subsidies, you end up losing significantly on each vehicle. For publicly listed companies, this simply isn't sustainable. This is the system difference.	Western companies were mainly incentivized through non-financial regulatory measures which is not appropriate as they lost money on each car. This is a central difference to China.		
3	German	The aspect that I find somewhat unfair plays out on a different level. What's unfair is that if you, as a European, want to enter the Chinese market and truly serve it, you're often pushed to do so through local ventures. If you choose to export instead, you face very high	Actually unfair was that Western companies needed to enter the Chinese market through ventures due to regulations.		

Appendix

		taxes unless you produce locally.			
3	German	It's unprofessional in Europe to have believed that a charging infrastructure could magically establish itself while simply observing from a political standpoint. I find it foolish to think that everything in Europe can be managed through regulatory prohibitions. This approach just doesn't work in an international context anymore.	Europe has missed to timely invest in charging infrastructure. It was naive to think that BEVs can be enabled solely through regulatory restrictions.		
2	German	Federal subsidies are often only available to domestic companies—you can access many subsidies, significant funding, and substantial investments only if you're a Chinese company. This has given them an immediate advantage, enabling them to offer lower prices than foreign competitors.	China's government has limited support to domestic firms, giving them a high advantage.		
2	German	Chinese initiatives differ in that they are much more strategic and long-term oriented than those in other countries. In Germany, for instance, there are often short-term measures like the EV subsidy. The Chinese made a strategic decision to shift toward NEVs and then clearly analyzed where they needed to focus their efforts, including securing raw materials, gaining access to expertise, and building the necessary infrastructure.	Chinese efforts are more strategic and long-term oriented compared to other countries.		
5	German	China has a huge advantage in its economic policy by acting as a single country, allowing it to make swift, decisive actions. In Europe, on the other hand, we have to align diverse interests, which often prevents such radical decision-making. While in Germany the automotive lobby is enormous, there are countries like the Netherlands that aren't dependent on it and can therefore make decisions much more quickly.	China can take much more swift and radical policy decisions than Europe as it acts as one country.		
5	German	I don't think it's fair to say that China's government support is unfair. They simply recognized early on that there was a gap to fill with low-cost BEVs and invested extensively to gain a competitive advantage. In the end, it's up to the customer to decide what they want to buy.	China's government support was not unfair - they just acted quickly and stringent.		
9	German	There are certainly aspects of how China has operated that haven't been entirely fair, especially compared to truly free markets like Europe. China's more protectionist economic framework required Western companies to make significant concessions just to access the market.	China's protectionistic approach may be seen as unfair as it forces Western companies to make concessions to access the market.		
9	German	On the other hand, I wouldn't necessarily call subsidies and government support unfair. These are simply tools that a government can use to promote an industry and secure jobs in the long term. We see similar actions in the U.S. with the Inflation Reduction Act.	In general, government support is not unfair, and we see similar approaches in the U.S. with the inflation reduction act.		
7	English	I'm not sure whether the purchasing subsidy has a bias toward different brands, but I believe that in order to qualify for the subsidy, the vehicle must be included on a government-approved list. Once a vehicle is on this list, it becomes eligible for subsidies. I'm not sure about the situation in Europe or the U.S., but I know that Tesla is already on the list in China, which allows them to benefit from the subsidies.	In China, vehicles on an approved list qualify for subsidies, and Tesla is already eligible. The process doesn't seem to favor specific brands.		
					sulted in significant losses for OEMs on each BEV sold. In contrast, China adopted a more comprehensive approach, integrating financial and non-financial policies from the outset. Expert 7 identifies government-owned OEMs as a rather distinctive feature of the Chinese market, noting that such companies receive augmented support for R&D. Furthermore, Expert 6 argues that license plate restrictions are less prevalent in Western countries, yet highly efficacious for consumer uptake. Expert 11 additionally identifies further disadvantageous conditions in the West, including higher energy costs and corporate taxes as government-related differences. In general, the provision of government support for strategically important industries should not be regarded as unfair and is entirely justifiable and common, as stated by a number of experts. It is convenient for Western countries to now express discontent with the policies, having failed to adopt them at an opportune moment, as argued by Expert 6. Nevertheless, Experts 3 and 10 acknowledge that the Chinese government's historically protectionist approach to FDIs

Appendix

7	English	In China, there are indeed many state-owned OEMs, such as FAW and GAC. These companies likely receive some support from the government, particularly in terms of R&D, to foster innovation and maintain their competitiveness.	State-owned OEMs in China, like FAW and GAC, get government support for R&D.		may have been unfair, given the comparatively more open stance of Western markets.
7	English	When it comes to infrastructure development, plate restrictions, or city road restrictions, these are generally applied in a more neutral manner across all OEMs, whether state-owned or private. While there may be some influence or preferential treatment in certain areas, it doesn't seem to create a significant or strict bias that would distort the overall competition within the market.	Infrastructure development and city restrictions are generally applied equally across all OEMs, whether state-owned or private. While there may be some preferential treatment in certain areas, it doesn't significantly distort competition.		
7	English	As I mentioned, electric vehicles are not just about the auto OEMs or the auto manufacturing industry; they're also about China's national resource security strategy. China wants to reduce its reliance on imported oil from other nations, so they aim to transition to a new type of vehicle, one that relies more on renewable energy to some extent. I can imagine that the Chinese government places a strong emphasis on this industry, but I can't draw a conclusion about how the level of support compares between Chinese OEMs and those in other countries.	Electric vehicles are part of China's strategy to reduce oil dependence and shift to renewable energy. The government strongly supports this industry, though it's hard to compare the level of support to other countries without specific data.		
8	German	To the first question, yes, this is part of a long-term, well-thought-out industrial policy that we find in almost no other form of society. Industrial policy as such does not exist everywhere, and in other places, it is subject to different democratic dynamics, whereas there are, of course, different conditions in China. That's why the five-year plans or longer-term industrial policies that China introduces are particularly noteworthy. The long-term transition embedded in these plans, or the shift toward mobility and electromobility for various reasons, includes, for example, reducing dependency on other regions and oil reserves.	China's long-term industrial policy, exemplified by five-year plans, is a unique feature not commonly found in other societies. These plans drive the transition to electromobility, aiming to reduce dependency on foreign regions and oil reserves, and reflect China's distinct political and economic conditions.		
8	German	In the past, all economic regions have tried to use tariffs, comparative advantages, or substitutes to their own benefit. This is fair and happens in all directions. For example, if you open the news and read about \$10 billion subsidies for Intel or other chip manufacturers, it's no different from what China has done elsewhere to attract the automotive industry. This is a completely standard approach.	Countries, including China, use tariffs, comparative advantages, and subsidies to attract industries, similar to the \$10 billion subsidies for Intel, which is a standard global approach.		
8	German	Sometimes it's portrayed as though China has done something that other countries would never use as a tool. But similar measures are used regularly in discussions around various industries, and this perception is fundamentally incorrect.	China is often portrayed as using tools that other countries wouldn't, but similar measures, such as subsidies, are regularly used in discussions around various industries.		
8	German	If you do some research, you'll find similar patterns in the documentation on the rise of the Japanese auto industry, where high tariffs on Western imports were common, or in the case of the Korean industry. These examples also highlight the strength of the domestic market as a different factor. It seems that there's sometimes a black-	The rise of the Japanese and Korean auto industries also involved high tariffs on Western imports. Most countries use tariffs and similar tools, though not always as effectively as China.		

