

# Take Volkswagen as an Example to Critically Analyze the Feasibility and Market Response of the Future Sustainable Development Strategy in the Automotive Industry

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**Abstract:** As a leading global automaker, Volkswagen's success in the traditional automotive manufacturing sector is unquestionable. As the market and environment evolve, the company is increasingly demanding green and sustainable development. Against this backdrop, Volkswagen has adjusted its business strategy in an effort to achieve new levels of success. This report provides a key overview of Volkswagen's current strategy, its global reach, and its international activities. This article explores the strategic transformation and market response of the automotive industry in the context of sustainable development, focusing on Volkswagen as the primary research subject. Against the backdrop of increasingly stringent environmental regulations and a shift in consumer preferences towards green mobility, automakers are accelerating their transition to electrification and low-carbon manufacturing. This article will evaluate Volkswagen's global strategic response using theoretical frameworks such as Porter's Five Forces Model, the OLI Model, and a SWOT analysis. Drawing on the case studies of Tesla and General Motors, this article analyzes the feasibility and limitations of Volkswagen's strategy in Europe, China, the United States, and the emerging African market, using publicly available financial data and sustainability reports.

**Keywords:** Sustainable Development Policy; Automotive Companies; Different Global Markets

## 1. Introduction

Globally, climate change and ecosystem degradation have gradually evolved into major challenges affecting national security, social stability, and economic sustainability, and their

threat level continues to rise. Faced with increasingly severe environmental challenges, "sustainable development" has been widely incorporated into the core agendas of governments and multinational corporations, particularly in developed regions such as the European Union, where green transformation is advancing at an unprecedented pace. This process is not only the result of policy initiatives but also reflects institutional arrangements under different political logics [1]. In 2021, the European Union officially launched its "Fit for 55" climate plan for sustainable development. The plan explicitly sets a target of reducing greenhouse gas emissions by 55% below 1990 levels by 2030, and introduces supporting policy tools such as the Carbon Border Adjustment Mechanism (CBAM) to strengthen enforcement [2].

Against this policy backdrop, the automotive industry has become the primary focus of pressure to achieve carbon neutrality. As one of Europe's largest and world-leading traditional automakers, Volkswagen's high sensitivity to policy and market responses has led the company to clearly state in its 2023 Sustainability Report: a goal to reduce carbon emissions from its fleet by 30-50% by 2030 and achieve full carbon neutrality by 2050 [3]. This strategic shift not only responds to the challenges of tightening international policies but also demonstrates the company's deep foresight into future market dynamics.

At the same time, consumer awareness of sustainable mobility is rapidly evolving. According to corporate life cycle theory, in mature markets such as Europe and the United States, electric vehicle (EV) acceptance continues to rise, with penetration rates climbing year by year, while the market share of traditional fuel vehicles is facing structural decline [4]. This trend is forcing automakers to accelerate the reshaping of their product mix

and the redefinition of their brand value. "System adjustment" refers to the coordinated transformation of multiple interrelated parts to ensure that the entire system can achieve the overall strategic goals more efficiently. For Volkswagen, achieving a systematic adjustment of its technology platform, battery supply chain, and brand positioning while maintaining profitability has become a key to its global strategy. This article will critically analyze Volkswagen's sustainable development transformation from three perspectives: macroeconomic policy trends, industry structural changes, and Volkswagen's own strategic response. It will explore the drivers, paths, and potential risks of Volkswagen's transformation to sustainable development. Incorporating feedback from multiple markets, it will provide a comprehensive assessment of Volkswagen's global adaptability and future competitive advantages.

## 2. Literature Review and Theoretical Framework

In recent years, research on the impact of policies and markets on corporate green transformation has deepened. According to policy-driven theory, government regulations play a key role in promoting sustainable development, particularly in markets with well-established institutions such as the European Union [2]. Furthermore, the theory of planned behavior suggests that when consumers choose electric vehicles, their environmental attitudes, perceived social norms, and perceived behavioral control are the primary factors influencing their purchase intention [5]. These two theories together explain why companies face dual transformation pressures from both upstream regulators and downstream consumers. To more systematically analyze Volkswagen's response strategy, this article will utilize the following tools:

**Porter's Five Forces Model:** Assessing the competitive landscape and external threats in the automotive industry, including new entrants, battery suppliers, and alternative mobility options;

**SWOT Model:** Integrating industry trends and corporate resources to identify strengths, weaknesses, opportunities, and risks in the company's transformation process;

**Life Cycle Theory:** Determining the development stages of electric vehicles in

different global markets and revealing the opportunities and challenges for Volkswagen's strategic adaptation[6-8].

