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1 Introduction

This report is a critical analysis of the macro marketing environment of the electric vehicle (EV) industry with strategic implications on pioneers and followers. The EV market is on a rapid growth path, and the revenues are expected to reach US \$993 billion by 2025, and global sales to surpass 30 million units by 2030 with China leading the market through supportive policies and lowering the cost of batteries, and Europe and the United States are projected to experience steady growth filled with Chinese manufacturers like BYD and Geely (Statista, 2025; IEA, 2025c).

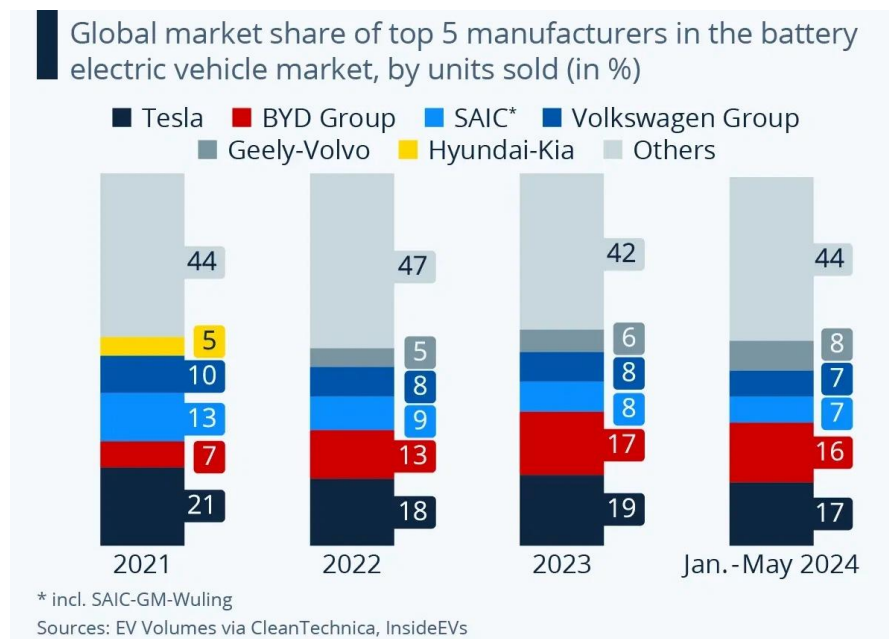


Figure 1: Global Market Share of Pioneer and Follower EV Firms (Statista, 2024)

First-mover benefits are enjoyed by pioneer companies, especially Tesla, as they are the first to innovate in battery technology, autonomous driving, and charging infrastructure (Liu, Boothman and Graham, 2025). Conversely, follower companies like Volkswagen, BYD, and Geely are fast-followers, using economies of scale, technological spread, and localisation.

2 Macro Marketing Environment Analysis

2.1 Technological Factors

One of the key macro marketing forces influencing strategic decision making in the electric vehicle (EV) industry is technological change (Zhao, Meng and Li, 2025). Blistering innovation in battery chemistry, production platforms, software, autonomy, and charging are pushing companies to continuously review their competitive advantages.