Appendix

		and-white perspective applied here, which isn't appropriate, as virtually all countries use these tools—and do so regularly. Perhaps they don't do it as cleverly, as consistently, with the same planning security, or with the strength of a large domestic market. But on the other hand, assuming that over a billion people would be content with a standard of living far below that of Western nations is also an unrealistic expectation.			
6	English	Yes, I think this depends on the specific situation in each country. For example, I find the vehicle plate control policies in China interesting. It's an idea adapted from countries like Singapore, Japan, or the UK, where similar measures are used to manage traffic. But in China, the rapid growth of major cities has made the issue more pressing, so the government has taken more rigorous actions to control the number of vehicles and plates.	Vehicle plate control policies in China, inspired by countries like Singapore, Japan, and the UK, have become more stringent due to the rapid urbanization and traffic congestion in major cities.		
6	English	In this context, I don't see it as unfair because each country has its unique challenges, and the government is fulfilling its role in managing both the industry and urban infrastructure. Each country might have different policies based on their specific circumstances. For example, I don't know of a comparable policy in Germany, but I'm sure there are other strategies in place there to support local industry. In my view, it's the responsibility of every government to support strategic industries for the future. Some regions, like the EU, may have missed the early shift towards electric vehicles, while China acted quickly, which gave them an advantage. But that advantage doesn't make it unfair.	In my view, each government has a responsibility to support strategic industries based on its unique circumstances, and China's early focus on electric vehicles doesn't make their advantage unfair—it's simply a result of acting quickly while other regions, like the EU, may have missed the initial shift.		
10	German	China's foreign policy approach often involves investing without regard to the governing regime, aiming to gain influence through these investments, as seen with examples like the Hamburg port. While this approach can draw criticism, the U.S. pursues a similar strategy through friendship treaties and security partnerships, such as those in Peru, Chile, and parts of Africa focused on countering extremism. Whether China's mercantilist approach is more effective than the U.S.'s security-oriented strategy is unclear, but democracies face the challenge of not always being able to do business with everyone, which may give China an advantage.	China's foreign policy focuses on investment to gain influence, regardless of the governing regime. While the U.S. uses security partnerships and friendship treaties to secure resources, China's mercantilist approach may offer more flexibility, especially as democracies are constrained with business relationships due to political and social values.		
10	German	You're asking a somewhat ungrateful person here because I'm really not a fan of the theory that the Chinese government is always behind the success of certain Chinese companies. In my view, there are also German companies that receive significant subsidies from the German government, but no one would argue that these companies are only successful because of those subsidies. Governments support their economic centers—what the Chinese have done, especially with joint ventures and subsidies to support their firms, definitely	Government support for domestic industries, including subsidies and protectionism, is common worldwide, not unique to China.		

Appendix

		benefits the local industry. But, honestly, other countries do this too. The U.S. has imposed tariffs on Chinese EVs, and the EU has done the same. So, protectionism and government support aren't unique to China.			
10	German	China is interesting in that, ideologically, it leans towards communism, while also embracing a highly unleashed form of capitalism. How much this combination benefits them, I can't say, as I don't have the expertise for that. But I wouldn't attribute the success of Chinese BEV OEMs solely to government policies or the political system. To me, that's more of a convenient excuse for some companies that perhaps didn't take the competition seriously enough.	China's blend of communism and capitalism is unique, but the success of Chinese BEV OEMs is not solely due to government policies or the political system; it also reflects competitive shortcomings by companies that underestimated the market.		
11	German	Let's put it this way: calling it "unfair" doesn't sit well with me in this context. In a country where we earned a lot of money over many years, you have to earn market access and play by their rules if you want to profit there. So, complaining doesn't seem appropriate to me. The fact is, we made money hand over fist for 20 years, and now we're facing complete disruption. We're essentially being left behind and starting to complain. I recently saw a statement from a German entrepreneur who invested in a software company in China. He said that complaining is pointless; we simply need to start working hard and get better.	Rather than calling it "unfair," it's important to acknowledge that market access in China must be earned by playing by their rules. For years, Western companies profited greatly, but now, facing disruption, some are starting to complain. A German entrepreneur recently emphasized that complaining is useless—it's time to work harder and improve.		
11	German	You can also look at the USA or Europe, where there are certainly examples of protecting industries and implementing respective measures for investments from other continents. So, I don't think much of the complaint that the government is favoring their companies. On the other hand, there are indeed points worth addressing, and our own policymakers should have responses. That brings us back to politics. How can they create solutions within these kinds of tendencies and complex situations that also enable our products to remain competitive? Consider the issue of energy—without going into detail, energy costs, corporate taxation in Germany, and so on are now very high. These are factors that, in the long run, don't benefit our country.	While it's common for countries to protect their industries, the issue lies in how policymakers respond to the challenges posed by such dynamics. Energy costs, high corporate taxes, and other factors in Germany create challenges for competitiveness. These issues need to be addressed by our policymakers to ensure that our products can remain competitive in the long term.		
12	German	At the end of the day, I can't answer that and don't necessarily want to, because what is fair? Fair is always a subjective or cultural perspective, and I believe you'll find a lot of people in the Western world who will say it's absolutely unfair. I mean, look at the tariffs imposed by the European Union, for example.	The concept of fairness is subjective and culturally influenced. While many in the Western world may view certain actions as unfair, it's important to recognize that fairness varies depending on perspective.		
12	German	The U.S. will likely soon play a much larger role in China, and no one would call that unfair. Maybe someone will say it's unfair that Western OEMs have made so much money over the past years and taken so much out of the country. That's the challenge. I believe it's probably something you'd have to look into with WTO regulations, espe-	The concept of fairness is subjective and depends on perspective. While some may view the profits Western OEMs made in China as unfair, others may argue that it is part of the natural course of business. The long-term strategy behind such moves is of-		

Appendix

		cially since China is a member, to understand what is fair and what is unfair. It might be argued that some aspects are unfair, but I don't know. Personally, I would say that the concept of "fair" can be answered with "yes" or "no," depending on the perspective you have. Is it a long-term smart move? That's definitely the case—hats off.	ten smart, even if some aspects may be considered unfair from certain viewpoints.		
13		This system in China is indeed tightly woven, whereas in Europe, regulations tend to be more sporadic, with measures introduced at certain points and often withdrawn a few years later. However, China's government is also very flexible; if they realize an idea they implemented is not working, they are quick to adjust or change it.	The main difference to other countries is that their regulations tend to be more sporadic and not as long-term oriented compared to those in China.		
1	German	Yes well, in the end the companies are all still controlled by the government, even if they seem so independent on the outside, so the party plays a big role in BYD and others, so they are implanted there and they set the direction, so that's how I see it and I believe that it will stay that way as long as, let's say, China has such a form to rule the country, right?	The Chinese BEV industry is still heavily reliant on the government as the party plays a central role in setting the strategic direction.	CL3.3: Industry Independence in the Present	Most experts see the Chinese BEV sector still reliant on some form of support from the government as the majority of BEV OEMs operate at a loss. It is likely that bankruptcies and consolidations will occur in the near future, but the party leadership will prevent widespread failures across the industry, according to Expert 3. On the other hand, several interviewees, including Expert 7, 4, and 11, bring up a reduction in financial incentives with the increased maturity of the market. However, Experts 1 and 4 mention that the state maintains a presence in numerous OEMs, establishing the long-term strategic trajectory for their operations. Expert 10 stresses that OEMs are also often driven by the fear of being excluded from the market if not achieving government-set goals. On the demand side, Expert 7 emphasizes that cus-
3	German	I believe financial incentives will remain relevant in the future. Many Chinese OEMs are operating at a loss, and there will be many bankruptcies. However, the Chinese government will also provide support to prevent widespread failures across the industry.	Financial incentives will remain relevant in the future in addition to the "Dual-Credits" system, also to prevent bankruptcies on a broad scale in China.		
3	German	The "Dual Credit System" is very effective when combined with financial incentives, and it somewhat resembles the European fleet emissions system. However, what's key is that China initially created scale in the electric vehicle market through incentives, enabling OEMs to now be better positioned to meet the quotas of the regulatory system. On the other hand, manufacturers in the West were largely left to manage on their own.	The "Dual-Credits" system is effective in combination with financial measures as the Chinese government has supported OEMs achieving a high scale in BEVs, while Western OEMs were mostly left to manage on their own.		
2	German	In China, we're definitely beyond the phase of financial purchase subsidies; these have been reduced or eliminated, partly because the Chinese also see the risk posed by import tariffs. They clearly also want to move away from a price war—competing mainly on price—which was also driven by subsidies.	China moves away from financial subsidies to reduce mainly price-based competition and the risk of further import tariffs.		
2	German	The dual credits system has certainly had a positive impact on the industry. Since certificates can be traded within this system, indirect financial effects can also be achieved. Some OEMs generate a significant portion of their revenue through these trades.	The dual credits system is effective, also because it provides a financial incentive through trading of certificates.		
9	German	As companies move up the value chain, they tend to become more profitable. For instance, BYD and CATL have established themselves as major players in battery technology. These companies have grown significantly and are likely no longer dependent on government support.	Companies higher up in the value chain are not dependent anymore on the Chinese government.		
9	German	On the other hand, many OEMs are still not profitable. The Chinese government	We can expect a consolidation in the Chinese BEV mar-		

