

# Analysis of the Core Competitiveness of New Energy Vehicles—A Case Study of Xiaomi Motors

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## Abstract:

In recent years, China's new energy vehicle market has experienced explosive growth. Simultaneously, the emergence of a new trend of technology companies entering the automotive industry has shifted the focus of industry competition from hardware performance to comprehensive strength. This paper aims to construct a four-dimensional framework for analyzing the core competitiveness of new energy vehicles: technology, cost, users, and ecosystem. Using Xiaomi Motors as a case study, this paper explores how technology companies can build competitive advantage through differentiation strategies. This study employs a case study approach, combining information such as the Xiaomi SU7's model positioning, technology layout, and pricing strategy, and employs a systematic analysis based on the four-dimensional framework. The results indicate that Xiaomi Motors' core competitiveness lies in its technological balance of "in-house research and development + collaboration," the cost advantages of reusing the consumer electronics supply chain, user stickiness driven by the fan economy, and the ecosystem barrier of a "closed loop of people, cars, and homes." This differentiation path can provide practical reference for other crossover automotive companies.

**Keywords:** New energy vehicles; Xiaomi Auto; core competitiveness.

## 1. Introduction

In recent years, China's new energy vehicle market has experienced explosive growth, becoming a core driver of the global automotive industry's transformation. Against this backdrop, the global automotive industry is accelerating its transition toward electrification and intellectualization. China, through policy

guidance and industrial collaboration, has further consolidated its position as a core growth engine for the new energy vehicle market. According to data from the China Association of Automobile Manufacturers (CAAM), new energy vehicle sales in China will reach 12.866 million units in 2024, accounting for 40.9% of total vehicle sales. In 2015, this share was only 0.9%, representing a market expansion of

over 38 times over the past decade. This growth is driven by the breakthrough increase in power battery energy density from 150Wh/kg in 2015 to 255Wh/kg in 2024, as well as the improvement of charging infrastructure with 95% coverage of highway service areas. It is also closely related to national policies such as purchase tax exemptions and the dual-credit system. In December 2021, the „Notice on the 2022 Financial Subsidy Policy for the Promotion and Application of New Energy Vehicles“ was issued, extending the national purchase subsidy policy until December 31, 2022. Meanwhile, the emergence of tech companies in the automotive industry is reshaping the competitive landscape. Xiaomi announced its car manufacturing venture in 2021, releasing its first model, the SU7, in 2023 and delivering it rapidly. Huawei, through its „Smart Car“ model, is collaborating with automakers to deliver smart cockpit and autonomous driving technologies. These companies are breaking away from the traditional automaker’s „three-electric technology“ competitiveness framework and extending their competition into areas such as „ecosystem synergy“ and „user operations.“ Against this backdrop, the automotive industry chain, technology chain, and value chain are undergoing accelerated restructuring, and the boundaries of the original industry are constantly expanding [1]. However, existing research lacks clarity: most core competitiveness analyses focus on traditional automakers’ manufacturing and supply chains, overlooking how technology companies are building barriers through the consumer electronics ecosystem and fan economy; and some evaluation metrics are difficult to adapt to the characteristics of the „smart electric era.“ Based on this, this paper aims to: first, develop a core competitiveness analysis framework for new energy vehicles that adapts to the industry’s characteristics, clarifying the connotations and mechanisms of the four dimensions of „technology, cost, user, and ecosystem“; second, using Xiaomi Auto as a case study, analyze its practices in these four dimensions and explore the differentiation strategies of cross-border tech companies. In terms of research significance, in theory, it can supplement the core competitiveness theory in the context of technology cross-border car manufacturing and improve the existing evaluation system; in practice, it can clarify the direction of „advantage reuse“ for technology companies planning to cross-border, and also inspire for traditional car companies to optimize ecology and user operations.

## 2. New Energy Vehicle Core Competitiveness Analysis Framework

### 2.1 Technology Dimension: Performance Cornerstone of Competitiveness

The technology dimension directly determines key user perception indicators such as vehicle endurance, safety,

and intelligent experience, focusing on the two core areas of „three-electric system“ and „intelligent technology“, which work together to support the core experience of product competitiveness. At the same time, technological innovation can improve the market transformation ability of new products, improve the commercialization and industrialization process of products, expand market share and market competitiveness [2].