These analytical tools are not used in isolation; rather, they form a complementary, step-by-step, and comprehensive analytical framework:

The Five Forces Model reveals the industry's competitive structure, providing external input for identifying opportunities and threats in the SWOT analysis.

The SWOT Model integrates industry analysis results with the company's internal resources to provide a basis for strategic decision-making;

Life Cycle Theory further determines whether opportunities identified in the SWOT analysis are timely and actionable;

Using this integrated framework, this article will systematically evaluate Volkswagen's strategic behavior in the context of the global sustainable development trend, analyzing its path to success and the structural challenges it faces.

## 3. Volkswagen's Sustainable Strategy and Evolution

As the global automotive industry accelerates its evolution toward low-carbon, intelligent, and service-oriented development, Volkswagen officially launched its "NEW AUTO" strategy in 2021, marking its transformation from a traditional internal combustion engine manufacturer to a comprehensive "sustainable mobility solutions provider." This strategy not only responds to increasingly stringent environmental regulations but also demonstrates Volkswagen's proactive adaptation and strategic foresight of future market trends.

### 3.1 Core Objectives and Implementation Path

According to Volkswagen AG and Gebler et al., the "NEW AUTO" strategy includes the following key pillars:

**Electrification Transformation Goal:** By 2030, Volkswagen plans to achieve a 70% share of electric vehicle sales in Europe and 50% in China and the United States. It plans to launch more than 50 pure electric models across the group's multi-brand system (such as Volkswagen, Audi, and Porsche). **Reinvesting in Smart Mobility Technologies:** The Group plans to invest over €35 billion in electric platforms (such as the MEB and PPE architectures) and autonomous driving systems, creating a unified software platform, VW. OS, to enable intelligent vehicle connectivity, remote updates, and

data-driven management.

**Zero Impact Factory Initiative:** The goal is to achieve carbon neutrality in global production by 2050, utilize 100% green electricity in all factories by 2030, promote water recycling and material recovery mechanisms, and reduce the impact on the environment throughout its lifecycle.

**Market Differentiation Strategy:** Based on the policy environment and user preferences in different regions, Volkswagen will focus on mid- to high-end electric vehicles in Europe, strengthen joint ventures and local adaptation in China, and build charging infrastructure in the United States through the "Electrify America" initiative to enhance overall market penetration.

### 3.2 Strategic Challenges and Current Dilemmas

While the overall direction of the "NEW AUTO" strategy is clear, its importance has been confirmed from a macro perspective. However, Volkswagen still faces numerous practical challenges during implementation:

**Software development is lagging:** Cariad, Volkswagen's software development subsidiary, is behind schedule in developing several core modules, resulting in delayed launches of several new models, including the Audi Q6 e-tron and the Porsche Macan EV. As vehicle intelligence continues to rise, shortcomings in software capabilities are severely hampering the group's ability to deliver on its intelligent strategy [10].

**Difficulty integrating the digital ecosystem:** To raise technological barriers and strengthen its competitiveness, Volkswagen is attempting to integrate systems such as autonomous driving, in-car entertainment, and cloud data into a unified platform. However, Volkswagen's multi-brand architecture results in low system compatibility and lengthy development cycles. This results in uneven integration across its brands, and overall, its efficiency struggles to match that of pure electric startups like Tesla[3,9].

**Brand synergy and resource waste:** Volkswagen Group's multi-brand matrix, while covering multiple tiers and markets, also results in fragmented resources and a blurred strategic focus. For example, Audi, Skoda, and Volkswagen brands have internal overlap in the mid-range electric vehicle market, while Bentley and Porsche also have market overlap in

the high-end market. This overlap has impacted the efficiency of centralized R&D[11].