Appendix

		is now focusing on topics beyond electric mobility and is reducing financial incentives. Therefore, I believe that there will be a market consolidation, from which a few strong companies will emerge.	ket with the government reducing financial support.		tomers nowadays prefer electric vehicles, even without direct purchasing subsidies.
7	English	As mentioned before, in the beginning, there were significant direct purchasing subsidies, but these subsidies have been decreasing year by year. Now, they have become quite marginal in terms of their impact on the overall price. Chinese consumers have become accustomed to electric vehicles, and they are now more willing to purchase them even without government subsidies.	Initially, direct purchasing subsidies were significant, but they have gradually decreased and now have a marginal impact on price. Chinese consumers have become accustomed to electric vehicles and are now more willing to buy them without subsidies.		Most experts consider the "Dual-Credits-System" to be an efficacious regulatory measure that will further motivate OEMs to prioritize electric vehicles.
7	English	Yeah, I think the industry doesn't heavily rely on government support today. Even without certain government incentives, consumers would still purchase electric vehicles. As I mentioned, in some higher-tier cities, the electric vehicle already has a better role, such as the favorable policies. However, the electric vehicle is also penetrating into Tier 3 and Tier 4 cities. Customers are becoming more aware of the benefits of electric vehicles, and this awareness is helping drive adoption.	The Chinese EV industry shows reduced dependence on government incentives, with consumer demand for EVs remaining strong even without specific policy support. EV adoption is growing not only in higher-tier cities, where favorable policies may enhance uptake, but also increasingly in Tier 3 and Tier 4 cities, driven by rising consumer awareness of the benefits of EVs.		Furthermore, the trading of credits provides an indirect financial incentive, as mentioned by Expert 2. Some experts hypothesize that this quota system can replace financial incentives, also having China's fear of further trade restrictions in mind. Expert 3, however, notes that it is only effective in combination with financial support as the majority of Chinese OEMs is still not financially independent. Expert 10 highlights that companies situated further upstream in the value chain, such as CATL, are not reliant on government assistance and already characterized by high profitability today.
7	English	So, I can imagine the market has already shifted from being policy-driven to a more consumer-driven market now. While the policy is still there, it is no longer the major driver.	The Chinese EV market has shifted from policy-driven to increasingly consumer-driven, with consumer demand now playing a greater role than policy incentives.		
7	English	Overall, the market is highly competitive, both in terms of product offerings and pricing. This intense competition makes it difficult for some Chinese OEMs to generate profit, but it benefits customers by offering more choices and better prices. So, I would say the market is now driven more by supply-side factors and technological advancements rather than by government policies.	The Chinese EV market's intense competition and focus on innovation drive supply and benefit consumers with more choices and better prices, shifting away from policy reliance.		
7	English	As you mentioned regarding the dual credits, I think it is still a valid policy. The purpose of the dual credit system is to stimulate OEMs to transition from ICE vehicles to BEVs by providing credits for producing electric vehicles. These credits help offset the credits OEMs would normally get from ICE vehicles.	The dual credit policy remains effective, incentivizing OEMs to shift from ICE vehicles to BEVs by awarding credits for EV production, which offsets ICE-related credits.		
7	English	So, I think the dual credits are not much of a challenge for most OEMs now because the electric vehicle penetration rate is already high enough to meet the requirements of the dual credit system. A few years ago, some OEMs were still struggling to accumulate enough credits from their BEVs, but now it's less of an issue. I think the overall price of the credits is decreasing recently because the supply is already sufficient now.	The dual credit system is now less challenging for most OEMs, as high EV penetration rates allow them to meet credit requirements more easily. This increased supply of credits has recently led to a decrease in their overall price.		
8	German	Yes, exactly. What many overlook from a consumer perspective is that they focus on direct purchase subsidies and think that's everything, but that's absolutely not the case. The more significant instrument, particularly in the European context, is the CO2 penalties and the ever-lowering CO2 thresholds that trigger these prohibitively high penalties.	Many consumers overlook that CO2 penalties and lowering CO2 thresholds, rather than direct purchase subsidies, are the key drivers for OEMs in Europe. These penalties compel manufacturers to bring more zero-emission		

Appendix

		This is what really drives OEMs. Next year, the threshold will be lowered again, making it increasingly challenging for manufacturers to bring a higher percentage of zero-emission vehicles to market. Currently, the only viable technology for zero-emission vehicles is battery electric. So, they are essentially compelled to bring these vehicles to market due to CO2 penalties.	vehicles to market, with battery electric vehicles being the only viable option to meet these increasingly stringent requirements.		
8	German	The subsidies that are passed on to customers act as an additional instrument that helps, especially because the sticker price of a battery electric vehicle is still not on par with that of an internal combustion engine vehicle.	Subsidies for customers serve as an additional tool to help, especially since the sticker price of a battery electric vehicle is still higher than that of an internal combustion engine vehicle.		
8	German	At some point, this technology will be mature enough and demand will be strong enough that subsidies won't be necessary anymore. But right now, we're in a transition period. What I think most people overlook—and why, in my view, their perspective seems so skewed—is that, having grown up with internal combustion engines for generations, we rarely even question what we're actually doing. If you start to think about it, you might begin to see things more clearly.	As battery electric vehicles mature and demand grows, subsidies will become unnecessary. Currently, we are in a transition period, and many overlook this shift due to the long history of internal combustion engines. Reflecting on this can provide clarity.		
4	German	Yes and no. There are definitely some players who have become quite independent. However, as soon as you do business in China, you're always somewhat reliant on what the government does. The government could theoretically decide that they no longer need to provide strong incentives for the automotive industry, or they could implement stricter regulations—essentially, any government could do this. But I'd say these companies are now much more robust; they're global players today. For instance, since I've been back in Germany, I've noticed an increasing presence of Chinese cars on the roads, like MG, Nio, or BYD, which are actively marketing here. This indicates that they're much stronger than they were 5 to 8 years ago, and they don't rely as heavily on direct financial support or subsidies from the government. However, as a Chinese company, you're always somewhat dependent on the direction set by the government and industrial policy. So, while they're less reliant on direct government funding, they're still influenced by the broader industrial policy and the government's strategic direction.	While Chinese automakers have become more independent and robust, especially as global players like MG, Nio, and BYD increasingly market in Europe, they remain influenced by government industrial policy and strategic direction, even if they are less reliant on direct subsidies or financial support.		
6	English	I think the Chinese BEV industry is already in a strong position and developing well. However, it may still benefit from short-term local protection, especially given that, while the supply chain has advanced in the middle- and low-end segments, China still has weaknesses in high-end or core technologies for BEVs. So, some level of support may still be beneficial for the next few years—perhaps around five years or so—to allow the industry to fully catch up in these areas.	The Chinese BEV industry is strong, but short-term local protection may still be useful for the next five years to help address weaknesses in high-end or core technologies, allowing the industry to fully catch up in these areas.		
10	German	I think that in China, it's less about chasing subsidies and more about the	In China, the driving force behind local manufacturers		