As the „power core“, the iteration of the three-electric system is the key to improving the competitiveness of new energy vehicles. Among them, the improvement of the energy density of new energy vehicle power batteries is an important direction for the development of the three-electric system technology. The optimization of power battery performance (especially the breakthrough of energy density) plays a decisive role in the endurance and safety redundancy of the entire vehicle, and directly dominates the iteration path of the three-electric system technology and the development trend of the industry [3]. Intelligent technology reshapes the competitiveness of new energy vehicles from the dual dimensions of interaction and safety, becoming the key to user-perceived value. Intelligent cockpits reduce driver distraction through efficient interaction. Autonomous driving relies on technology to break through the limitations of human driving. „In terms of safety, this technology significantly improves road safety by eliminating the subjective errors of human drivers. Research data shows that about 90% of traffic accidents are caused by improper driver operation. Autonomous driving equipment, relying on millimeter-wave radar and intelligent decision-making algorithms, can effectively avoid traditional driving hazards such as distraction and physiological function decline“ [4].

### 2.2 Cost Dimension: Key Support for Market Penetration

The cost dimension determines pricing and profitability. Building cost barriers through the coordinated optimization of „supply chain management - scale effect - refined control“ is the core competitiveness against traditional fuel vehicles. In the precise allocation of Research and Development (R&D) costs and scale effect, focusing on cost control of core components with a high proportion is the key. Battery costs account for 40% of the total cost of new energy vehicles, and automotive electronics (including chips and sensors) account for 20%. These two types of components constitute the main direction of cost optimization. Secondly, by diluting fixed costs, costs can be significantly reduced. The indirect costs of new energy vehicles show a linear downward trend as the scale expands [5]. Digital innovation of manufacturing efficiency: Achieve precise cost reduction through technological innovation: Adapt high-digital management to highly automated production equipment, and use self-developed testing systems to improve quality control, effectively

reducing unit manufacturing costs. With the expansion of production capacity, manufacturing costs can be further reduced.

### 2.3 User Dimension: the Core Carrier of Long-term Value

The user dimension focuses on „acquisition - retention - value-added“. Building user stickiness through brand and service is the key to the breakthrough of technology companies in cross-border car manufacturing. In terms of brand loyalty, new energy vehicle companies can enhance their market competitiveness through user communities and co-creation product design. In the verification of the perceived value model, the social value weight of „community belonging“ reached 0.23, and „brand technology image“ accounted for 19% of the key factors in purchase decisions, confirming the dual driving force of brand community and technology recognition on loyalty [6]. A full-cycle service experience is the core support for user retention and value-added. Based on a service system that covers the entire vehicle purchase and use process, this system effectively enhances user purchase intention by precisely responding to customer needs and optimizing service points. By improving the after-sales service system and addressing issues like recharging, user loyalty can be sustainably improved, creating a long-term closed loop of „experience optimization - loyalty enhancement.“

### 2.4 Ecosystem Dimension: A Differentiating Barrier for Cross-Border Tech

The ecosystem dimension, through „cross-device collaboration and scenario integration,“ creates a closed loop connecting „people, cars, and homes,“ and is a core differentiating barrier for technology companies compared to traditional automakers. While traditional automakers focus primarily on vehicle hardware, cross-border tech companies can leverage the existing smart device ecosystem to break the isolation between cars and devices like mobile phones and home appliances, enabling cross-device data and command flow. This synergy embeds the vehicle into users' daily lives, transforming it from a simple means of transportation into a smart living hub. Deep scenario integration significantly reduces user switching costs and strengthens customer loyalty. At the same time, the value-added of software services supported by the ecological foundation can expand the functional boundaries of products through continuous upgrades, extend the life cycle, and create sustainable income, forming a profit model of „hardware drainage - software value-added“, breaking away from dependence on hardware profits and consolidating competitive advantages.

