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Comparative Analysis of Chinese and US New Energy Vehicle Markets and Development Strategies of Chinese New Energy Enterprises

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Abstract. This study conducts a comprehensive analysis of the electric vehicle (EV) industries in China and the United States, recognizing their pivotal role in global economic growth, environmental sustainability, and energy security. With the EV market experiencing rapid expansion driven by government support and consumer demand for eco-friendly products, this paper underscores the importance of exploring the strategies of these two markets. By examining market dynamics, technological innovations, and policy frameworks in both countries, the study reveals similarities and differences in their approaches. While China's growth is largely policy-induced, the US market is primarily market-driven. The paper offers strategic recommendations to capitalize on strengths and address weaknesses, emphasizing the need for cross-country cooperation on infrastructure, consumer education, and technical and regulatory standards. Recognizing the significant impact of national strategies on global EV industry competitiveness, the study emphasizes the importance of understanding these factors for fostering sustainable growth and innovation. Future research should incorporate primary data to delve deeper into consumer behavior and refine market forecasts, ensuring continued insights into the sector's development.

Keywords: Electric Vehicles; Market Analysis; China; United States; New Energy Enterprises.

1. Introduction

1.1. Research Background

The electric vehicle (EV) industry is crucial in global economic growth, environmental sustainability, and energy security. The EV market is expanding rapidly as countries implement emissions reduction targets and consumer demand for environmentally friendly products increases. China and the US have seen significant growth in electric vehicle sales within the last few years. China’s new energy vehicle sales are expected to increase from 4.4 million units in 2022 to 7.5 million units in 2024, with a projected market share increase of 10 percent, while sales in the US will grow by 0.9 million units between 22 and 24 years, with a market share increase from 7.3 percent to 11 percent [1]. The rise of the electric vehicle industry has created tremendous market opportunities for automakers, component suppliers, and related service providers, contributing to the booming electric vehicle markets in China and the United States. Electric vehicles use battery power to reduce vehicle exhaust emissions, which improves environmental pollution and the greenhouse effect to a certain extent. In recent years, the range and performance of electric vehicles have been improving while the cost has been gradually decreasing, which has led to a broader audience for the electric vehicle market. At the same time, as climate change intensifies and fossil fuel reserves are depleted, a shift to renewable energy is imperative, and the growth of the electric vehicle industry can help promote energy diversification and security. Electric vehicles promote electricity as an alternative to conventional oil, helping to reduce dependence on petroleum resources to a certain extent and improving national energy security. In addition, electric vehicles can be used with renewable energy sources (e.g., wind and solar) to promote the optimization of the energy mix and diversification of energy use.

As a vital part of the overall development strategy of China’s new energy companies, new energy vehicles need to consider various factors such as technological innovation, market dynamics, policy

environment, and international cooperation to ensure long-term competitiveness and sustainable development. The Chinese government has made the new energy vehicle industry a vital area of national strategy to promote sustainable development and technological innovation. Various government support policies, such as subsidies, tax incentives, and the construction of charging infrastructure, directly impact the development strategies of new energy companies. At the same time, China's new energy companies can maintain their competitiveness in the global market through the continuous optimization and improvement of battery technology, electric drive systems, and vehicle control technology. On this basis, China's robust supply chain has dramatically reduced production costs and improved the production efficiency of new energy vehicles.

1.2. Literature Review

This section synthesizes recent literature on the new energy vehicle (NEV) market, focuses on the competition between the EV industry in different markets in China and the US and the competition between EVs and internal combustion engine vehicles, predicts the impact of government policies on the development of NEVs, and focuses on the feasibility of the EV industry for the country's efforts to broaden its energy channels.

Desai, Hittinger, et al. revealed the competitive relationship between electric vehicles (ETVs) and internal combustion engine vehicles (ICEVs) under different consumer preferences and cost scenarios [2]. The study uses an integrated model to predict a trend toward lower market share and cost for EVs by considering consumer diversity and behavior. In addition, the article explores the effect of government policies to support the market transition of EVs, noting that short-term government support is essential in accelerating market acceptance and cost reduction of EVs based on current technology and costs.

