

Competitive Strategies for OTA Services: Adapting the Strategic Clock for Tesla

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Abstract. The electronic vehicle (EV) market is radically growing in the automotive industry, while OTA services have become one of the main focuses of EV companies' competition. By applying the "strategic clock" model, this article analyzes feasible competitive strategies for Tesla's OTA services and gives possible suggestions for EV companies to optimize their OTA services. The author first introduces Tesla's OTA services' content and pricing strategies. And then, feasible strategies are analyzed in 8 paths in the "strategic clock". Finally, the previous analysis proposes several suggestions for Tesla and other companies to develop their OTA services. This article may play a positive role in the EV industry by improving competitiveness in OTA services. As the EV market grows, the EV markets will witness fierce competition in OTA services in the future.

Keywords: OTA Services, Competitive Strategies, Strategic Clock, Tesla.

1. Introduction

Electronic vehicle (EV) is an uprising star in the automotive industry for its extraordinary eco-friendly and high energy efficiency traits. The EV market is promising (Fig. 1): China and Europe will become the two major markets for new energy vehicles in 2025. In China, production and sales of new energy vehicles are expected to exceed 9 million units in 2025, when the market size soars to trillions of RMB. For the competitive market landscape in mainland China (Fig. 2), BYD and SAIC are strong rivals of Tesla China.

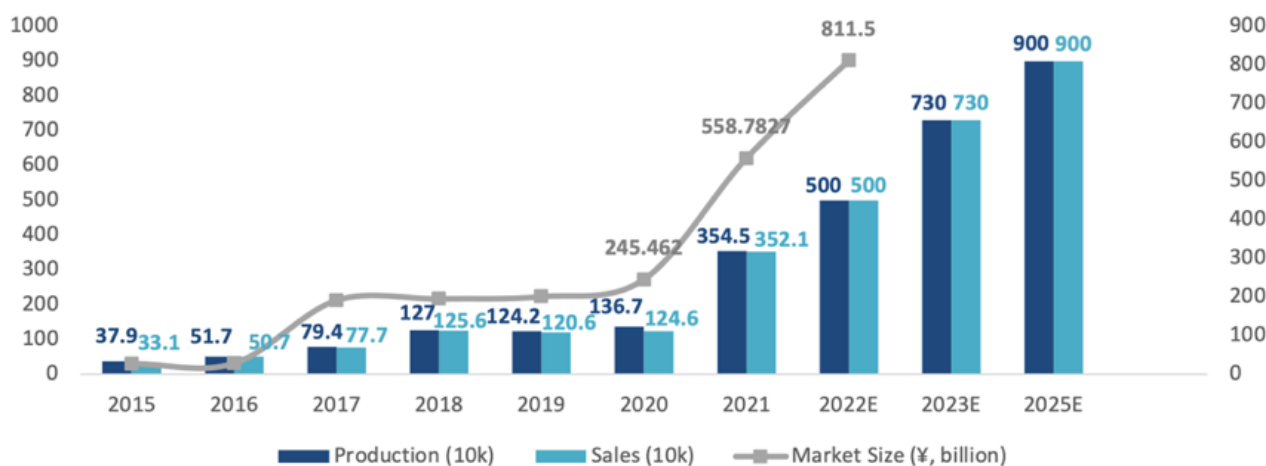


Figure 1. New Energy Vehicles Market Size in China (Resource: CPCA, EV Sales & Market share)

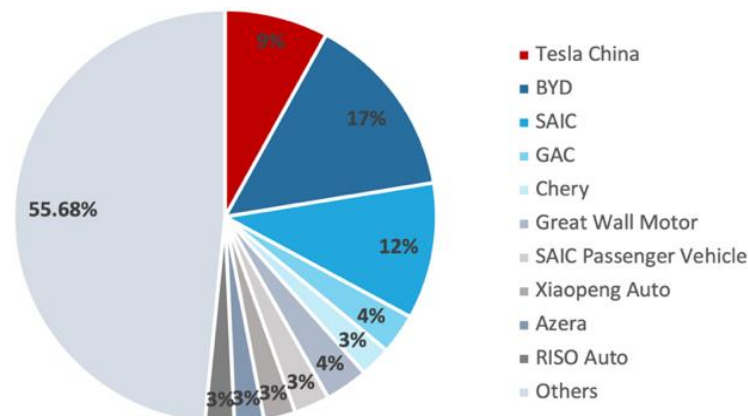


Figure 2. Competitive Landscape of New Energy Vehicles in China in 2021 (Resource: Marklines, CAAM)

EV enterprises face traditional product competition and complementary product supplier competition (such as energy infrastructure) - the latter makes the new energy vehicle industry a platform industry. The integrated interconnection of software and hardware will become the key to the success of EV enterprises [1]. In terms of hardware, Tesla has a considerable patent reserve, which is 986 in total. For its software, by adopting OTA technology, Tesla has realized digitization, visualization, automation, and virtualization of hardware control through the in-vehicle service system, maximizing the performance and value of vehicles.