## 3. Case Analysis of Xiaomi Auto's Core

## Competitiveness

### 3.1 Overview of Xiaomi Auto

As the core carrier of Xiaomi Group's cross-border layout in the field of new energy vehicles, Xiaomi Auto has focused on „reconstructing automotive products with consumer electronics thinking“ since the official announcement of its car manufacturing plan in 2021. The launch of its first mass-produced model marks the transition of technology companies' cross-border car manufacturing from concept to practice. The initial investment in Xiaomi's smart electric vehicle business is RMB 10 billion, which provides solid support for the implementation of the automotive business [7]. From the perspective of product progress, Xiaomi Motors held a technology launch conference on December 28, 2023, publicly unveiling the five core technologies of the pure electric sedan SU7 for the first time, but did not announce the price and listing information; held a listing conference on March 28, 2024, officially announcing the launch of SU7, with the standard version priced at RMB 215,900, the Pro version at RMB 245,900, and the Max version at RMB 299,900. Within 27 minutes of its launch, the number of pre-orders exceeded 50,000 units; the first batch of delivery ceremony at the Yizhuang factory was held on April 3, 2024. As of May 15, 2024, the cumulative delivery volume of the SU7 series exceeded 10,000 units, with the first month's lock-in volume reaching 88,063 units [7]. This market performance is highly consistent with the promotion rhythm of Xiaomi Group's „full ecosystem of people, cars, and homes“ strategy. In terms of vehicle positioning, Xiaomi SU7 focuses on the C-class high-performance eco-tech sedan market, and its core user group shows significant eco-attribute: 66% of the first batch of car owners are Xiaomi mobile phone users, and 99% have purchased Xiaomi eco-products[8]. Its direct competitor is the Tesla Model 3, and it has formed market segmentation through differentiated pricing, a large number of technological applications, and reasonable configurations.

### 3.2 Analysis of Xiaomi SU7's Technology and Eco-Competitiveness

As a benchmark product for technology companies to cross-border car manufacturing, Xiaomi SU7's technological competitiveness stems from the R&D experience and ecological resources accumulated by Xiaomi Group in the field of consumer electronics. Through the dual-wheel drive of „hard technology innovation + soft ecological integration“, it has built a differentiated technological barrier. In 2024, Xiaomi Group's investment in the research and development of smart electric vehicles reached 6.2 billion yuan [9]. This high-intensity investment supports SU7's technological breakthroughs in core areas such as the three-electric system, intelligent driving, and intelli-

gent cockpit. Compared with traditional competitors such as Tesla Model 3, SU7's technology path emphasizes „user experience-oriented technology integration“ and achieves efficient conversion of technical parameters and actual scenario value by accurately matching the needs of target users (72% of them are technology enthusiasts aged 25-40).

### 3.2.1 Performance breakthrough and scenario adaptation of the three-electric system

Xiaomi SU7 adopts the „layered configuration + core innovation“ strategy in three-electric technology, providing differentiated solutions for different user needs. The basic version is equipped with a 73.6kWh lithium iron phosphate battery with a range of 700km; the Pro version uses a 94.3kWh battery, with a range increased to 830km; the top-of-the-line Max version is equipped with a 101kWh ternary lithium battery with a range of 800km. This layered strategy allows SU7's price to cover the range of 215,900-299,900 yuan [10], which has a wider market coverage than Tesla Model 3 (235,500-339,500 yuan)[11]. In terms of energy replenishment efficiency, the SU7 standard version and Pro version can replenish 350km of driving range in 15 minutes. In terms of power performance, the Max version's dual-motor system has a maximum power of 495kW and a peak torque of 838N·m, and accelerates from 0 to 100km/h in just 2.78 seconds. Its self-developed V8s motor has a maximum speed of 27,200rpm, and its technical parameters are among the top in the industry [10]. Fast energy replenishment and strong power performance have become the two major selling points of Xiaomi Auto.

### 3.2.2 Multi-sensor fusion solution for intelligent driving

Xiaomi SU7 adopts the „LiDAR + Vision Fusion“ technology route, which is in sharp contrast to the pure vision solution of the Tesla Model 3. The Pro/Max version is equipped with Xiaomi HAD, Xiaomi assisted driving, and is equipped with 1 LiDAR, 11 external cameras, 12 ultrasonic radars, and 3 millimeter-wave radars to build a 360-degree all-around perception system [10]. This hardware configuration makes SU7 perform more stably in complex scenarios. In terms of computing power support, the Pro/Max version is equipped with dual Nvidia Orin-X chips with a total computing power of 508TOPS. Although it is lower than the 720TOPS of Tesla HW4.0, it achieves higher perception efficiency through algorithm optimization[10]. It is worth noting that the Xiaomi SU7 comes standard with Urban Navigate on Autopilot (NOA) across its entire series, while Tesla's Full Self-Driving (FSD) capability requires an additional payment of 64,000 RMB for installation [11]. This pricing strategy significantly lowers the barrier for users to experience advanced intelligent driving features.