Guo, Sun, et al. found that although crude oil price is the most critical factor affecting crude oil imports in China, the increase in market share of new energy vehicles did not significantly reduce crude oil imports. It was found that for every 16.32 percent increase in crude oil price, crude oil imports decreased by one unit, while for every 133.99 percent increase in crude oil production, the contribution of crude oil import reduction was more minor [3]. This research suggests that in the short term, the effect of new energy vehicles on reducing crude oil dependence is limited. It will take a longer period and market penetration before the effect is visible.

He and Hao's comparative empirical analysis using an econometric model shows that Tesla's entry into the market has intensified competition with local Chinese automakers and significantly increased the variety of electric vehicles, thus improving consumer welfare [4]. This shows that due to the diversity effect brought about by introducing new products, Tesla's entry into the market, although putting pressure on Chinese car companies, also promotes market competition and technological innovation, which is positive for consumers and the development of the entire market.

While several scholars have explored the development of the electric vehicle market and consumer behavior in specific environments, comparative studies examining the strategies of electric vehicle firms in China and the United States are relatively sparse. In addition, little attention has been paid to the changing competitive landscape and how firms in each market position themselves for future growth.

1.3. Research Framework

The study first provides an overview of the development of the electric vehicle market in China and the US. Then, it compares the electric vehicle markets in China and the US to understand their similarities and differences. Once again, the study will provide insights into the growth strategies of Chinese EV firms, identifying how they are responding to domestic and international challenges. Finally, the study will synthesize these insights and make strategic recommendations for Chinese EV firms to improve their global competitiveness.

2. Description of the New EV Industry in the US and China

2.1. Chinese Electric Vehicle Market

China's electric vehicle market is the largest and fastest-growing market in the world. According to the China Association of Automobile Manufacturers (CAAM), in 2023, China's automobile sales reached 30.094 million units, a year-on-year increase of 12%. Among them, the sales of new energy vehicles reached 9.495 million units, ranking first in the world for nine consecutive years, with a year-on-year growth of about 38% and a market share of about 32% [5]. Its rapid development is attributed to the government's strong support, including policies such as financial subsidies, tax incentives, and vehicle purchase targets. In terms of technological innovation, Chinese companies have made significant progress in battery technology, electric drive systems, and intelligent network technology, with Ningde Times and others becoming the world's leading battery manufacturers. Regarding market structure, China's EV market consists of international joint-venture brands, traditional domestic manufacturers, and emerging pure EV start-ups rapidly taking over the market through innovative business models. Consumer acceptance of EVs has increased with the maturity of the technology and the promotion of government policies, while the construction of an extensive charging infrastructure has provided the necessary support. Market competition has become increasingly fierce due to the entry of international brands such as Tesla and the rise of new forces, driving technological advancement and product diversification. China's electric vehicle market is expected to continue to develop rapidly and maintain strong growth momentum, driven by policy and market demand.

2.2. US Electric Vehicle Market

The rapid expansion of the US electric vehicle market is attributed to government incentives, technological advancements, and rising consumer acceptance. Government measures such as tax incentives, subsidies for car purchases, and infrastructure development programs have boosted market growth, allowing traditional and emerging automakers such as Tesla, General Motors, and Ford to be active in the market and continue to introduce innovative models. With a focus on innovation and technology, new energy vehicles in the US continue to make technological breakthroughs, such as drive systems and intelligence, among the leading positions in the industry. At the same time, the fierce competition in the market has led to collaborations between significant brands, such as Ford and Rivian. As infrastructure improves in various regions of the US and the acceptance of electric vehicles increases, electric vehicles are expected to occupy a more important position in the US automotive market.

3. Comparison of China and US EV Industry

3.1. Similarities between the US and Chinese New Energy Vehicle Markets

3.1.1. Product and brand diversity.

The new energy vehicle markets in China and the United States have rich product lines and brand diversity. In China, in addition to traditional large automakers such as BYD, Geely, and SAIC, numerous emerging EV brands such as NIO, XPeng, and Li Auto are rapidly gaining market share with their innovative business models and technologies [6]. The US market has also witnessed diversification from Tesla to traditional automotive giants such as Ford and General Motors and emerging brands such as Rivian and Lucid, each attempting to appeal to consumers through unique design and technological innovation.