This article aims to analyze feasible competitive strategies for Tesla's OTA services, and also give possible suggestions for EV companies, similar to Tesla, to optimize their competitive strategy in OTA services. To analyze Tesla's OTA services, the author adopted the "strategic clock" model, discussing the feasibilities of three independent strategies (cost leadership, differentiation, and focus strategies) and combinations of those strategies for Tesla's OTA services. Analysis shows that Tesla should adopt a differentiation strategy with high added value by clarifying its brand image, achieving product differentiation, and expanding market penetration in the OTA sector.

This article could provide possible approaches for Tesla to develop OTA services, inspiring other EV companies' OTA services. This article could also provide strategic guidance to Chinese EV companies for their OTA services in China, one of the largest EV markets. In addition, this article may play a positive role in the EV industry by improving competitiveness in OTA services. As OTA services are relatively less discussed in existing studies, this article fills the gap in the competitive strategies analysis for EV companies.

2. Literature Review

Tesla could be considered as disrupting the automotive industry. As a leading company in the industry, Tesla has been studied by scholars. This session will provide an overview of Tesla's technology, business, and strategy. According to Braunfels, Tesla digitizes, automates, and visualizes its EVs and driving data. The high level of software and hardware technology integration gives Tesla a unique advantage in the EV industry [2]. Also, Anderson et al. addressed that Tesla is the entity that manages the OTA platform, including coordinating supply and demand, formulating product strategies, and building an information platform [1]. Tesla's integrated electrical and electronic layout helps to lighten the vehicle, thereby reducing energy consumption. ECU (Electronic Control Unit) and BMS (Battery Management System) constitute Tesla's electronic control system, and their computing efficiency is ahead of the average level of the industry [3].

Tesla faces several challenges from other EV companies. Tesla's hardware constitutes the core competence of Tesla, while the perfect software architecture drives the value realization of the core competence [4]. Compared with Tesla, BYD has certain competitiveness in market positioning, electronic technology, and supply chain management. BYD owns a wide range of products and a wide price range, covering most consumers from the down market to the high-end market [3].

Compared to Tesla, Azera's market share is lacking in competitiveness, but its software design is unique for a company that was only founded in 2014 [5].

One of Tesla's competitive strategies is its DTC (Direct to Customer) sales model. Compared with traditional sales models, DTC eliminates the resistance of middlemen - companies could provide consumers with more direct and faster service at lower prices and costs through DTC [6]. Tesla's DTC model mainly uses offline stores and online platforms. Tesla aims to provide enough space for customers to make decisions by providing high-quality offline and online services [7].

The "Strategic clock" model is introduced and applied in different disciplines. According to Zhou's study, the strategic clock synthesizes Porter's theories about competitive strategies. It presents 8 paths of general market-based approaches on a diagram, a market-based model of competitive strategic choice, and a model for developing available strategy [8]. Combined with the dynamic game of firms, Yan analyzed the optimal competitive strategy model for firms based on different development patterns within the strategic clock [9]. Li & Zhao adopted the strategic clock model, proposing five market entry modes and analyzing market entry strategies for Chinese companies to enter the "Belt and Road" business zone [10].

3. Competitive Strategies for Tesla's OTA Services

3.1. Case Description

OTA (Over-The-Air Technology) is mainly applied for remotely updating terminal devices and is widely used in mobile phone and computer system updates. Similar to updating the iOS in iPhone, Tesla's in-vehicle service system also pushes updates by OTA, which generally include adding platform-compatible software, optimizing software services, or improving hardware performance. Tesla's OTA services are categorized into FOTA (Firmware Over-The-Air) and SOTA (Software-Over-The-Air). FOTA services are mainly related to hardware updates and optimizing vehicles' performance, while SOTA services focus on informative and recreative applications. Tesla's primary OTA services and the corresponding prices are shown in table1.