2.1.1 Battery Innovation and Energy Storage Technologies

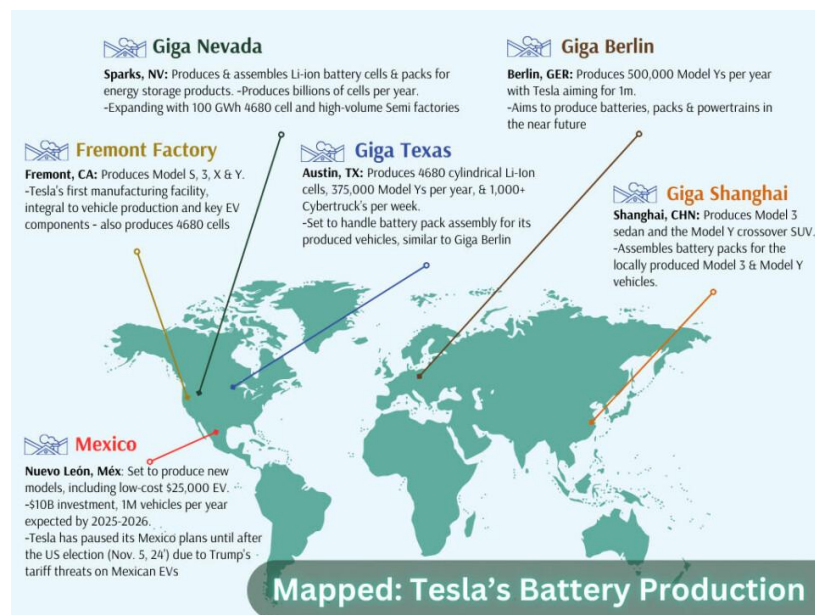


Figure 2: Tesla's Battery Production Facilities (Ozsevim, 2024)

The most important source of competitiveness is battery technology. Tesla has already ramped up its 4680 cell production to more than 100 million units, allegedly matching supplier costs and enhancing first-mover benefits in cost and range (Visconti, 2025). This lead is however being eroded by progress in lithium iron phosphate (LFP) batteries. BYD and Geely have targeting costs of 15 percent with Blade 2.0 batteries and short-blade LFP cells of about 192 Wh/kg and 3,500 charge cycles respectively, and the performance difference between nickel-based chemistries (Opletal, 2024; Panday, 2024). The massive investment Volkswagen makes in battery alliances like Northvolt also reinforces follower firms. The technological hegemony of Tesla is under prolonged pressure because the global battery demand in 2024 will be more than 1 TWh, and the packs will cost roughly 115/kWh (IEA, 2025a).

2.1.2 Manufacturing Technologies and Production Efficiency

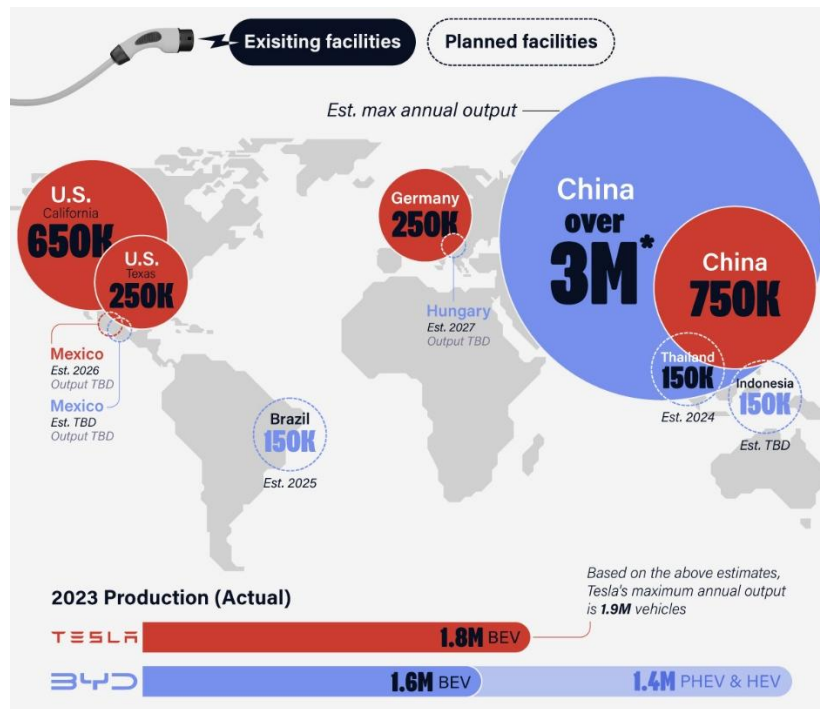


Figure 3: Concentration of Tesla and BYD's Manufacturing Facilities (Lu, 2024)