Appendix

		fear of being removed from the market. This fear isn't just limited to the automotive sector; it spans many product areas. There are rumored efforts by the government to increase the local Chinese content in products. As a Chinese manufacturer, I would be more afraid that the government, given the lack of a corrective mechanism, could one day say, "90% of your vehicle components are of Western origin, so you're no longer allowed to produce it." And if you have a problem with that, there's no way to contest it. If the CCP says you can't build that vehicle, then you won't be able to build it. So, I think it's not so much about chasing subsidies but rather about the fear of potential government sanctions.	isn't just subsidies, but the fear of government sanctions or being excluded from the market, especially if too much foreign content is used in products.		
10	German	What I find interesting about the Chinese market is that, from a historical perspective, it's somewhat like Germany in the 1920s to 1940s. Back then, the automotive industry was made up of many small manufacturers; it wasn't just BMW, VW, and Daimler. Audi, for example, literally means "Auto Union," representing the many small companies producing cars back then. Then came a wave of consolidation, and these small firms were absorbed by larger players like VW, Daimler, and BMW. VW is a prime example, with brands like Bentley, Porsche, and Audi—formerly independent—now integrated into the VW empire.	The Chinese automotive market mirrors Germany's early industry history, where many small manufacturers existed before consolidation led to larger players dominating, similar to how brands like Audi, Porsche, and Bentley became part of the VW group.		
10	German	According to a successful auto manager I once spoke with, he expects a similar consolidation wave in China, driven by the reduction in subsidies and the fear of government sanctions. Eventually, this will lead to a "Chinese Daimler," "Chinese Volkswagen," or "Chinese BMW." When that happens, it could be quite dangerous for existing global players, as these large, consolidated Chinese firms would have significant IP, established brands, and the capacity to compete with us on a global level—even more so than they already do. The real concern would be for the real BMW when a consolidated Chinese BMW emerges.	A successful auto manager predicted that China will experience a consolidation wave, eventually leading to a "Chinese Daimler" or "Chinese BMW," which could pose a significant challenge to global players, as these large, consolidated firms would have strong IP, established brands, and the capacity to compete on a global scale.		
11	German	The Dual Credit System was originally created to help the environment, not to serve as a funding mechanism for industrial companies. It was meant to provide an incentive to invest in clean energy. I don't think this issue is exclusive to vehicles, even though everyone is shifting toward electric vehicles. It's foreseeable that combustion engines might phase out—even though I'm a big fan of diesel. Therefore, this Dual Credit issue is a temporary measure. For me, it doesn't make a significant difference in the long run.	The Dual Credit System was designed to incentivize clean energy investment, not to fund industries. While it supports the shift to EVs, it's a temporary measure and won't significantly impact the long term.		
13		That may be true, but it is worth noting that the Dual Credit System is not a major issue for any company. Even if the transition to electromobility is lagging behind expectations for us and other Western OEMs, it does not pose a problem. The Chinese government does not differentiate where the credits come	The "Dual-Credits" system is effective and may be a replacement for financial incentives. However, at current regulations, it is not a major challenge for OEMs to achieve the credits demanded.		

Appendix

		from, and the trading system allows Western OEMs to acquire surplus credits generated by companies like Tesla or Chinese OEMs at a relatively low cost. While this may not be ideal for the reputation or image of Western OEMs, it does not threaten profitability, as the credits needed to meet market requirements can be obtained inexpensively. The system is functional and effective, but the abundance of credits available, especially from Tesla and Chinese OEMs, makes it less of a critical challenge.			
13		You are correct that these incentives, at least in their current form, will decrease or disappear entirely within the next one to two years. However, they have primarily been limited to vehicles in the entry-level price range. For the vehicles that are currently very successful, such as those from Li Auto and NIO, the incentives have already been minimal and will soon be nonexistent, as these models are in a higher price segment.	Financial incentives in China will decrease in the next years. However, they were only relevant for lower-priced vehicles anyways lately.		
1	German	The restrictions or sanctions or tariffs, for me that's just, let's say, a temporary solution, the power that China has in the world at the moment, they will certainly prevail or find other ways to somehow circumvent these tariffs or penalties that are being introduced.	Chinese OEMs will find ways to circumvent tariffs introduced by Europe and the USA.	CL3.4: Protectionist Measures in the West	Expert 3 views trade tariffs imposed by Western countries as a legitimate instrument for ensuring fair prices of imports from China, safeguarding their domestic industries and value chains. This is analogous to the approach previously adopted by China in the nascent stages of the domestic automotive industry. Experts 5 and 7 add that Chinese OEMs can still operate at a sufficiently profitable level. It is crucial to acknowledge the indispensable role of Chinese competition at fair prices, as emphasized by Experts 3 and 6, in driving innovation and scaling up infrastructure in the West. Moreover, they condemn the more protectionist strategies that have been proposed in EU politics. This hypothesis is supported by Experts 1 and 2, who argue that
1	German	They are already looking for production capacities in Europe, so if they do, it might be a few years and now that so much capacity is being freed up in Europe, plants are being closed and sold by the existing European car manufacturers. If that fits, they would strike there, I mean, and there are a lot of things up for sale in the near future, be it Ford, VW or Audi.	Chinese OEMs will invest in production capacities in western countries to prevent tariffs.		
1	German	All right, so I'll say it's that ping pong game again. If with the tariffs, I don't think much of them because they only work in the short term, we just have to give the right answer. Why are Chinese cars simply cheaper and that we increase our productivity here again in order to compete, because I don't care what you call it with subsidies and tariffs, that has never worked in the long term and we have the best example in Germany with the subsidies for electric vehicles.	Tariffs are not sustainably supporting the ability of western countries to compete, it will be an ongoing fight. Western OEMs need to improve productivity.		
3	German	I find it entirely legitimate for countries like the U.S., the EU, or even Latin American nations to consider what fair import tariffs should be. It's not about import protection per se, but rather about setting import tariffs at levels that allow a country to protect its own industry and value chain, just as China has done. In this context, everything follows the usual trade flows and trade policies, which I find entirely logical and normal.	Import tariffs are appropriate to protect the local industries, very similar to what China has done in the past.		
3	German	I believe it's right not to completely close off one's own industry through import restrictions. It's actually a professional approach to handling this. I think competition at fair prices can also accelerate innovation within our own	Chinese imports at fair prices are important for innovation pressure in our local industry and can support scaling infrastructure.		

Appendix

		markets and the more BEVs we have on our streets, the better the infrastructure will be developed.			trade restrictions are not a viable long-term strategy for fostering Western competitiveness.
3	German	I see a trend where Chinese OEMs are analyzing the most cost-effective ways to bring vehicles to Europe and the U.S. in terms of value creation, in order to meet export quotas set by the Chinese government. Naturally, they are also considering local contract manufacturing to reduce or bypass tariffs.	Chinese OEMs are considering local contract manufacturing to reduce implied tariffs by the EU and U.S.		
3	German	It's admittedly a bit unfortunate that products like BMW's Mini or Mercedes' Smart are now effectively only produced in China and are therefore fully subject to import tariffs in the West. This clearly calls for the development of new value creation structures.	Also Western OEMs are subject to the tariffs and consequently forced to re-think their value chains.		Conversely, a considerable number of experts have identified the potential risks associated with the imposition of trade tariffs. For example, Expert 2 has expressed concern that the prices of input materials from China may increase in response to such measures. Additionally, Experts 4, 5, 8, and 12 highlight the potential for retaliatory measures to impact other sectors where Western countries rely on exports to China. Moreover, Expert 8 highlights the detrimental impact of heightened trade restrictions on global prosperity and security. Lastly, several Western OEMs are required to rethink their value chains, given that some models are exclusively manufactured in China and are, therefore, susceptible to the repercussions of trade tariffs, as per Experts 3 and 7.
2	German	Tariffs are typically a last resort against superior industries from other countries. In the short term, they can be the right tool, but in the long term, we need to think about how to become competitive again in terms of products and prices. If we impose tariffs on BEVs, China could respond by raising raw material prices in the future, as we are dependent on them for those resources.	Tariffs are not a suitable tool to become competitive in the long term. Also, there is a risk of China increasing raw material prices.		
5	German	I see such import tariffs usually very critical. It is normally a form of protectionism for a struggling industry. We have to keep in mind that Germany is an export nation in general, far beyond the automotive industry. Reactions from China could have significant impacts.	Import tariffs pose a significant risk to other sectors too in case of a Chinese reaction as Western economies depend on exports.		
5	German	I also talked to representatives of Chinese OEMs and their reaction to the tariffs was that they will just swallow them but won't get distracted from their strategic course.	Chinese OEMs can still operate profitable, even with the tariffs.		
9	German	I'm actually not a fan of such measures, like what Trump is planning now. It's a tool that can be used selectively, but I believe we tend to harm ourselves in the process.	Trade tariffs pose a risk to Western countries.		
7	English	I think it's quite natural for European or U.S. governments to increase the tariff, as I mentioned. If you want to stimulate a certain industry in your country, you need to leverage some tools to do that. So, I think it's quite natural.	Increasing tariffs is a natural approach for European or U.S. governments aiming to stimulate domestic industries by leveraging protective economic tools.		
7	English	So I would say, but I think that even in Europe, you know, the tariff has increased from 10% to 30%. In my mind, even with the tariff, Chinese products can still, I wouldn't say have a super advantage in price, but they are still competitive in certain ways. So yes, in my mind, I think the price gap between European models and Chinese models could reach 30% to 50%.	Even with recent tariff increases in Europe from 10% to 30%, Chinese EVs remain competitive, with price differences between European and Chinese models still reaching 30% to 50%.		
7	English	There is a huge price gap, so I think the increasing tariffs could definitely have some negative impacts on the Chinese models. But as I mentioned, Chinese models still have an advantage in terms of technology, including the smart cockpit and very fancy digitalization functions. So, I think Chinese products are still competitive to some extent.	The increased tariffs may negatively impact Chinese EV models, yet they remain competitive due to technological advantages, such as advanced smart cockpit features and sophisticated digitalization.		
7	English	Yeah, so in general, I can't imagine whether the European or U.S. governments have other tools to protect their industries. I wouldn't necessarily say it's	Using tariffs as a protective measure is a common and natural approach for European and U.S. governments,		