3.1.2. Intense market competition.

Intense competition exists between new energy vehicle manufacturers in the US and Chinese markets, with both countries having their representative new energy dropship industries, namely BYD and Tesla. In China, the competition between new power car brands and traditional automakers is particularly intense, with emerging brands gaining significant market share quickly thanks to rapid

technological innovation and flexible market strategies. The US market is also showing intense competition, with Tesla continuing to lead the way in EV technology and market share, while other emerging brands and traditional automakers are also increasing their R&D and market investment in EVs in an effort not to be marginalized by the market.

3.1.3. Demand for rapid technology iteration and innovation.

The new energy vehicle markets in China and the United States have evolved in response to solid demand for technology iteration and innovation, driven by intense market competition and gradually growing consumer demand for high-performance and environmentally friendly vehicles. The governments of both countries have facilitated rapid technological advancements in electric vehicles, including battery performance enhancement, autonomous driving, and vehicle intelligence, by providing policy support such as financial subsidies, tax incentives, and construction of charging infrastructure. In the market, competition between traditional automakers and emerging players has led to continuous technological evolution, such as the innovations in battery technology by Tesla and Ningde Times, as well as the collaboration between Azalea and NVIDIA on intelligent driving systems, which exemplify the dynamics of technological cooperation and competition [7]. This environment drives the development of new technologies and accelerates the improvement and application of existing technologies, thereby meeting market demand for more efficient and environmentally friendly transport.

3.2. Differences Identified in the EV Industry in the US and China

3.2.1. Market structure.

The Chinese and US new energy vehicle markets show significant differences in market structure, mainly in terms of dominant market forces, brand composition, vehicle model diversity, and stage of market development. The Chinese market is dominated by local brands, strongly supported by national policies, and the market covers a wide range of vehicles, from public transport to private cars, emphasising low cost and large-scale penetration. On the other hand, the US market is led by private companies such as Tesla, focuses on the premium segment, emphasises technological innovation and performance optimisation, and has a more diverse market structure, including competition from domestic and foreign brands. The Chinese market is driven by policy and is growing faster, while the US market is more reliant on market mechanisms, with a high degree of market maturity and free and marketised competition between firms. These differences reflect the different orientations of the two countries in terms of industrial policies, market environments, and consumer preferences, which have shaped the uniqueness and development trajectory of their respective markets.

3.2.2. Consumer groups.

The US and Chinese new energy vehicle markets differ significantly in consumer groups, and these differences mainly stem from the influence of their respective cultural, economic, and policy environments. In China, consumer purchases of new energy vehicles are primarily driven by government incentives, such as tax breaks and vehicle purchase discounts, making new energy vehicles an affordable option. In addition, Chinese consumers prefer local brands and value the cost-effectiveness and practicality of vehicles.

In contrast, US consumers are more motivated by environmental awareness and the pursuit of technological innovation, preferring technologically advanced brands such as Tesla and placing a higher value on vehicle performance, comfort, and high-tech features. This difference not only reflects the different development strategies of the two markets but also the different preferences of consumers in terms of values and functional needs.

3.3. Problem Identified

3.3.1. Market acceptance.

Although the new energy vehicle market is proliferating in China thanks to government subsidies, market acceptance faces many challenges. Consumers' range anxiety and lack of charging infrastructure for EVs remain significant barriers, especially in areas far from urban centers. At the same time, consumers need to understand new energy vehicle technology, especially misconceptions about vehicle maintenance and long-term usage costs, which also constrain further market acceptance. However, the most important consideration for consumers is still the cost-performance issue. After the subsidy slopes have been rolled back, the price of new energy vehicles remains high relative to traditional fuel vehicles. Consumers will weigh the cost of new energy vehicles against the economic and environmental benefits they bring when considering a car purchase.

In the US, market acceptance of new energy vehicles is strongly influenced by culture and consumer habits. While technological innovations have attracted some consumers, high initial purchase costs and trust in the new technology, particularly concerns about autonomous driving and battery safety, remain barriers to broader market acceptance. In addition, market acceptance of new energy vehicles in the US varies significantly by region. California, for example, has a much higher acceptance of new energy vehicles than some inland and southern states, which is directly related to local policy support and charging infrastructure development. These issues highlight the need for more policy support and the importance of social education in promoting the widespread adoption of new energy vehicles.