Innovation in manufacturing has transformed competition in industries as well. The integrated model and gigacasting technology of Tesla with presses as large as 6,100 tons simplified the process and contributed to the growth of the die-casting market, which is estimated to increase to between 751 million and 2.6 billion by 2030 (Reuters, 2023). Nonetheless, the recent divestiture of next-generation casting by Tesla demonstrates the constraints of the scalability. The vertically integrated system of BYD, which covers batteries, semiconductors, and assembly, allows the company to lead costs in the mass-market segments, with high volumes of production (Lahiri, 2025). VW MEB platform and intended SSP architecture are additional scale efficiency because of modular brand level standardisation.

2.1.3 Software, Autonomous Systems, and Digital Capabilities

Software is also one of the areas of differentiation. The technological leadership and recurrent revenue of Tesla are supported by Full Self-Driving v12 that is trained on the large-scale video data and could be updated over the air (Visconti, 2024). Still, the competition is evolving fast. Chinese companies like NIO and XPeng are carrying out city-wide autonomous tests and installing their own chips, and Volkswagen has invested approximately EUR14 billion in software development since 2020 and

partnered, including with XPeng, to speed up their development (Kulawik, 2025). Such advancements pose a risk to the perceived Tesla advantage of autonomous systems.

2.1.4 Charging Infrastructure and Standardisation

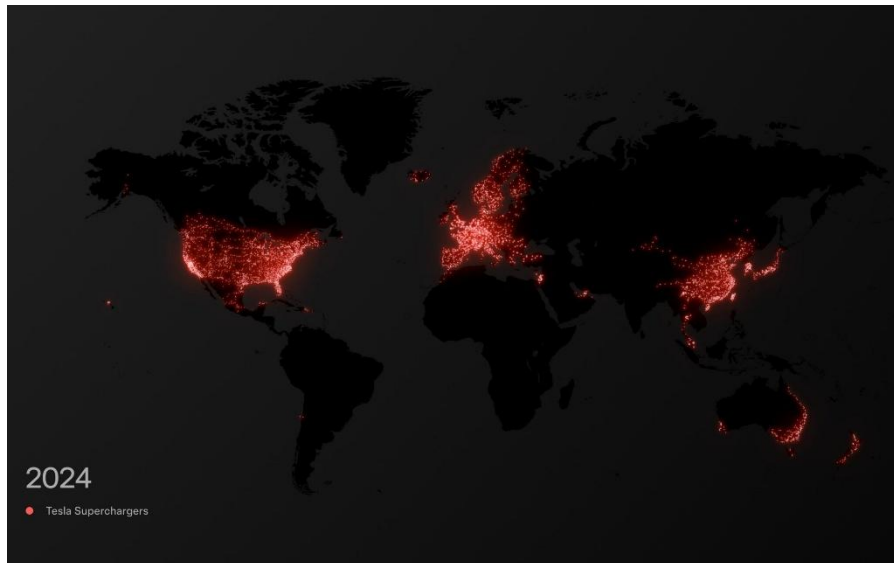


Figure 4: Tesla Supercharger Locations (Kane, 2024)

The network of Superchargers has also been a key point of differentiation with Tesla having 6,975 fast-charging locations and 65,495 connectors worldwide by the end of 2024 (Kane, 2025). However, this benefit is fading, with the number of charging stations in the UK growing by 53 percent to more than 61,000 in 2024 (Jolly, 2024). The introduction of the North American Charging Standard of Tesla to other manufacturers further minimises exclusivity and allows adherents to enjoy common infrastructure (Guy, 2023).

2.1.5 Overall Implications for Pioneer and Follower Firms

All in all, technological change has provided a more competitive world. Tesla has to maintain innovation leadership in the face of rapid imitation, and the followers including BYD, Volkswagen, and Geely are using the cost, scale, and technological diffusion as means to close gaps and increase market share.