**Organizational sluggishness:** Compared to emerging electric vehicle companies like Tesla and BYD, Volkswagen, a traditional manufacturing giant, generally has a more complex organizational structure and decision-making process. This multi-layered approval mechanism and highly formulaic processes reflect a growing tendency towards bureaucracy within the company, which often leads to rigid organizational operations. This structural inertia creates significant obstacles in responding to market changes and rapid technological iteration, particularly in software platform development, battery strategy adjustments, and the pace of new model launches. Faced with intelligent and digital transformation, companies often struggle to respond flexibly and implement trial-and-error optimizations, thereby weakening the agility of overall strategic execution and competitive responsiveness. This situation is common in the automotive industry. Studies have shown that "agile silos" within traditional automotive companies are often embedded in waterfall-style, bureaucratic management systems, leading to frequent conflicts between innovative practices and the upper structure, severely restricting the company's ability to respond at key strategic junctures [12].

**Increasing pressure to compete with global competitors:** Volkswagen Group faces fierce competition in the new energy vehicle sector in the global market. Tesla, a US company, has significant advantages in battery technology, autonomous driving algorithms, and software ecosystems. BYD, a Chinese domestic company, has significantly reduced costs through highly vertically integrated supply chains and fully utilized China's low-cost labor, posing a significant challenge to Volkswagen's technological leadership and price competitiveness [13-14].

### 4. Comparative Analysis of Financial Performance and Industry Position

A company's financial performance can be measured through several key financial ratios to measure its debt-paying ability, profitability, and shareholder returns. Drawing on the research of Almehairbi et al., this article compares Volkswagen with its competitors, Tesla, General Motors, and, by extension, BMW

and Toyota, five representative automakers [15]. The article also provides detailed calculation methods to enhance analytical transparency. For ease of comparison, all financial data below is expressed in billions of U.S. dollars (USD B) and converted using estimated exchange rates from each company's annual report. Current Ratio: This ratio measures a company's short-term debt repayment ability. The calculation formula is:  $\text{Current Ratio} = \text{Current Assets} \div \text{Current Liabilities}$

Volkswagen:  $199.1 \div 174.5 \approx 1.14$

Tesla:  $289.1 \div 151.3 = 1.91$

General Motors:  $81.3 \div 68.8 = 1.18$

BMW:  $49.9 \div 38.7 \approx 1.29$

Toyota:  $174.1 \div 120.7 \approx 1.44$

Applying these ratios into the calculation, Tesla's current ratio is the highest (1.91), reflecting its strong short-term debt repayment ability and sufficient cash flow. Toyota and BMW both maintain a current ratio between 1.3 and 1.4, indicating a solid asset structure. Volkswagen's current ratio is relatively low, indicating a relatively tight liquidity reserve. Net Profit Margin: This measures a company's ability to convert sales revenue into net profit. The formula is:  $\text{Net Profit Margin} = \text{Net Profit} \div \text{Operating Revenue} \times 100\%$

Volkswagen:  $16.6 \div 361.2 \times 100\% \approx 4.6\%$

Tesla:  $12.6 \div 96.6 \times 100\% \approx 13.04\%$

General Motors:  $10.1 \div 163.4 \times 100\% \approx 6.18\%$

BMW:  $19.9 \div 166.5 \times 100\% \approx 11.96\%$

Toyota:  $26.9 \div 307.6 \times 100\% \approx 8.74\%$

Substituting these values, Tesla and BMW are at the forefront of profitability, exceeding 13% and 11%, respectively. Toyota remains stable, while GM is slightly better than Volkswagen. Volkswagen's profit conversion rate ranks last among the five, and it urgently needs to improve its profit structure through technological upgrades and operational efficiency optimization.

Return on Equity (ROE): This measures a company's ability to generate profits from shareholder investment. The formula is:  $\text{ROE} = \text{Net Profit} \div \text{Shareholder Equity} \times 100\%$

Volkswagen:  $16.6 \div 212.2 \times 100\% \approx 7.8\%$

Tesla:  $12.6 \div 63.4 \times 100\% \approx 19.89\%$

General Motors:  $10.1 \div 66.3 \times 100\% \approx 15.23\%$

BMW:  $19.9 \div 86.9 \times 100\% \approx 22.89\%$

Toyota:  $26.9 \div 164.6 \times 100\% \approx 16.35\%$

In terms of ROE, BMW ranks first with a shareholder return of nearly 23%, followed closely by Tesla. Both companies demonstrate

efficient capital utilization driven by high-value-added products and premium brands. Volkswagen ranks last among the five, indicating that it still has significant room for improvement in shareholder value creation. Furthermore, while Volkswagen's global sourcing and distributed production model contributes to cost control and market penetration, it also makes it more vulnerable to fluctuations in raw material prices, exchange rates, and geopolitical factors[3]. For example, during the Russo-Ukrainian conflict, Volkswagen's parts supply chain in Eastern Europe was disrupted, delaying the delivery of new models.