Appendix

		the most appropriate tool, but it's quite natural for them to do that. So, yeah, it's a common and natural approach, I think.	though it may not be the most ideal tool for supporting domestic industries.		
7	English	I don't see any reaction from the Chinese government to that. Even in Europe, not every country shares the same view on tariffs. For example, in Germany, many German OEMs still have significant investments in China. Therefore, the German government may be more cautious and less aggressive when it comes to implementing tariff actions.	The Chinese government has shown little response to increased tariffs, and in Europe, opinions on tariffs vary. For instance, Germany, with substantial OEM investments in China, may approach tariff measures more cautiously than other countries.		
7	English	Yes, I believe that the fear of potential retaliatory tariffs or restrictions on European OEMs in China may make the German government more cautious in implementing aggressive tariff policies. However, I don't see any immediate response from the Chinese government at the moment. That said, I do think Chinese OEMs could become more aggressive in establishing local production in Europe in the future, especially if they want to achieve their ambitious targets in the European market. That's my perspective on this topic.	Fear of retaliatory tariffs likely makes Germany cautious with tariff policies. Chinese OEMs may increase local production in Europe to achieve their market goals.		
8	German	Whenever, as has been seen in the past, a country imposes tariffs to penalize imports while heavily benefiting from exports, there has often been a countermeasure in the form of tariffs or other means to balance this out.	When a country imposes tariffs to penalize imports while benefiting from exports, countermeasures such as retaliatory tariffs are often implemented to restore balance.		
8	German	I believe that, fundamentally, global development shows that global trade and exchange have been able to increase prosperity on all sides, and that's the core aim. The more prosperity and growth there is, the less tension we experience. Less tension means fewer conflicts, and therefore, overall, this is a positive direction. Moving towards more tariffs, barriers, and protectionism is not a good development—not only economically but also socially and, beyond that, in terms of security. In absolute terms, this trend towards protectionism is fundamentally not a positive development.	Global trade and exchange have increased prosperity, reducing tension and conflicts, which is a positive direction. Moving towards more tariffs, barriers, and protectionism is not beneficial economically, socially, or in terms of security, and this trend is fundamentally negative.		
8	German	In the end, this is also a multilateral negotiation process, and we'll have to see where it ultimately leads. Tariffs are being reintroduced now—something that had long been reduced. But these measures have always existed in some form, and perhaps they are simply recalibrating to a different level. What I want to emphasize is that it sometimes seems as though we're introducing something entirely new, when in reality, such measures have always been present. That they are increasing is not beneficial for society, but we'll see where things actually head in the coming years.	Tariffs are being reintroduced, but such measures have always existed in some form. Their increase isn't beneficial for society, and the future direction remains uncertain.		
4	German	No, I think it was simply very smart. I've followed the EU's anti-subsidy investigation closely and often couldn't see much difference between what China has done and what we do here. After all, we also have purchase incentives, bailout packages, short-time work programs, and all sorts of subsidies. I understand the motivation to protect the domestic market in Europe, especially	China's innovation strategy, including subsidies and competitive pricing, mirrors many of the support mechanisms seen in Europe, and while fairness debates may persist, if it successfully strengthens their automotive industry, it will have been a highly effective approach. The challenge		

Appendix

		given the extreme price competition in China, which we can't keep up with. That's understandable, but it's simply China's innovation strategy. Theoretically, we could do the same. The anti-subsidy investigation, which is a precursor to an anti-dumping investigation, aims to counteract practices where industries are targeted with below-market prices to drive them out. I understand the argument, but I think it's within their rights and, ultimately, fair. There's an ongoing debate in Europe about what's fair and unfair, which I can confirm as valid from a European perspective. But fairness is seen differently in China; it's a philosophical question of worldview, and I'd rather not judge it. If China's innovation strategy succeeds in making their automotive industry highly competitive, and hypothetically, if it "outcompetes" the European automotive industry, then it will have been an incredibly successful strategy, regardless of fairness debates. Protecting our market is a fair response, but it comes with potential costs—like reduced market access for European automakers in China or a potential loss of consumer access to affordable Chinese EVs. In the end, this is a political question with no absolute right or wrong. The situation exists, and the real question is how we handle it. There's no straightforward answer.	for Europe lies in navigating this competition, balancing market protection with the risk of reduced access to affordable Chinese EVs and potential retaliatory measures. Ultimately, how this situation is handled is a complex political question with no clear-cut answers.		
4	German	However, I do believe tensions could escalate. The relationship between China and the West hasn't been this strained in decades, and that's concerning. The more the West isolates itself, the more China will likely do the same. At this point, they're capable of sustaining many industries independently. Short and medium-term, it seems likely that we'll see more decoupling or "de-risking," as countries shift to self-reliance—a trend that was underscored by events like the Ukraine conflict.	Tensions between China and the West are likely to rise, driven by a shift toward self-reliance and "de-risking" post-Ukraine conflict.		
4	German	Personally, I see this decoupling as risky for everyone involved. We're better off as a global community when we work together, and that's not just philosophy; it's reality. For instance, China can produce solar panels more cost-effectively than Germany. While there might be value in protecting German production, the overall economic efficiency is diminished when everyone tries to do everything themselves. The trend toward isolation might ease at some point, but it's hard to say when or how. The upcoming U.S. elections in November will also play a big role, as will China's economic trajectory.	Decoupling could be risky for everyone, as global cooperation benefits economic efficiency.		
6	English	In my view, tariffs are generally a form of protection for local industries, and they can be beneficial in the short term if there are temporary issues and more time is needed to strengthen local infrastructure. In that case, they can offer a buffer to allow local businesses to become competitive internationally. However, if the tariffs are set too high or remain in place for too long, they can	In my view, tariffs can be useful in the short term to protect local industries and allow them time to strengthen, but if they're too high or prolonged, they can hurt competitiveness and innovation in the long run.		