Table 1. Tesla's OTA Services and Charges (Partial)

	Services	Content	Charges
FOTA (Firmware Over-The-Air)	Full Self-Driving (FSD)	Auto lane changing, auto-parking, smart summoning, etc.	Buyout: \$15000 Subscription: \$99/\$199 per month
	Media Control Unit	Games, theater mode, cellular network, etc.	\$1500
	Home Charging	J1772 wall connector	\$550
	Acceleration	0.5 seconds reduction in 100 km	\$2000
SOTA (Software-Over-The-Air)	Standard Connectivity	Navigation	Free for eight years
	Premium Connectivity	Navigation, traffic visualization, sentry mode, video streaming, music streaming, internet browser, etc.	\$9.99 per month

Tesla's charging methods for OTA mainly include "subscription"(mainly for SOTA) and "buy-out"(mainly for FOTA). These charging strategies are closely related to the consumers' habits. For example, FSD, home charging, and acceleration services are firmware services with long-term dependencies. Although those charges are higher, a one-time purchase at the beginning can rationalize high prices in an average sense. Conversely, Tesla applies the cheaper subscription strategy for SOTA, attracting higher price elastic users to capture more marginal profits. Therefore, Tesla's OTA pricing strategy, the combination of buy-out and subscription, helps Tesla to form a profit structure with FOTA as the mainstay and SOTA for marginal revenue.

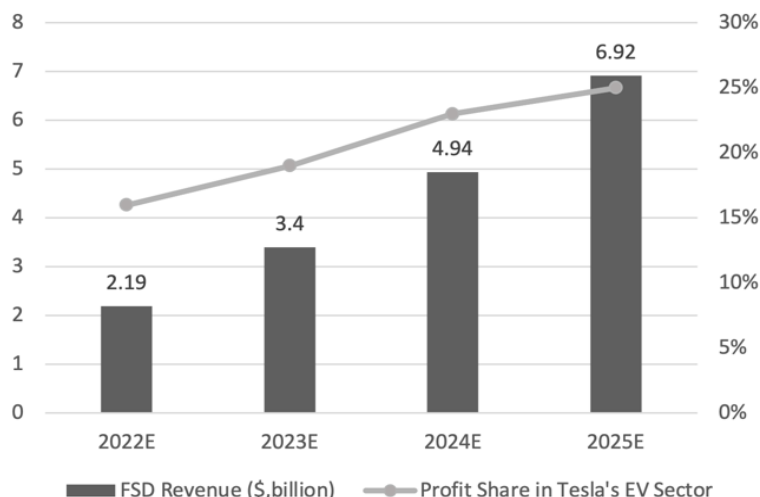


Figure 3. FSD Revenue and Profit Share in Tesla's EV Sector (Resource: ESSENCE SECURITIES)

Tesla's FSD service is expected to contribute 1/4 of the gross profit of Tesla's automotive business in 2025 (Fig. 3). In the long term, Tesla is likely to transform FSD's charging strategy into "subscription". It is expected that 80% of Tesla owners will become subscribers of FSD, and FSD revenue may exceed \$16 billion annually in 2030 [11]. In conclusion, OTA services contribute significantly to Tesla's automotive business, and enhancing OTA's subscription coverage is one of Tesla's future orientations. As one of the most important revenue sources and one of Tesla's outstanding advantages, OTA services need appropriate competitive strategies to enhance Tesla's competitiveness.

3.2. Competitive Strategies Analysis – Strategic Clock

"Strategic Clock" was developed from Porter's "Generic Competitive Strategy" model, which contains three independent strategies (cost leadership, differentiation, and focus strategies) and combinations of those strategies (Fig. 4). The X-axis represents price, which is positively related to products' demand risk. The Y-axis represents added value, positively related to the degrees of product differentiation. The eight paths in the strategic clock represent different strategy combinations. This section uses the strategic clock model to analyze the competitive strategies for Tesla's OTA services.