## 3.3 Cost Competitiveness Analysis of Xiaomi SU7

As a typical technology company crossing over to car manufacturing, Xiaomi SU7's cost competitiveness is built on the refined management experience of the consumer electronics industry and the scale effect of automobile manufacturing, forming an „ecological synergy cost reduction“ path that is completely different from Tesla's vertical integration model. According to Xiaomi Group's 2024 annual report, the gross profit margin of the „intelligent electric vehicle and other innovative businesses“ segment reached 18.5%, which is significantly higher than the cost control level of new energy vehicle start-ups at the same stage, confirming the unique value of the technology cross-border model in cost management [9]. The formation of this competitiveness stems from the precise allocation of R&D investment, ecological coordination of the supply chain, digital innovation of manufacturing efficiency, and efficient reuse of user assets, etc., in multiple dimensions of system optimization.

### 3.3.1 Precise allocation strategy for R&D costs

Xiaomi adopts the R&D cost control model of „concentrated breakthrough of core technology + reuse of ecological resources“ to achieve a balance between technological innovation and cost control. In 2024, Xiaomi Group's R&D investment in intelligent electric vehicles reached 6.2 billion yuan, and a cumulative investment of 4.6 billion yuan in 2023, totaling 10.8 billion yuan in two years [9]. The focus is on the three core areas of the three-electric system, intelligent driving, and the Pengpai OS car system. Unlike Tesla, which distributes its R&D expenses across the entire supply chain, including battery chemistry, full-stack autonomous driving algorithms, and Gigafactory construction, Xiaomi significantly reduces marginal costs by reusing its technological expertise in consumer electronics. The Snapdragon 8295 chip in its smart cockpit is sourced from the same supply chain as Xiaomi phones, reducing cockpit system hardware costs.

In terms of R&D amortization efficiency, the cumulative delivery of SU7 in 2024 will be 136,854 vehicles (including the standard, Pro, and Max configurations). If the 10.8 billion yuan R&D investment is amortized over 10 years, the R&D cost per vehicle is approximately 7,900 yuan. Xiaomi plans to achieve 350,000 SU7 sales by 2025, by which time the R&D cost per vehicle will be reduced to 3,100 yuan. Tesla's Model 3 saw its R&D cost per vehicle reduced to 3,000 yuan per vehicle through mass production from 2017 to 2024. However, Xiaomi, a new entrant, narrowed the gap to 2.5 times in just one year. This efficient conversion is due to Xiaomi's „modular R&D“ strategy: the three-electric system, intelligent driving, and cockpit systems are developed as independent modules, which can be quickly reused for more models in the future.



### 3.3.2 Supply chain ecosystem synergy and cost control

Xiaomi has established a differentiated advantage in core component cost control through its supply chain strategy of “joint venture lock-ins + volume procurement.” As the battery constitutes the largest cost item in electric vehicles, Xiaomi has achieved cost optimization via its joint venture model: the company co-founded Times BAIC (Beijing) New Energy Technology Co., Ltd. with Contemporary Amperex Technology Co. Limited (CATL). Its core business is to supply lithium iron phosphate batteries to Xiaomi SU7 [12], which directly supports the pricing advantage of 215,900 yuan for the standard version of SU7. Unlike Tesla’s 4680 battery technology cost reduction path, Xiaomi focuses more on the deterministic cost advantage brought by supply chain collaboration. Tesla’s 4680 battery achieves cost reduction through dry electrode technology, but the mass production rate in 2024 is insufficient, resulting in actual costs higher than expected; while Xiaomi uses CATL’s Shenxing battery and Kirin battery which are mature mass-produced products. Through the dual supplier strategy (CATL + BYD Fudi), the purchase price is further lowered. In terms of intelligent driving hardware, the cost of the Hesai AT128 laser radar equipped in the SU7 is controlled at around 3,000 yuan, which has a significant configuration cost advantage compared to Tesla’s FSD optional fee of 64,000 yuan.