Appendix

		negatively impact the local industry's competitiveness and innovation.			
6	English	Regarding China's potential response to tariffs, it's likely that if the Chinese government sees these measures as unreasonable or significantly damaging to their industry, they would consider responding. While it's challenging to predict specific actions, China has so far remained relatively calm, responding in measured ways rather than escalating tensions. However, if tariffs continue to escalate or have a significant impact on China's industry, we could expect a stronger reaction from their government.	If tariffs continue to escalate or significantly impact China's industry, we could expect a measured but potentially stronger response from the Chinese government, though they've remained relatively calm so far.		
10	German	I don't really have an opinion on that. It's simply a trade restriction measure intended to make a competing product more expensive, which initially benefits the domestic industry by giving it a price advantage. There may also be countermeasures in response. Whether this will ultimately lead to a net positive for us, I'm not sure—I honestly don't have enough experience to judge that.	Trade restrictions provide a temporary price advantage to domestic industries. However, it's unclear whether this will result in a net positive, as the long-term effects depend on various factors and countermeasures.		
11	German	Yes, let's put it this way: regarding the USA, I see it as a populist measure. For the EU, it's an issue that needs to be discussed to find a reasonable consensus. It's neither good nor bad overall, but it's the wrong approach if trade barriers make international trade more difficult or even hinder it altogether.	In the case of the USA, it's seen as a populist measure, while for the EU, it requires a discussion to reach a reasonable consensus. Overall, it's neither entirely good nor bad, but trade barriers that complicate or hinder international trade are the wrong approach.		
12	German	I think the worst thing that could happen to us is a trade war, especially for Germany as an export nation. That's why it's incredibly dangerous. And that brings me back to the issue of dependencies—where are we dependent, and where is China dependent? I believe we're already at a point where we're more dependent on China than they are on us. On one hand, you could say, for example, the profits from the automotive industry, well, that has to be managed somehow. If they're not as present in that scale anymore, so be it. But when it comes to Jonas's topic of raw materials, we are completely dependent.	A trade war would hurt Germany, especially as it becomes more dependent on China. While automotive profits may decline, the real concern is reliance on China for raw materials.		
12	German	So, China isn't really dependent on whether they can sell vehicles in Europe or not. With all due respect, I don't believe that's the case. At the same time, there are ways out, and I'm not sure if you saw the interview from about 2, 3 weeks ago, in the Manager Magazin, with the European head of BYD. She was asked about tariffs and trade barriers, and she responded by saying, "Well, it's just how it is. Europeans are responsible for that." She added that it didn't bother her much because BYD's factory in Portugal is set to start production in 2026, and the one in Turkey in 2027. As for the next factory, she didn't know yet, but they'll manage to bridge that year in between.	China isn't heavily dependent on selling vehicles in Europe. BYD plans to adapt with factories in Portugal (2026) and Turkey (2027) to manage trade barriers and continue expanding in Europe.		
13		Both personally and as a company, we have taken a clear position that tariffs are neither a sensible nor helpful tool. This is not just because we import vehi-	Tariffs are not the right tool to achieve competitiveness with Chinese OEMs. There is also high risks associated with them, partly because we		

Appendix

		cles, which undoubtedly carries a certain risk for the German and European automotive industries. Germany strongly opposed the tariffs, while countries like France and others that have lost market share in China supported them. We believe the better approach is to remain decisively present in China, keep up with the pace of technological development, and become part of the system. By leveraging technologies developed in China and bringing them to other regions, we can remain competitive. The key is not to build barriers around the market and hope that tariffs will solve the challenges.	also export many cars to China. Additionally, we need to focus on becoming more competitive in terms of technology and speed again.		
1	German	I think we have to find solutions in Europe, the Europeans have to trade together with the USA and China and do so as Europeans and not as individual countries, because they individually are too small.	European countries should unite more to compete with China and the USA.	CL3.5: International Policy Outlook	It is anticipated by several experts that Western countries will intensify their policy activities in the BEV segment, encompassing strategic investments in raw materials and infrastructure, in addition to financial incentives on the supply and demand sides. Expert 1 underscores the imperative for enhanced collaboration among EU countries to bolster their competitive standing vis-à-vis China. In addition, potential FDI restrictions for Chinese companies with the requirement for JVs with Western OEMs to facilitate a knowledge transfer were brought up several times. Moreover, Expert 10 posited that strengthened recycling regulations in the West could create indirect access to rare earths. Also, he sees more rigorous policies governing material origins, including the implementation of digital product passports.
3	German	It takes government intervention in the West to successfully build up its own raw material value chain and protect it from the Chinese, similar to the example of green steel.	Western governments need to intervene to decrease dependency on Chinese raw materials.		
3	German	We've shot ourselves in the foot if we completely eradicate combustion technology and ignore the fact that nearly all supply chains for battery electric vehicles run through China. It's a rather foolish approach, and as a politician with an entrepreneurial mindset, I would break away from this absolutism and avoid making us entirely dependent. All this talk about reducing dependency on China misses the point, while at the same time, there's an actual push to drive a core domestic industry into dependency on the Chinese industry and its value chain. Industrial policies by the EU are, in part, highly ideologically driven regulations. These work if the market remains global and open, allowing supply and demand to operate effectively. However, when the market is already constrained by limited supply chains, it's no longer a free play of forces. Northvolt for example struggles as they are dependent on Chinese machines that do not work properly.	By completely eliminating combustion engines, the West makes itself highly dependent on Chinese value chains. This is a high risk for our economies which is also shown by the current example Northvolt.		
3	German	Now financial incentives in the West are being ramped up again because it's clear that without them, nothing happens. A lot of money is being spent behind the scenes, with numerous European projects now receiving funding. So, I believe Europe is actually starting to increase its support even further.	Western countries seem to increase their financial incentives as they are elementary for a ramp-up of BEVs.		
3	German	I believe the current target fleet emissions for CO ₂ will be relaxed. It's becoming evident that these targets are unachievable, even for manufacturers producing lighter, smaller vehicles, so some normalization will likely take place. Will there be a complete shift away from the overarching goal of electromobility? I don't think so, but I do believe the timelines for these targets will be extended.	Western countries will likely extend the CO ₂ target timelines as they are not achievable for OEMs.		

Appendix

3	German	If the West were to take emissions reduction seriously, investing in e-fuels would be an incredibly effective path, especially regarding existing fleets, where there's tremendous potential. It still takes quite a long time for the CO ₂ burden from battery production to be offset. If we approached this issue without ideology, e-fuels would, in my opinion, already be a viable option in Europe, though it's unlikely to happen on an industrial scale.	E-fuels would be a good solution for existing fleets if governments invested more in their development.	Expert 7 anticipates that investments in charging infrastructure in China will continue to intensify. Expert 8 asserts the necessity of fair pricing of fossil fuels, including the ecological damage imposed, in order to increase the attractiveness of BEVs in the West without direct purchasing subsidies. Expert 3 criticizes the lack of technological openness in the EU and the risk of creating excessive dependence on Chinese value chains by eliminating ICEs. He suggests that e-fuels could be a promising avenue for growth if the government were to provide more extensive support. Experts 4 and 7 anticipate that trade tensions between China and the West will intensify in the future, posing a risk to the supply chains of both parties and international wealth.
2	German	On the other hand, Chinese OEMs can now much more easily set up production in Europe without partnerships. I can't understand this—it seems to me that strategic foresight is lacking in the EU.	It is not strategically wise to let Chinese OEMs enter Europe without a need for strategic partnerships with domestic companies.	
2	German	Chinese OEMs can simply shift production to Europe to bypass tariffs. However, this doesn't help us gain know-how. A sensible strategy would be to require joint ventures and strategic alliances for this purpose—just as China has done in the past.	Western countries should also demand strategic alliances for investments from China.	
2	German	I think it's unrealistic to surpass the Chinese in the NEV sector. It might be possible to get back on an equal footing, but that will definitely require strategic measures. Securing raw materials, demanding strategic alliances, and investing in infrastructure are just a few examples.	To compete with China in the BEV sector, broad strategic measures in Europe and the U.S. are necessary.	
2	German	The West should also consider becoming a leader in other areas of mobility to continue securing jobs. Public transportation could be one such area, for example.	Western countries should invest in other mobility sectors to secure employment.	
2	German	For China, it will be crucial to further improve in areas like international business, particularly mastering aspects such as sales, marketing, and after-sales services. They haven't yet achieved the same level of expertise in these areas as Western OEMs.	China's OEMs need to improve in conducting business internationally.	
5	German	I think there will indeed be a ping-pong play of political actions between the West and China, including tariffs and other tools. But in the long-term, both sides will realize that they will need to take the competition seriously and allow open competition.	There will be a policy war between the West and China in the medium-term.	
5	German	We also need to mention the raw materials topic. Here, China acted early with smart policies but there will probably also be such strategies from other countries as they realize the importance of rare earths in several sectors.	Western countries will also implement supporting policies for raw materials, similar to China.	
9	German	I can certainly imagine that, from an economic perspective, more partnerships with Chinese companies will become necessary in the future. And if the economy demands it, regulations may eventually follow suit.	Stricter regulations for Chinese FDIs in the West are realistic.	
9	German	The topic we mentioned earlier about consumers and the origins of materials—like supply chain laws—has been widely discussed and criticized. I think that, in some form, even if somewhat softened, it will come into effect. Especially with developments like digital product passports and battery passports, I can see complementary regulations emerging.	Regulations regarding product and material origin will be strengthened.	
9	German	I also believe there will be significant	There will be developments	