2.2 Environmental Factors

Environmental issues have emerged as an influencing macro marketing player in the electric vehicle (EV) business, which dictates strategic priorities, regulatory compliance needs, supply chain choices, and consumer expectations (Peng et al., 2024). With the growth in the intensity of climate change issues and the strength of

environmental policy frameworks by governments, pioneering and follower organisations are presented with a changing environment creating strategic opportunities and systemic risks.

2.2.1 Regulatory Pressures and Zero-Emission Standards

The transport emissions regulation is becoming increasingly global, with Europe aiming to achieve 100 percent of zero-emission new car sales by the middle of the 2030s and the United States increasing California-equivalent standards (IEA, 2024). Ever since 2023, seven more states in the United States and the District of Columbia have implemented ACC II, and three have put in place ACT, which extends binding ZEV requirements (NCEL, 2023). Renewed trade-in subsidies of 20,000 yuan per EV remain another policy tool used by China to keep domestic demand alive (The Business Times, 2025). These trends also support Tesla in conforming to the ZEV credits and subsidy regimes because of its full-electric portfolio. Nonetheless, as Volkswagen, BYD, and Geely electrify to reach the same standards, they get the same regulatory benefits, undermining the initial compliance advantage of Tesla (Mckinsey, 2019). The use of regional policies such as EU tariffs on up to 38.1 percent of imported Chinese EVs also redefine competition without providing Tesla with a unique competitive edge.

2.2.2 Evolving Consumer Environmental Expectations

The pressure on the environment is growing, and consumer preferences toward low-emission and environmentally friendly cars are shaped by it. Tesla has been able to leverage this trend with its image of a sustainable technology leader, which helps to sustain brand loyalty and high prices (Arreola et al., 2024). But the expectations of consumers have not been limited to tailpipe emissions, but include battery recycling, sourcing of raw materials, and manufacturing sustainability. Tesla is thus under increased pressure regarding its supply chain since battery mineral mining produces approximately 14 tonnes of CO₂ per vehicle and company-wide emissions grew by 5 percent in 2023 and Gigafactory expansion, even with recycling practises that can offset the battery effects up to 90 percent over time (Tesla, 2023). Conversely, Chinese producers like BYD and Geely enjoy the diversification of the supply chain and state-supported recycling systems, and the Volkswagen investment in closed-loop battery recycling and sustainable manufacturing helps it to improve its competitive edge due to the increasing environmental consciousness (Ernst, 2022).

2.2.3 Resource Scarcity and Raw Material Risks

The second environmental driver influencing strategic marketing management is the lack of resources, especially the growing demand of lithium, nickel, cobalt and graphite, which increased 6-30% annually in 2024 (IEA, 2025b). Tesla has attempted to apply this risk by signing long-term agreements with more than 20 suppliers, 10-year lithium agreements with Piedmont Lithium (up to 50,000 metric tonnes/year), and by diversifying supply into China, Australia, and the United States. However, the dependence on mining hubs is subjecting Tesla to the geopolitical and environmental scrutiny (Lambert, 2022). By direct mining rights in Brazil and increased domestic refining, Chinese EV companies, including BYD, have increased their resource security, which allows maintaining costs and supply. Cross-brand diversification and responsible sourcing initiatives have helped Volkswagen to learn how to mitigate long-term risks on raw materials as the company had to learn at the beginning of the pioneers (Scherelis and Bothge, 2019).

2.2.4 Circular Economy Pressures and End-of-Life Regulations

The requirements of the environment are becoming more and more overlapping with the waste management and circular economy efforts, due to the tightening of battery disposal and end-of-life vehicle policies. Tesla has developed an early lead with a relationship with Redwood Materials, who provides recycled anode copper foil to Gigafactory Nevada and developed a believable U.S. closed-loop system. Nevertheless, the followers are quickly catching up. By 2025, BYD has a 80-95% material recovery rate, which facilitates its reuse in energy storage and Volkswagen has pledged to have a net-zero by 2050 and reduce its carbon footprint per kilometre by 30 percent by 2030, which is supported by specific battery recycling plants (Le, 2025; Volkswagen Group, 2024). Since recycling standards are mandated and follower capabilities are scaling, the early circular economy of Tesla is being diluted, making it less differentiated in its sustainability positioning.