### 3.3.3 Digital innovation in manufacturing efficiency

The „dark factory“ model of Xiaomi’s Yizhuang factory optimizes manufacturing costs through highly digital management. In terms of production equipment configuration, the factory has more than 700 robots, key processes are 100% automated, and core production equipment (such as die-casting) is independently developed by Xiaomi and its ecosystem companies [10]. In terms of unit manufacturing cost, the manufacturing cost of a single vehicle (including equipment depreciation) is controlled at 12,000 yuan. This data is derived from the annual production capacity of 150,000 vehicles and capital expenditure of 4.061 billion yuan of the Yizhuang factory. The capital expenditure data comes from the „Capital Expenditure - Factory Construction Investment“ table [9]. Although the SU7’s production speed is 76 seconds per vehicle, which lags behind Tesla’s Shanghai factory, Xiaomi’s self-developed „X-Eye“ detection system, based on a large AI model, has an accuracy rate of over 99.9%. The cost reduction trend brought about by large-scale production has initially emerged. With the total production capacity of the Yizhuang plant reaching 450,000 units after the second phase is put into production, the unit manufacturing cost of SU7 is expected to drop by 10%-15%. Compared with Tesla’s integrated die-casting technology, Xiaomi’s 9,000-ton die-casting machine has a higher unit cost, but the mold cost has been reduced by purchasing domestic equipment [10]. This „moderate automation + high digitalization“ manufactur-

ing strategy ensures efficiency while avoiding the initial investment pressure of tens of billions of yuan for Tesla’s super factory.

### 3.3.4 Hidden cost advantages of ecological synergy

Xiaomi’s user asset reuse in the „full ecosystem of people, cars, and homes“ constitutes a hidden cost advantage that is difficult for traditional car companies to replicate. From the perspective of the operating expense ratio, in 2024, Xiaomi Group’s sales expenses for „intelligent electric vehicles and other innovative businesses“ accounted for 8% of the sales price. This data was calculated based on 2.67 billion yuan in sales expenses and 32.8 billion yuan in automobile revenue. The details of sales expenses and revenue are from the management discussion and analysis - revenue, sales costs [9]. In terms of channel costs, Xiaomi has built lightweight service points through 20,000 Xiaomi stores nationwide and embedded car display and experience functions into the existing retail network, significantly reducing sales costs. 66% of the first batch of SU7 owners were Xiaomi mobile phone users, and 99% had purchased Xiaomi ecological products [8]. This strong ecological connection allows Xiaomi to reach a precise user group without investing huge marketing costs. The cost competitiveness of Xiaomi SU7 verifies the unique value of technology companies in cross-border car manufacturing: by injecting the „precision R&D, efficient supply chain, digital manufacturing, and ecological operation“ genes of the consumer electronics industry into the automotive field, cost optimization is achieved while ensuring technological competitiveness. Although this model still needs to catch up with Tesla in terms of absolute scale, it provides a new paradigm of „ecological synergistic cost control“ for the new energy vehicle industry. Its 18.5% gross profit margin has proven the commercial feasibility of the technology cross-border model and laid a cost foundation for subsequent product line expansion.

## 3.4 Analysis of Xiaomi Auto’s User Base and Service Experience Advantages

Xiaomi Auto’s core user base stems from the cross-border reuse of the „Mi Fan Ecosystem“. This user conversion path, which relies on brand trust, significantly reduces the education cost for new brands to enter the automotive market. Among the first 100 valid sample owners of SU7 delivered, 66% were Xiaomi mobile phone users, and 99% had used Xiaomi IoT ecosystem products (such as smart bracelets, smart home devices, etc.) [8]. This user overlap is much higher than the common feature of „first-time buyers with no brand association“ among new forces in the industry, which confirms the conversion efficiency of the Mi Fan Ecosystem to the automotive field. The underlying logic of this strong association is the „technology + cost-effectiveness“ brand recognition that Xiaomi has accumulated over the years. Consumers’ trust in the quality of Xiaomi consumer electronics products and ecologi-