It is worth noting that while the Volkswagen Group's brand structure (such as Audi, Porsche, and Seat) facilitates market segmentation and brand premium, it also leads to platform redundancy and duplication of resources, hindering a unified and modular green transformation path.

A horizontal comparison of five major global automakers reveals that Tesla and BMW lead in financial performance, specifically in terms of profitability and shareholder returns. These two companies demonstrate strong competitiveness, which is conducive to attracting further investment and expanding their scale. Toyota's overall performance has remained stable, reflecting a high degree of operational stability within its organization. In contrast, despite its large asset base, Volkswagen suffers from disadvantages in short-term debt repayment capacity, profit margins, and return on capital. This weakness reflects its relatively weak financial adaptability to sustainable transformation. Therefore, if Volkswagen plans to maintain its leading position in green transformation and global competition in future development markets, it urgently needs to deepen reforms and strategic updates in three areas: cost control, technological investment, and business integration.

## 5. Global Market Feasibility Assessment and Regional Strategic Response

### Europe

Driven by the Green Deal and the Carbon Border Tax, Europe has established a comprehensive policy framework supporting the development of electrification. Gebler et al. (2024.9) point out that Volkswagen has a clear first-mover advantage in Europe by partnering

with companies to build a fast-charging network, optimize green logistics, and manage carbon emissions.

Volkswagen Group, Volkswagen Group official website data indicates that its charging division, Elli, has deployed over 900,000 public charging stations in Europe, including 80,000 high-power charging stations, covering 28 countries[16]. This infrastructure has expanded by 80% in two years [16]. Furthermore, to further integrate energy and home charging systems, Elli is collaborating with Norway's Otovo to promote integrated home solar and energy storage charging solutions. By integrating Huawei inverters and energy storage systems, home users can save up to 40% on charging costs[17]. In the heavy-duty logistics sector, MAN (a Volkswagen subsidiary) and E. ON are collaborating to build 80 400kW fast-charging stations across Europe by 2025, expanding to 170 stations in countries such as Germany, the UK, Italy, and Poland. The goal is to create a pan-European green logistics network for electric trucks[18]. Furthermore, Volkswagen's 2023 annual report stated that it had deployed over 600,000 public charging points in Europe and achieved a 113% year-on-year increase in BEV (battery electric vehicle) sales in Western Europe, reaching a 26% overall market share, with BEVs accounting for 19% of this share in Western Europe[19-20]). Driven by the Green Deal and the Carbon Border Tax, Volkswagen has demonstrated significant infrastructure and market leadership in Europe's electrification transition through the deployment of a large-scale charging network, cross-company energy collaboration, and the development of a green logistics system.

#### China

In recent years, China's new energy vehicle market has grown rapidly, ranking first globally for many consecutive years. The International Energy Agency (IEA,[21]) reports that China will account for nearly 60% of global new electric vehicle registrations in 2023, with over a third of these new vehicles being electric[21]. Data from the China Passenger Car Association (CPCA) indicates that China's new energy vehicle retail sales will reach nearly 11 million units in 2024, with a market penetration rate of 47.9%[22]. This growth reflects not only the widespread adoption of environmental education and rising consumer awareness in China, but also the continued support of national policies,

including vehicle purchase subsidies, license facilitation, and tax incentives.

As a representative of domestic companies, BYD has rapidly established strong cost advantages and economies of scale through its vertical integration of batteries, motors, and control systems. Data shows that BYD's global new energy vehicle sales will exceed 3 million units in 2023, significantly surpassing Tesla in market share [23]. Furthermore, according to Ainvest research, BYD's integrated supply chain system offers an average cost advantage of approximately 15% over Tesla[13].