Appendix

		regulation around recycling. This way, we in the West can indirectly secure access to raw materials, for example, through regulations that prevent intermediary products from being sent to China for cheaper recycling.	in regulations for battery recycling, also to gain access to materials.		
7	English	In the near future, I think there are some risks, especially due to political tensions, particularly in the relationship with the US and its allies. These tensions could lead to trade restrictions or sanctions that disrupt China's ability to import or export refined minerals, which could pose a significant risk.	In the near future, political tensions, especially with the US and its allies, could lead to trade restrictions or sanctions, disrupting China's ability to import or export refined minerals, posing a significant risk to its supply chain.		
7	English	I believe that, with many of the incentives already utilized, including subsidies, tax exemptions, and plate restrictions, the Chinese government might focus more on regulating vehicle standards going forward. As mentioned earlier, many Chinese OEMs compete heavily on price, which could lead some to reduce their standards. To avoid this, I think the Chinese government might step in to regulate the market to prevent excessive price competition, although I'm not entirely certain about this.	With many incentives like subsidies and tax exemptions already in place, the Chinese government may shift focus toward regulating vehicle standards to prevent excessive price competition among OEMs and maintain quality.		
7	English	And also, I think the Chinese government might, you know, emphasize a bit on the charging infrastructure because the vehicle is already populating in, to some extent. So, the charging infrastructure could be a kind of the, we call it a new type of infrastructure in China. The traditional one is the building of bridges and highways, and the charging infrastructure is kind of the new type of infrastructure.	The Chinese government may also emphasize expanding charging infrastructure as EV adoption grows, viewing it as a "new type of infrastructure" alongside traditional projects like bridges and highways.		
7	English	But in the traditional sense, like the subsidies will reduce in the future. So it's a very clear trend. Then, the reduction of the subsidies, increasing regulation on product quality, and the development of charging infrastructure will become the mainstream. Additionally, carbon neutrality will play a significant role, with electric vehicles being a key part of the competition in this area.	Subsidies are set to decrease, while stricter product quality regulations, expanded charging infrastructure, and a focus on carbon neutrality will shape the industry's future, with EVs playing a central role in sustainability efforts.		
8	German	Yes, we are constantly polluting our environment with full awareness of what we are doing—climate warming—and we simply allow it to continue. On top of that, this oil often comes from countries that have been prominent in the news, leading to extreme wealth that goes far beyond superficial luxuries like gold-plated steaks. It raises questions about where the real value creation lies. All this money flows into states that, in some cases, contribute to conflicts around the world, and we persistently pollute the atmosphere, fully aware of the destruction we're causing. And yet, we don't charge anything for it.	We knowingly pollute the environment, contributing to climate change, and allow it to continue. Oil wealth often flows to countries involved in global conflicts, raising questions about where real value creation lies. Despite the destruction caused, we don't account for the environmental costs.		
8	German	We allow this, and these are costs as well. In that sense, it's what I'd call a form of subsidy because we tolerate this environmental pollution. There's no meaningful comparison between these technologies. From an economic perspective, the right approach would be to say that if a product isn't priced at its true cost, it gets overused beyond the	By not factoring the true environmental costs into fuel prices, fossil fuels remain too cheap. Gradually increasing prices to reflect these costs would make combustion engine vehicles more expensive and highlight their environmental impact.		

Appendix

		optimum. This is exactly what's happening with fossil fuels because no one includes the cost of climate change in the CO2 emissions and, therefore, in its use. It's simply too cheap—essentially given away. There are some taxes, but they are nowhere near what they should be in purely economic terms. The simplest solution would be to factor the true cost of environmental damage into the price per liter of fuel, gradually making it more expensive. Then we'd all realize that driving combustion engine vehicles has become far too costly.			
8	German	I'm now driving with an electric motor, which would naturally be the approach that supports technological openness, as promoted by some other parties. However, this direct path—where the true environmental cost would be factored into fuel—is politically untenable in today's Western democracies. We've seen the backlash, like the Yellow Vest protests in France. Since this route is closed, the strategy has shifted to an indirect method. This alternative approach targets the automotive industry, which has lost some of its lobbying power. By imposing CO2 penalties on automakers for the emissions of the vehicles they sell, they're now punished for each CO2-emitting car. This method is, at best, an indirect way to achieve the desired environmental effect, but it's politically feasible since it lacks strong lobbying opposition and is less visible to the average citizen.	Directly factoring environmental costs into fuel prices is politically difficult, so CO2 penalties on automakers are used instead. This indirect approach achieves environmental goals with less public opposition.		
8	German	If I ignore all of this, I get the impression that there's a fairly priced, standard technology—the combustion engine—that serves as the default, allowing me to continue using it at "fair" prices with all costs supposedly accounted for. In contrast, electric vehicles appear as an inferior technology requiring artificial, ideologically driven support to be even remotely viable. Then, liberal arguments about technological openness are used to argue that electric vehicles are a fantasy, an ideological push, and unnecessary, claiming they've already "proven" to be ineffective. This entirely overlooks that we permit massive environmental pollution without factoring in its real costs. If we did that—if a liter of fuel cost €5 or if we adopted e-fuel prices at that level—the situation would immediately be clear. We would have a truly fair market where market forces could operate properly. But because I don't create this fair market by allowing fuel to remain artificially cheap, there is still a need for intervention.	Combustion engines seem fairly priced, while electric vehicles are seen as reliant on ideological support. This ignores the true environmental costs of fuel. If fuel prices accounted for these costs, the market would be fair, and electric vehicles would be more competitive.		
8	German	This idea is far too complex for the typical one-dimensional communication today. But it's wrong to assume we currently have a functioning, fair market and that subsidies for electric vehicles are there simply to push an ideology. No, the subsidies exist to counterbalance the advantage given to the old technology, which isn't fairly priced. Let's remember, we're talking about fossil fuels derived from oil sourced	The idea of fair pricing is too complex for today's one-dimensional communication. Subsidies for electric vehicles aren't about pushing ideology; they counterbalance the unfair advantage of fossil fuels, which are underpriced and sourced from uncertain regions. Meanwhile, EVs ideally run on green electricity,		

Appendix

		from unknown places around the world, transported in massive tankers. In contrast, the electricity for EVs ideally comes from green sources in Germany, like wind turbines, even though we struggle to build the power lines needed in the south. This situation is extremely unfair, yet it doesn't appear that way in the public discussion.	yet this imbalance is rarely acknowledged in public discussions.		
4	German	If I could predict that, I'd be sitting in a much higher-paid, more influential position—though I'm certainly not poorly compensated or in an unimportant role! But that's really the million-dollar question. I think China's responses are often quite subtle. For example, they didn't immediately impose tariffs on imports in response to recent EU actions. There was some talk about a potential 25% import duty on vehicles over 2.5 liters of engine capacity as a warning to the EU Commission, essentially saying, "If you do something, we might respond." However, they didn't follow through. Instead, they targeted French brandy with taxes, likely because France was seen as pushing for the investigation due to its limited business interests in China beyond its domestic auto industry. China tends to take a very calculated approach, focusing on the outcomes. I believe they're highly data-driven in their decisions, looking closely at what each action will achieve. For instance, imposing taxes on larger German-engineered vehicles might not benefit them, whereas targeting French exports could make a point without significant impact on themselves.	China's response to geopolitical tensions is often measured and strategic. Their approach is highly data-driven, where they carefully consider the outcomes of each action, focusing on achieving specific objectives without unnecessary escalation.		
4	German	In the end, there are numerous complex factors at play: diplomatic strategies, trade policies, and international relations all matter deeply in how things develop with China. Finding the right balance and exercising diplomatic finesse is crucial, but it's a very challenging task, one that many people are likely better suited to handle than I am. It's a fascinating situation to follow, though.	The situation is highly complex, with diplomatic strategies, trade policies, and international relations all playing pivotal roles.		
10	German	What I'm observing is that the EU seems more inclined to try and keep the Chinese out entirely, especially depending on what's defined as critical infrastructure. For instance, when it comes to areas like port facilities, the EU appears more cautious about allowing Chinese involvement. The question for Germany, with the automotive industry being such a strategic sector and major employer, is whether it might be viewed similarly.	The EU is becoming more cautious about Chinese involvement in critical sectors, such as port facilities, due to concerns over national security and influence. For Germany, with its automotive industry being a key strategic sector and employer, there's a question of whether similar caution will apply, particularly as global competition intensifies.		
10	German	Joint ventures were indeed a way to localize and, to some extent, gain access to foreign know-how, but I don't see any efforts in the EU to extend that kind of opportunity to the Chinese. Instead, there seems to be a trend towards excluding them entirely or making them uncompetitive, through tariffs and other measures. In the EU, few countries—perhaps Hungary, where Chinese factories are being built—seem open to this,	In the EU, there is a clear shift towards limiting Chinese involvement, with countries like France, Italy, and Germany focusing on exclusion rather than collaboration through joint ventures. While Hungary may be an exception with Chinese factories, most EU nations seem more focused on protecting their		