3.3.2. Sales strategy.

Developing the new energy vehicle market in China has relied heavily on government subsidies, leading firms such as BYD. (B.Y.D.) and Azalea (NIO) to over-rely on policy support for their sales strategies. As subsidies gradually decrease, these companies must find new competitive advantages to attract consumers, such as improving product quality and strengthening branding. Meanwhile, product homogeneity is rampant in the market, with most brands, such as Xiaopeng (XPeng) and Li Auto (Li Auto), lacking differentiation in design and technology and thus competing at a disadvantage in terms of price, undermining the industry's overall profitability. In addition, the lack of brand influence limits the expansion potential of China's new energy vehicle industry in the global market. For example, brands such as JAC and Great Wall need more substantial brand influence in the international market, making it difficult to compete with international brands such as Tesla.

In the US, significant issues in the new energy vehicle market include high vehicle purchase costs and inadequate infrastructure. Although Tesla is a leader in technological innovation, its high price limits its product appeal to the low- and mid-range markets. In addition, while Tesla has established an extensive supercharging network, other brands, such as General Motors' Chevrolet Bolt and Ford's Mustang Mach-E, need more market acceptance due to inadequate charging infrastructure. The US market also needs more consumer education, with many consumers having misconceptions about the maintenance costs and battery life of electric vehicles, which has hindered the broader adoption of new energy vehicles.

3.3.3. Policy focus.

Policy rollbacks in China create market instability, and the market may face short-term sales fluctuations and adjustments as the government gradually rolls back subsidies for the EV industry. This dependency may inhibit the market's potential for natural growth, and some companies may face operational pressures due to policy changes. In addition, local protectionism and lagging technical standards hinder healthy competition and uniform market development [8]. Although the central government has set a national policy framework, at the specific implementation level, local governments may impose different regulations and standards to protect local enterprises.

Politics highly influence the US's new energy vehicle policy, and policy discontinuity creates market uncertainty. In addition, consistency between federal and state policies limits the popularity and utility of EVs. For example, California has unique zero-emission vehicle requirements and incentives, while other states may not have corresponding policies [9]. This inconsistency may lead to market segmentation, limiting the nationwide rollout of new energy vehicles. Further, despite policies to boost new energy vehicle sales, the US government still needs to adequately build and invest in charging infrastructure. More infrastructure investment is needed to limit the utility and attractiveness of EVs, especially in non-urban areas.

4. Suggestions

4.1. Improve Market Acceptance of New Energy Vehicles

Infrastructure development is a critical factor in driving the acceptance of new energy vehicles, especially the gradual improvement of charging facilities. The Chinese Government and private sector have invested heavily in infrastructure development, rapidly expanding the charging station network in cities and along highways. This strategy not only effectively solves the problem of difficult charging for EV users but also accelerates the spread of the infrastructure through solid government support, such as providing free public charging station construction sites. In contrast, the construction of charging stations in the United States relies more on private sector investment and innovation, and although the federal and state governments also provide funding and policy support, the overall speed and density of charging network expansion lag behind that of China. From 2015 to 2021, China far outpaces the US in the growth of both fast and slow public charging piles, speedy charging piles, of which China has almost six times as many as the US [10]. Therefore, China's experience in rapidly building charging infrastructure, especially its model of government-private sector cooperation, provides vital lessons for the US, while the US's experience in encouraging private investment and innovation provides insights for China's continued development. Both countries can learn from each other and effectively promote the growth and maturity of their respective new energy vehicle markets.

Second, consumer education also plays a crucial role. The Chinese government can promote new energy vehicles' environmental and economic advantages through official media and educational campaigns, for example, by widely publicising the benefits of new energy vehicles in terms of reduced air pollution and lower energy consumption through television, radio, and online platforms. In addition, China has actively organised nationwide exhibitions and public open days for new energy vehicles to showcase new technologies and vehicle performance directly to consumers, increasing consumer knowledge and boosting their confidence in purchasing. In the United States, on the other hand, consumer education relies more on corporate marketing strategies and NGO advocacy efforts. US automakers and new energy vehicle-related companies provide detailed product information through brick-and-mortar shops and online platforms, highlighting the advantages of new energy vehicles regarding operational efficiency, maintenance costs, and future technology trends. At the same time, many non-profit organisations play a crucial role in promoting new energy vehicles by raising public awareness of the sustainability advantages of new energy vehicles through educational seminars, community events, and partnership networks.