Meanwhile, competition in China's new energy vehicle industry continues to intensify, leading to an escalating price war. NEV sales are projected to increase by 40.7% year-on-year in 2024, but industry profit margins will decline to 4.4% [24]. Regarding exports, China's auto exports will increase by 63.7% year-on-year in 2023, with a rapidly increasing share of electric vehicles, further solidifying its position as a major global exporter of electric vehicles [25]. ICCT analysis indicates that the Chinese government has invested over \$230 billion in the new energy vehicle industry, providing sustained support for market development [26-27]. Volkswagen faces intense challenges in this context. To maintain its market share in China, Volkswagen has localized vehicle and battery production through joint ventures with local companies such as SAIC and FAW[28]. At the same time, Volkswagen has launched a dedicated China-specific CMP platform development program, aiming to launch over 30 localized electric vehicle models in China by 2030. It also aims to reduce costs by 40% to boost market share and competitiveness [29].

In summary, the Chinese market is driven by a triple combination of "scale + policy + technology." With the rapid rise of local companies, multinationals like Volkswagen face the dual pressures of localization transformation and cost structure optimization.

#### America

Although the Biden administration has promoted the electric vehicle industry through the Inflation Reduction Act (IRA), Volkswagen faces challenges in market expansion due to its slow progress in local manufacturing and battery supply chain in the United States, as well as the severe decline in brand trust following the "Emissions Gate" incident [30]. To shoulder responsibility for the negative impact of the

"Emissions Scandal" scandal, Volkswagen invested \$2 billion to establish Electrify America, an electric vehicle charging network. By 2025, this network will have over 1,080 fast-charging stations and over 5,000 fast chargers in the United States, marking Volkswagen's significant effort to rebuild its charging infrastructure [31]. Furthermore, Volkswagen plans to strengthen its manufacturing capabilities in the United States, including expanding its Chattanooga, Tennessee, plant and increasing R&D investment [32]. Furthermore, Volkswagen announced plans to build a new \$2 billion plant in South Carolina to produce all-electric pickup trucks and SUVs for its revitalized American classic brand, Scout. The plant's annual production capacity is targeted at 200,000 units, with production expected to begin in 2026 [33]. Furthermore, Volkswagen's electric vehicle strategy also includes local production of the ID.4 electric SUV in the United States. This model, which went into production at the Chattanooga plant in 2022, will be the company's first locally manufactured BEV [34].

In the US market, although Volkswagen is constrained by the "Emissions Scandal" scandal and insufficient localization, it is striving to rebuild trust and strengthen its local competitiveness by building the Electrify America charging network, expanding its manufacturing and R&D base, and reviving the Scout brand of electric vehicles.

#### Emerging Markets in Africa

Ayeter et al. (2020.35) point out that Africa is generally plagued by barriers such as insufficient charging infrastructure, unstable power grids, and a lack of understanding of sustainable development concepts that hinders electric vehicle purchases[35]. Therefore, adopting low-cost solutions such as mild hybrid (HEV) or battery-as-a-service (BaaS) will help gradually promote green transportation concepts and address market realities. Volkswagen announced a significant investment in its South African plant to address Africa's slow electrification market[36]. According to Reuters, Volkswagen will invest 400 million rand (approximately US\$210 million) in South Africa's Eastern Cape Province to upgrade manufacturing facilities and introduce a test fleet for the ID.4 electric vehicle, covering the South African and Rwandan markets. The South African government also plans to invest 1

billion rand (approximately US\$54.27 million) in new energy vehicle production and infrastructure to promote local production of electric vehicles and batteries, and to attract 30 billion rand in private sector investment [37]. Tax incentives and subsidies may also be introduced to support the development of the electric vehicle industry chain.

Furthermore, Toyota plans to enter the South African new energy vehicle market in 2026, launching three pure electric models and maintaining its hybrid dominance in the local market [38]. This move demonstrates that even with insufficient infrastructure, major brands are attempting to increase market penetration by diversifying their product lines.

## 6. SWOT Analysis and Strategic Evolution

Amid the wave of electrification, Volkswagen faces multiple opportunities and challenges. Using a SWOT framework, we can systematically assess its current strategic position and evolving direction.