Appendix

		whereas countries like France, Italy, and Germany appear more focused on keeping them out and not facilitating market entry through joint ventures.	markets from Chinese competition.		
11	German	I don't believe we will resort to joint ventures. Instead, we'll impose local content policies, which already exist today, requiring them to demonstrate how much they source locally for specific automotive applications. Local firms, however, could also be Chinese companies with manufacturing and development facilities in places like the Czech Republic, as they also fall under local regulations. This shift will definitely happen—as more Chinese companies enter our markets, more Chinese suppliers will naturally follow.	Local content policies will require companies to source locally for automotive applications. Chinese companies with facilities in Europe will comply, and as more Chinese firms enter the market, their suppliers will follow.		
11	German	The Chinese will certainly continue focusing on overseas markets, and the question then is where there is currently the least political resistance and the greatest market potential—such as Africa. We're already seeing that countries like those in Africa, or states like Iran, Belarus, and so on, are increasingly filled with Chinese cars.	Chinese companies are expanding into markets with low political resistance and high potential, such as Africa, Iran, and Belarus, where their cars are increasingly present.		

Appendix 13: Sino-Foreign joint ventures, 1983–1992 (Yuan Jia-Zheng and Carles Brasó Broggi 2023)

Partners						Participation	
Domestic	Foreign	For- eign coun- try	Joint Ven- ture	Year	Location	Domes- tic (%)	For- eign (%)
BAIC	Jeep American Motors Corporation (AMC)	USA	Beijing Jeep Corporation (BJC)	1983	Beijing	68,65	31,35
SAIC	Volkswagen	Germany	Shanghai Volkswagen (SVW)	1984	Shanghai	50	50
GAC	Peugeot	France	GAC-Peugeot	1985	Guangzhou (Guangdong)	66	34
Nanjing Automotive	Fiat-IVECO	Italy	Nanjing-Iveco (NAVECO)	1985	Nanjing	50	50
Chongqing Qingling Automotive	Isuzu	Japan	Qingling Isuzu	1985	Chongqing	77	27

Appendix

FAW	Volkswagen	Ger- many	FAW-VW	1991	Changchun (Jilin)	60	40
Dongfeng	Peugeot Cit- röen	France	Shenlong Limited	1992	Wuhan (Hubei)	50	50

Appendix 14: Sino-Foreign joint ventures, 1993–2001 (Yuan Jia-Zheng and Carles Brasó Broggi 2023)

Partners						Participation	
Domestic	Foreign	Foreign country	Joint Venture	Year	Location	Domestic (%)	Foreign (%)
Changan	Suzuki	Japan	Chongqing Changan-Suzuki	1993	Chongqing	51	49
Dongfeng	Nissan	Japan	Zhengzhou Nissan	1993	Wuhan (Hubei)	79	21
Chang'an	Suzuki	Japan	Chang'an Suzuki	1993	Chongqing	51	49
Nanjing Yuejin	Fiat	Italy	Nanjing Fiat	1995	Nanjing	50	50
Changhe	Suzuki	Japan	Changhe Suzuki	1995	Jingdezhen (Jiangxi)	51	49
Fujian Automotive	Yulon Taiwan	Fujian Yulon	1995	Fujian	50	50	Fujian Automotive
FAW	Volkswagen	Germany	FAW-VW-Audi	1996	Changchun (Jilin)	60	40 (which 10 is Audi)

Appendix

Dongfeng Motors	UD Trucks	Japan	Dongfeng Nissan Diesel Motor (DND)	1996	Guangzhou (Guangdong)	50	50
SAIC	GM	USA	Shanghai GM Wuling	1997	Shanghai	50	50
Jiangsu Yaxing Motor & Coach	Benz	Germany	Yaxing Benz	1997	Yangzhou (Jiangsu)	50	50
GAC	Honda	Japan	Guangqi Honda	1998	Guangzhou (Guangdong)	50	50
FAW	Toyota	Japan	FAW Toyota	1998	Changchun (Jilin)	50	50
Tianjin Xiali	Toyota	Japan	Tianjin Toyota	2000	Tianjin	50	50
GAC	Isuzu	Japan	Guangzhou Isuzu	2000	Guangzhou (Guangdong)	51	49
Chang'an	Ford-Mazda	A, Japan	Chang'an-Ford	2001	Chongqing	50	50

Appendix 15: Independent Chinese Automobile manufacturers (Yuan Jia-Zheng and Carles Brasó Broggi 2023)

Company	Complete name	Year foundation	Location	Property	Main product category
Great Wall	Great Wall Motor Automobile Manufacturer	1984	Baoding (Hebei)	Private	Commercial and passenger cars
Geely	Geely Automotive Company	1986	Hangzhou (Zhejiang)	Private	Passenger cars
Brilliance	Brilliance Auto Group	1992	Shenyang (Liaoning)	State	Commercial and passenger cars
Lifan	Lifan Group	1992	Chongqing	Private	Commercial and passenger cars
BYD	BYD Automotive Company	1995	Shenzhen (Guangdong)	Private	Commercial (bus) and passenger cars
Chery	Chery Automobile Company	1997	Wuhu (Anhui)	State	Passenger cars

Appendix 16: Home country supplier share of popular BEV models (MarkLines 2024a)

Model

L6 Pro (4WD) (China)

Model Y (RR) (China)

Model Y Performan...

Wenjie M7 (RR) (Ch...

Model Y (4WD) (Chi...

Model Y (USA)

Wenjie M7 (4WD) [...

Y (FF) (China)

Model Y (Germany)

Model Y (USA)

Wenjie M7 (China)

Y Plus (FF) (China)

Count of Country

Column Labels

Row Labels

Australia

Austria

Canada

China

France

Germany

Hong Kong

India

Ireland

Israel

Italy

Japan

Netherlands

Norway

Portugal

South Korea

Spain

Sweden

Switzerland

Taiwan

UK

USA

Grand Total

Dolphin (FF) (China)

2022

2023

2024

Dolphin (Thailand)

2024

ID.3 (Germany)

2020

2021

2022

2023

2024

ID.3 (Germany)

2022

2023

2024

ID.3 (RR) (China)

2022

2023

2024

[illegible]

Appendix

[illegible]

Appendix 17: Tariffs, Pre- and Post-WTO Membership (Holweg, Luo, and Oliver 2009)

	Before entry into WTO	After entry in WTO
Tariffs	200% in 1980s 80-100% in 1990s	25% by 2006
Import quotas	30,000 vehicles a year allowed from foreign carmakers	Quota increased by 20% a year, phased out by 2006
Local content requirements	40% in first year of production, increasing to 60% and 80% in second and third years, respectively	No local content ratio requirement
Auto financing for Chinese domestic costumers	Foreign, nonblank financial institutions prohibited from providing financing	Foreign, nonblank financing permitted in selected cities prior to gradual national rollout
Foreign participation in sales and distribution	Limited to wholesaling through joint ventures; prohibited from consolidating sales organizations of imports, joint ventures	Will by 2006 be allowed to own vehicle wholesale, retail organizations, integrated sales organizations