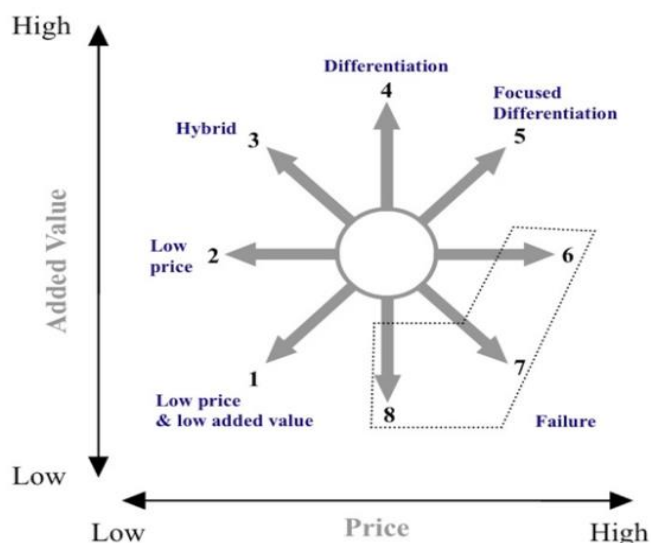


Figure 4. Strategic Clock Model

Path 1: A focused low-cost strategy, i.e., a strategy with lower price and added value. Tesla's SOTA services are most likely to achieve this path. SOTA mainly focuses on application updates,

and the marginal cost per additional user is almost zero. The dominant cost of SOTA generates from software vendors and platform maintenance, which indicates the possibility of further price reduction. Even if Tesla could adopt path 1, path 1 is not the optimal choice.

Path 2: Cost leadership strategy, i.e., solely lowering prices. Tesla could maintain advantages in OTA service by strengthening vendor competition. Devices such as bidding, auction, and negotiation are feasible options to reduce expenditures on the vendor side. However, path 2 is highly replicable, so it is not an optimal strategy for Tesla's OTA services.

Path 3: Hybrid strategy, a combination of cost leadership and differentiation strategy, aims to increase the product's added value while reducing or maintaining the price level. In addition to supply chain management capabilities, Tesla has a strong advantage in data collection, which helps to provide targeted OTA customer service. For instance, Tesla's Autopilot system collects billions of kilometers of driving data, providing a solid database for Tesla to understand users' driving habits and develop customized OTA updates [2]. Therefore, it is feasible and plausible for Tesla to enhance OTA services with lower prices and higher added value.

Path 4: Differentiation strategy, i.e., offering more added value to users with the ordinary price. To achieve this strategy, companies ought to obtain core competencies to respond to the differentiated demand from consumers. Tesla has strong competitiveness in both software and hardware sections: Tesla's products and services have achieved digitalization, virtualization, automation, and visualization. Also, supported by digitalization technology, Tesla can provide personalized and customized services to consumers [2]. Therefore, it can be inferred that Tesla can satisfy consumers' differentiated needs.

Path 5: Focused differentiation strategy, i.e., a dynamic strategy with high prices and high added value. Tesla has a strong ability to integrate supply chains and has the capabilities to provide high-tech and high-value-added OTA services. Technological investigation requires significant initial investments, which forces the prices of Tesla's OTA services, especially the FOTA services, to be relatively high. However, high pricing may bring greater demand risk. Therefore, the focused differentiated strategy should be applied moderately and combined with other competitive strategies to mitigate the demand risk.

Strategies lead to failure: The other three paths could be setbacks for companies' competitiveness. They could shift to the focused differentiation strategy and increase the added value of their products through various means, such as increasing R&D investments or providing customized services.

Table 2 illustrates the feasibility of Tesla's OTA services competitive strategies. Overall, strategies with high added value are suitable for Tesla's OTA services, including combinations of centralization strategies and other strategies (Path 3-5). Specifically, Tesla should utilize its supply chain integration capability and patent advantages, developing high-quality FOTA services. In conclusion, for technology-based EV companies, the main element of competitive strategies should be improving the added value of products and services while considering price factors.

Table 2. Competitive Strategies Analysis of Tesla's OTA Services

Path	Price level	Added Value	Traits	Feasibility	Remarks
1	Low	Low	Low cost & low quality	Unfeasible	Inappropriate for Tesla's brand positioning
2	Low	Ordinary	Low price	Unfeasible	Easy to imitate or duplicate
3	Low	High	Low price & high quality	Feasible	Demanding core competencies and user identification capability
4	Ordinary	High	High added value	Feasible	
5	High	High	High price & High quality	Feasible	Applicable to FOTA services such as FSD and Autopilot

3.3. Suggestions

Based on the competitive strategies analysis for Tesla's OTA services, it could be concluded that Tesla's OTA services should adopt a differentiation strategy with high added value. The main goal

for Tesla is to clarify its brand image, achieve product differentiation, and expand market penetration and OTA services coverage.