### Strengths

As a globally renowned brand, Volkswagen, with its multi-brand portfolio, including Audi and Porsche, covers the premium to mass-market segments. Furthermore, its strong capital base provides the financial backing for its electrification and digitalization efforts. Its MEB platform, with its scaled development, is one of the more mature electric architectures in the industry.

### Weaknesses

Volkswagen lags behind Tesla in software capabilities, and its CARIAD division is experiencing slow growth. The 2015 emissions scandal has had a lasting impact on brand trust, particularly in the US market. Furthermore, traditional production lines and labor costs contribute to a heavy overall cost structure, impacting profitability.

### Opportunities

Continued policy subsidies from various countries, such as the EU Green Deal, China's new energy vehicle strategy, and the US IRA Act, coupled with rising consumer awareness of environmental issues, are creating a favorable environment for electric vehicle sales. Furthermore, the development of green finance is making it easier to access low-cost capital.

### Threats

Facing fierce competition from technology leaders like Tesla and BYD, raw material price

fluctuations and geopolitical factors (such as the Russia-Ukraine conflict and the Sino-US trade war) have increased supply chain risks. Regulations across countries are diverging, further increasing compliance costs and market entry barriers.

Using a SWOT framework, Volkswagen's sustainable strategy demonstrates both competitive advantages and structural constraints within the organization. Its brand influence, scaled manufacturing platform, and favorable policies in key markets provide a foundation for transformation, but these advantages have not yet been effectively translated into the innovation required by the electric vehicle industry. Furthermore, Volkswagen's slow progress in software development, damaged reputation following the emissions scandal, and heavy cost structures have weakened its core competitiveness. Therefore, while policy and market trends present opportunities, Volkswagen's heavy reliance on external subsidies and regulations reflects a lack of internal drivers. Furthermore, Volkswagen faces pressure from emerging electric vehicle companies like Tesla and BYD, as well as supply chain risks. While its strategy is feasible, its long-term competitiveness remains uncertain unless it overcomes organizational and technological shortcomings.

## 7. Conclusion

This study critically analyzes Volkswagen's strategic practices within the context of global sustainable development from four perspectives: policy environment, industrial structure, corporate strategy, and market feedback. This analysis reveals the underlying challenges and structural issues facing the transformation of the traditional automotive industry as a whole.

First, from a strategic perspective, Volkswagen's "NEW AUTO" plan demonstrates its forward-thinking understanding and strategic intent regarding electrification, digitalization, and carbon neutrality. However, in practice, it exposes deep structural weaknesses in software capabilities, localization cadence, and organizational agility. Particularly in the key markets of the United States and China, Volkswagen is significantly inferior to pure electric vehicle companies like Tesla and BYD in terms of technology stack integration and responsiveness.

Second, from a financial perspective, despite

Volkswagen's stable asset base and global manufacturing capabilities, its core metrics such as net profit margin and return on equity (ROE) are not competitive within the industry. This phenomenon reflects the fact that its multi-brand structure, redundant resource allocation, and transformation efforts are suppressing profitability. Compared to highly efficient companies like Tesla and BMW, Volkswagen urgently needs to innovate in capital utilization efficiency and value creation. Furthermore, judging by global market feedback, Volkswagen's sustainability strategy has achieved relatively positive results in Europe, but is constrained by trust issues and regulatory compliance barriers in the United States, and faces extremely fierce local price competition and technological blockades in China. In emerging markets like Africa, charging infrastructure, policy support, and consumer education remain insufficient, making it difficult for its "global strategy" to achieve true regional synergy and differentiation.

Finally, from an industry perspective, the challenges Volkswagen faces are typical, representing the widespread "path dependency" dilemma faced by traditional large automakers as they strive for a sustainable future: they must maintain their existing profit structure while also building new business models, often leading to resource conflicts and organizational disruption. This dilemma demonstrates that capital investment and product transformation alone are insufficient to support a truly sustainable transition.

In summary, while Volkswagen's strategic transformation direction is highly reasonable and it remains a key driver of green transformation in the global market, the feasibility of its model still needs to be based on deep organizational transformation, the reshaping of its technological structure, and the renewal of its global collaborative strategy. Otherwise, its global leadership in the emerging competitive landscape will face long-term challenges.

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