2.2.5 Implications for Pioneer and Follower Competitiveness

All in all, environmental factors create opportunities and threats to pioneers and followers. Tesla is still highly in tune with regulatory, consumer, and sustainability pressures but with more scrutiny and less differentiation as competitors bolster their environmental positioning. Among the followers, including Volkswagen, BYD, and Geely, environmental change will help them to enter the market faster, have access

to green incentives, and become responsible, cost-effective substitutes in the changing EV environment.

3 Strategic Responses of Pioneers and Followers

3.1 Strategic Responses of Pioneers

The innovative leaders, vertical integration and sustainability-focused practises help pioneer firms to react towards the pressure of technology and the environment. These measures are meant to differentiate products, manage major components of the value chain and strengthen the brand perception and meet regulatory and societal requirements. This is the practise of Tesla, which operationalised technological and environmental strategies to maintain first-mover advantages.

3.1.1 Tesla's Technological Response

The vertical integration of Tesla in batteries manufacturing displays the way in which innovators use proprietary technology to gain competitive advantage. The company had manufactured its 100 millionth 4680 battery cell by September 2024 with a run rate of 200-250 GWh/year (Lambert, 2024). It was found to be 104.7 per kWh and 69.7 per kWh with U.S. tax credits, 11 percent lower than the cost of Chinese production. The second-generation 4680 cell provides 272 Wh/kg energy content, 500 kW charging and enhancement of the vehicle performance. The software ecosystem at Tesla supports technological leadership with more than 150 over-the-air updates every year and Full Self-Driving (FSD) v12, which uses neural networks trained on millions of driving clips (Liu, Boothman and Graham, 2025). These inventions increase customer loyalty, their recurring subscription income, and brand differentiation.

3.1.2 Tesla's Environmental Response

The EV-only range of Tesla is in line with the strict regulations of emissions and the increase of sustainability demands. In 2023, regulatory credit sales were up to 1.79 billion, and in Q3 2024 alone, up to 34% of net income (Dnistran, 2024). Lifecycle management projects will help in the avoidance of 32 million metric tonnes of CO₂e in 2024. Collaboration with Redwood Materials allowed retrieving up to 95% of major battery components, which contributes to the concept of a circular supply chain. The 10 years lithium deal of 50,000 metric tons per year with Piedmont Lithium, alleviates the problem of resource shortage and decreases foreign reliance (The Silicon Review,

2025). These tactics strengthen environmental legitimacy of Tesla and also provide barriers to entry to the competitors.

3.1.3 Strategic Implications

Incorporating a new battery technology, software development, and sustainable supply chains in the marketing storeys make Tesla a technological and environmental leader (Liu, Boothman and Graham, 2025). The threats are the increasing competition, supply-chain questioning, and the changing regulations, and the opportunities are the development of better brand loyalty, regulatory bonuses, and market shaping, which dictate the necessity of constant innovation and active stakeholder communication.

3.2 Strategic Responses of Followers

Follower firms react to technological and environmental pressures by using fast-follower strategy, adaptive innovation and scale-based competition (Gomez, Perez-Aradros and Salazar, 2022). They combine existing technologies, maximise cost-effectiveness, and use brand equity to bridge the distance between them and innovators without taking the risks of being the first to do so.