4.2. Improvement of Sales Strategies

Innovative business models and cross-border cooperation can significantly improve market acceptance and the effectiveness of sales strategies. Due to solid government promotion and large-scale market demand, the Chinese market is more suited to business models such as leasing and EV-sharing services. These models reduce consumers' initial burden of vehicle purchase while responding to urban congestion and environmental needs. For example, promoting electric car-sharing platforms through cooperation between the government and enterprises enhances consumer convenience and accelerates the popularity of new energy vehicles. In the US, due to diverse consumer preferences and high dependence on personal vehicles, sales strategies can focus more on

lowering the cost of car purchases through financial innovations such as long-term loans and leasing services. In addition, US companies can attract consumers by offering customised services and high-end technology configurations, using their high technology and high performance as their central competitiveness in the market. Regarding cross-border cooperation, China and the US can share market data, technological innovations, and management experience to overcome challenges in their respective markets. Through bilateral exchanges and multilateral forums, the two countries can deepen their understanding of each other's market strategies and jointly promote the development of global technical standards and environmental norms for new energy vehicles. For example, China and the US can work together to develop more efficient battery technologies or more environmentally friendly manufacturing processes, which will help reduce costs and promote the global acceptance of new energy vehicles.

4.3. Optimisation of Policies for New Energy Vehicles

To further improve the efficiency and effectiveness of US and Chinese policies in new energy vehicles, the focus should be adjusting and optimising incentives and enhancing legislative support. First, China and the United States must fine-tune their incentives to make them more targeted and sustainable. For example, China could adjust its subsidy policy away from reliance on subsidies for vehicle purchases and toward more support for R&D and infrastructure development, especially in battery technology and expansion of charging networks. This would promote technological innovation and increase the market's self-sufficiency. At the same time, the US should ensure that its incentives (e.g., federal tax credits) are stable and predictable so that manufacturers and consumers can invest with confidence in the long term. Second, regarding legislative support, both governments should adopt legal frameworks to promote the widespread adoption of new energy vehicles. China can drive the market transition to EVs by setting stricter emissions standards and mandatory market share requirements while increasing penalties for violations to ensure policy enforcement. The United States, on the other hand, needs to develop uniform standards for new energy vehicles and specifications for charging facilities through federal and state-level cooperation to eliminate state-to-state policy differences and create a coherent market environment to facilitate the rapid expansion of new energy vehicles.

5. Conclusion

5.1. Key Findings

This study provides an exhaustive comparison of the electric vehicle (EV) industries in China and the United States, highlighting significant differences in market strategies, policy support, and technological advances between the two countries. The EV industries in China and the United States have shown rapid growth, but the development paths and challenges they face are very different. In China, government subsidies and a robust supply chain have driven demand, while in the US, market forces and private investment have played a more significant role. The study suggests that China and the US can learn from each other's strengths to improve their problems, with China taking a more open approach, and the US needs to improve its infrastructure and harmonise its policies across states.

5.2. Research Significance

This study is an essential contribution to the development of the electric vehicle (EV) industry in China and the United States, and it provides an essential reference for the new energy industry in China. This paper provides a better understanding of the dynamics of the EV market in the US and China, the key factors influencing the development of this industry, and targeted solutions. This is essential to anticipate future industry trends and to adequately prepare for the shift in global energy dependence, thereby supporting sustainable growth and innovation in the sector.

5.3. Limitations

While this study provides comprehensive insights, it is limited by its reliance on secondary data, which may not fully capture the nuances of consumer behaviour and real-time market changes. Future studies should consider incorporating primary data through surveys or interviews to gain insights into consumer preferences and decision-making processes. In addition, longitudinal studies provide a clearer picture of the long-term impacts of policy and market developments, which can help formulate strategies for sustainable growth in the EV industry more effectively.

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