cal habits naturally extend to their purchase decisions for Xiaomi cars, becoming the core driving force for potential user conversion. In terms of user retention and service experience, Xiaomi breaks away from the traditional automaker's asset-heavy 4S dealership model. By leveraging a combination of „reusing existing channels and digital after-sales“ to deliver efficient service, it reduces operating costs while improving user convenience. At the channel level, Xiaomi leverages its nationwide network of „Mi Homes“ to build a lightweight network of automotive displays and experiences. A single store renovation requires only the installation of a display vehicle and basic promotional materials, eliminating the need to build a new standalone store. This model not only significantly reduces channel expansion costs but also provides users with a „one-stop experience“—consumers can simultaneously learn about the SU7 while shopping for Xiaomi phones, appliances, and other products, eliminating the need for a dedicated visit to a standalone auto dealership. In contrast, emerging entrants like NIO and Li Auto must invest tens of billions of yuan to build their own store networks. However, Xiaomi's channel reuse allows for rapid service coverage, significantly outperforming traditional cross-border models in terms of service reach efficiency. Notably, Xiaomi's service experience is further deeply integrated with its ecosystem, fostering differentiated user engagement. Xiaomi's Surge OS, as its underlying operating system, enables cross-device connectivity across mobile phones, cars, and smart homes. For example, SU7 owners can use the Xiaomi app to view their vehicle's battery life and charging progress in real time, achieving „car-mobile“ information synchronization. With this scenario-based integration, when leaving home, owners simply say „Xiaomi Car, ready to go,“ and the Xiaomi air conditioner automatically turns off, and the robot vacuum starts. This seamless integration of „people, cars, and homes“ extends the service experience from a single vehicle-use phase to a full range of life scenarios, further strengthening user retention.

## 4. Conclusion

This paper constructs a framework for analyzing the core competitiveness of new energy vehicles across four dimensions: technology, cost, users, and ecosystem. It then conducts empirical research using Xiaomi Auto as a case study. The results show that Xiaomi Auto's core competitiveness is reflected in „multi-dimensional collaborative empowerment“: on the technical level, through the model of „self-developed core experience + cooperative mature technology“, it balances technical experience and R&D costs; on the cost level, it reuses consumer electronics supply chain resources (such as the advantage of bulk chip procurement) and economies of scale to achieve the cost-effective pricing of SU7 with a starting price of 215,900 yuan, quickly entering the mid-to-high-end mar-

ket; on the user level, relying on the brand trust transfer of the Mi Fan ecosystem and the reuse of the „Mi Home“ channel, it reduces customer acquisition and service costs, and delivers more than 10,000 vehicles in the first month to verify its conversion efficiency; on the ecological level, it achieves cross-device collaboration with a „closed loop of people, cars and homes“, building a differentiation barrier that is difficult for traditional car companies to replicate. Its differentiation strategy essentially involves „transferring resources and capabilities from the consumer electronics sector to the automotive sector.“ This not only addresses the challenges faced by tech companies in cross-border car manufacturing, such as insufficient technological accumulation and high costs, but also lays the foundation for Xiaomi Auto to establish itself in the mid-to-high-end market.

Recommendations: Xiaomi Auto needs to further strengthen its in-house research and development of intelligent driving technology (currently, the SU7 intelligent driving system relies on external collaboration; in-house research and development will enhance technological independence and strengthen its competitive advantage in the long term). It also needs to accelerate the deployment of its charging station network (charging services are a core long-term user need, and the current lack of coverage hinders user experience). Other cross-border car manufacturers should focus on their core strengths and avoid „following the trend“ across all sectors, which results in resource dispersion. As competition intensifies in the new energy vehicle market, the industry's core competitiveness will evolve towards „smarter“ (implementation of advanced autonomous driving), more integrated (connection between vehicles and urban transportation systems), and greener (environmentally friendly battery recycling and low-carbon manufacturing). If Xiaomi Auto can continue to strengthen ecosystem collaboration and technological innovation, it is expected to further increase its market share in the mid-to-high-end market, becoming a benchmark for „tech companies' cross-border car manufacturing.“

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