3.2.1 Volkswagen

Volkswagen is a platform-based follower. It had been able to deliver more than 800,000 EVs in 2024, with ID.3, ID.4, and Audi Q4 e-tron models (Oemisch, 2025). The Scalable Systems Platform (SSP) 2025 architecture freeze will standardize EV designs by brand by 2029, allowing economies of scale and regular technology updates. Below EUR 25,000 are entry-level models with longer range and quicker charging. The technological dependency is mitigated by strategic alliances with Northvolt to manufacture batteries and software partnerships with Cariad, comprising XPeng and Rivian (ET BrandEquity, 2025). The global brand equity helps Volkswagen to position EVs as reliable, accessible and engineering-led, unlike the Tesla branding which is innovation-oriented.

3.2.2 BYD

BYD is a company that integrates cost leadership with vertical integration. In 2024, BYD distributed 4.27 million NEVs, which is more than Tesla in the world (Liu, 2025). Its in-house supply chain including battery cell manufacturing, semiconductor design and vehicle assembly enable fast iteration and low cost of production. The Blade Battery (LFP chemistry) provides high safety and cycle life of both EVs and energy

storage. The marketing of BYD focuses on mobility that is advanced and affordable, which promotes international growth to more than 70 countries (Wilson and Li, 2025). The environmental storeys emphasise clean mobility and national innovation, which are in line with the sustainability priorities in China. The opportunities can be capitalising on the scale and affordability to tap mass-market segments, whereas the threats can be the possible technological lags compared to the pioneers.

3.2.3 Geely

Geely uses a mix of strategies, which includes alliances and intelligent production. Partnerships with Volvo and Polestar and Zeekr ownership allow the company to share technology and access the premium segment (Geely, 2024). The flexible architecture and the growth of the digital ecosystem are supported by investments in the software-defined vehicle platforms, AI-driven production, and development of the domestic chips. Marketing presents Geely EVs as a company that promotes clean energy and national development and mobility, which is smart and meets the requirements of the regulators and society. This strategy will enable Geely to differentiate both in the premium and mass-market segment and reduce the risk of adopting technology.

3.2.4 Strategic Implications

The scale, platform modularity, and cost advantages are used by the followers to reduce the distance between them and pioneers. They also build legitimacy by integrating environmental compliance and sustainability storeys in marketing communications, especially where the market is regulated (Bohnsack et al., 2020). Although they cannot compete with the pace of innovation at Tesla, the strategic use of operational efficiencies, adaptive technologies, and market positioning allows Volkswagen, BYD, and Geely to compete favourably. This affordability, dynamic innovation, and sustainability communication makes followers viable substitutes in an ever-changing EV world.

3.3 Comparative Assessment

According to their market position and strategic priorities, pioneers and followers react differently to technological and environmental pressures (Covin, Slevin and Heeley, 2000). As an innovator, Tesla employs radical innovation, vertical integration, and sustainability leadership to gain first-mover advantages by proprietary 4680 battery technology, advanced software ecosystems, and circular supply chains, further brand

differentiation, and environmental legitimacy despite high costs of R&D and supply-chain risks (Liu, Boothman and Graham, 2025). The fast-follower/ hybrid strategies used by the followers like Volkswagen, BYD and Geely to pursue the scale, cost effectiveness, and quick market responsiveness are based on proven technologies, platform modularity, and vertical integration, with the focus on the reliability, accessibility and sustainability during the marketing process. As a result, innovators and brand leaders are better in the first place, and operational efficiency, adaptive adoption, and alignment with regulatory and market expectations reduce the gap by followers, which illustrate complementary ways to become competitive in the EV industry.

4 Conclusion

To sum up, the market of electric vehicles is influenced by the rapid technological change and the increasing environmental pressure, which encourage different approaches of innovators and followers. Tesla is an excellent example of the pioneer type due to radical innovation, vertical integration and a high level of sustainability as they enhance brand differentiation and regulatory congruence. Contrary to this, companies like Volkswagen, BYD and Geely utilise the adaptive strategies with the proven technologies, scale efficiencies and modular platforms, which are promoted by environmental marketing. Collectively, these strategies show how competitiveness can be maintained using innovation leadership or economically viable adaptability.

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