3.3.1. Suggestions for Tesla's OTA Services

First, Tesla's brand image should be differentiated. A company's brand image must stand out from homogeneity and maintain consistency over time. Tesla is not only an EV company but also a technology company. Tesla's vision in the automotive industry is to eventually achieve fully automatic driving by analyzing the driving environment and owner's habits with artificial intelligence. Such vision is prominently reflected in Tesla's OTA service. For example, in the Model S Plaid, expected to be delivered in 2023, physical gear, horn button, and turn signal controls are all integrated into the in-vehicle touchscreen. Bold designs reflect Tesla's firm goal of fully autonomous driving and its avant-garde technology brand image.

Second, added value in OTA services should be optimized by improving hardware capability to realize the differentiation strategy. Tesla should maintain its technical capability to create new possibilities for OTA services with outstanding hardware configuration. For instance, Tesla applied the carbon-fiber-wrapped motor technology, which guaranteed acceleration ability and thus provided appropriate hardware conditions for the "acceleration service" in FOTA. Also, Tesla added an active noise cancellation configuration to the stereo audio system and enhanced sound insulation, achieving better performance of SOTA services. In short, improving hardware capability could maximize utility and bring higher added value to OTA services.

Thirdly, the diversity of OTA services should be enhanced, including service contents, pricing strategies, and service targets. For service diversity, Tesla's FOTA service includes FSD, charging, and acceleration enhancement services. However, SOTA only includes Standard and Premium versions of "connectivity" services. Therefore, it could be inferred that there is room for service diversification in SOTA. For pricing diversity, Tesla has adopted a combination of buyout and subscription-based charging. For service target diversity, Tesla's OTA services are exclusive to Tesla owners. In the future, Tesla may share its OTA services technology with other EV companies by opening up the OTA platform and introducing a rental system. This could optimize Tesla's patent advantage to realize the scale effect of OTA services, especially FOTA services while increasing revenue sources and improving revenue structure.

3.3.2. Suggestions for Other EV Companies

Differentiation strategy may weaken homogeneous competition among EV companies and reduce competitive threats. The author believes that companies similar to Tesla could enhance their competitiveness in OTA services through a differentiation strategy (Table 3). In terms of brand differentiation, EV companies need to focus on maintaining the consistency of their brand image, developing OTA services with brand characteristics, maximizing their technological advantages, etc. In terms of product differentiation, EV companies could attract more consumers through tiered OTA services and diversified pricing methods to improve OTA services' subscription coverage. In addition, enterprises could choose to transform their OTA services platforms into open or half-open platforms to improve the market penetration of OTA services and realize the diversity of service targets and scale effect.

Table 3. Possible Ways to Achieve Differentiation Strategy in OTA Services

	Objectives	Approaches
Brand Differentiation	Brand image consistency	Focused enhancement of OTA services with brand characteristics
	Brand image recognition	
Product Differentiation	Higher added value	Hardware capability improvement
	Diversity of project tiers	Standard version & Premium version
	Diversity of pricing strategies	Buyout & Subscription
	Diversity of service targets	From closed platform to open platform

4. Conclusion

Tesla should adopt a differentiation strategy with high added value in the OTA services. Detailly, strategic clock analysis illustrates that cost leadership strategy is not feasible for Tesla's brand positioning. Also, it could be concluded that competitive strategies with high added value are relatively appropriate for Tesla's OTA services. Consequently, for EV companies like Tesla, the fundamental element in their competitive strategy is to optimize added value and price factors in OTA services.

To achieve a differentiation strategy with high added value, several approaches for Tesla are drawn as follows. First, Tesla's brand image should be differentiated by highlighting the brand's characteristics in its OTA services. Second, by improving hardware capacity, Tesla should optimize their OTA services with comprehensive approaches. Lastly, OTA services' coverage could be further expanded by diversifying service contents, pricing strategies, and service targets.

The differentiation strategy could also be applied to other EV companies' OTA services. EV companies should enhance their OTA services with brand characteristics to achieve brand differentiation. To achieve product differentiation, EV companies should increase added value in their OTA services and diversify product tiers, pricing strategies, or service targets.

Limitations in this article are listed as follows. As a theoretical approach, this article lacks quantitative analysis and statistical testing. Also, if data on companies before and after applying competitive strategies could be collected, more detailed suggestions could be proposed. However, competitive strategies drawn in this article are still inspiring for novel EV companies eager to develop and optimize their own OTA services, especially for Chinese EV companies such as Azera and Xiaopeng Auto. EV markets will witness fierce competition in OTA services in the future.

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