The Value Game in a Polarizing Market: A Study on Pricing Strategies and Future Trends of Smart Refrigerators

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***Abstract*—This thesis investigates the strategic pricing choices of companies in China's smart refrigerator market, characterized by increasing polarization between premium and budget segments. Drawing on theories such as differentiated pricing and perceived value, the research employs case study and literature analysis to examine the divergent strategies of brands like Haier and Xiaomi. The core findings indicate that successful brands in the premium segment reconstruct their value proposition through "hardware + scenarios + services" to justify higher prices. In contrast, budget brands compete on ecosystem integration and operational efficiency. The future pricing power will increasingly rely on a company's capacity to delineate novel usage scenarios and develop ecosystems. This study provides theoretical and practical insights for home appliance companies navigating pricing decisions during intelligent transformation.**

***Keywords*—smart refrigerator, pricing strategy, market polarization, value innovation, business model**

I. Introduction

In recent years, the home appliance industry has undergone a fundamental shift from rapid expansion to a phase of stockpiling, characterized by replacement demand. In this setting, the smart refrigerator has evolved into a crucial category, transforming from a mere food preservation device to a vital hub for kitchen intelligence, health management, and interconnected living (Guo, 2022). However, the market exhibits a pronounced structural polarization, often described as a "K-shaped recovery." According to industry monitoring data from AVC, the offline premium segment (priced above ¥8,000) has demonstrated robust growth, driven by embedded design and advanced health features. In contrast, the online budget segment (¥2,000–3,000) has expanded through volume-driven, cost-effective connectivity. Concurrently, the once-dominant mid-range market (¥3,000–8,000) has experienced continuous erosion (Pei, 2021). This structural bifurcation is further evidenced by the overall penetration trajectory of smart refrigerators, which rose from approximately 8.7% in 2018 to over 25% by 2021. Yet, the growth has been unevenly distributed across price tiers (Pei, 2021; Wang, 2019). Consequently, manufacturers face a fundamental tension between price wars driven by hardware commoditization and the pursuit of premium pricing through technological and scenario-based innovation.

The divergent strategies of incumbent home appliance giants and internet-native challengers further complicate the competitive landscape. Leading firms like Haier are shifting from "cost-plus pricing" to "value-based differentiated pricing," gaining pricing power by defining new scenarios such as health management and kitchen ecosystems (Guo, 2022). Meanwhile, companies like Xiaomi leverage "ecosystem efficiency" and asset-light operational models to compete aggressively in the budget segment (Pei, 2021; Li, 2021). The divergent methodologies prompt essential enquiries regarding the theoretical foundations of pricing in a divisive market, the primary factors influencing customer readiness to pay for premium attributes, and the development of sustainable profit models that extend beyond singular hardware transactions.

This thesis investigates these questions through a dual-method approach: a comparative case study of Haier and Xiaomi to dissect corporate strategies in practice, and a systematic literature analysis to ground these observations within established theoretical frameworks, including differentiated pricing, perceived value, and platform economics (Li, 2021). The theoretical significance of this research lies in testing and expanding the explanatory boundaries of classic pricing theories in the context of smart hardware ecosystems. In practice, it provides a decision-making framework for manufacturers, new entrants, and investors seeking to formulate robust product, marketing, and pricing strategies in a complex, rapidly evolving market.

II. Theoretical Framework and Market Analysis

A. Theoretical Framework: Pricing Theories in a Polarizing Market

The pricing strategies observed in the smart refrigerator market can be analyzed through the lens of established economic and marketing theories, adapted for the unique context of platform-mediated smart ecosystems.

1) Differentiated pricing theory and market segmentation

Differentiated pricing is a fundamental strategy for firms operating in markets with heterogeneous consumer preferences and willingness-to-pay. In the polarizing smart refrigerator market, this involves strategic segmentation rather than simple feature-based price discrimination (Pei, 2021). The market is effectively bifurcating into distinct premium and budget segments, rendering a uniform mid-range strategy increasingly untenable (Wang, 2019). Firms must therefore align their entire value chain with a chosen segment. This process necessitates a shift from traditional cost-plus pricing to value-based pricing, particularly in the premium tier. As Zhang demonstrates in the context of smart home platforms, pricing decisions are inextricably linked to the platform's ability to coordinate participation from both consumers and complementary manufacturers, with network effects playing a crucial moderating role (Li, 2021).

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2) Perceived value theory and consumer willingness to pay

Perceived value theory posits that a consumer's willingness to pay is determined by their overall assessment of a product's utility, weighing perceived benefits against perceived costs. In the smart appliance domain, the sources of perceived value are expanding beyond core functional benefits to include emotional and social dimensions (Liang & Wei, 2024). A consumer's usefulness from a smart home platform is enhanced by both the fundamental hardware performance and the network effects of a robust ecosystem of compatible devices and services (Li, 2021). This implies that a smart refrigerator's value proposition is increasingly tied to its ability to integrate into the home environment seamlessly and proactively offer health-related services. As noted by Zhang, the concept of "health" in refrigerators has broadened from basic sterilization to encompass comprehensive dietary and health management scenarios, making smart functionality more tangible and valuable to consumers (Zhang, 2020).

3) From product to solution: reconstructing the value proposition

The theoretical underpinning of premium pricing rests on a fundamental reconstruction of the value proposition from a standalone hardware "product" to a holistic "solution" encompassing hardware, software, and services. This shift leverages smart technology to address higher-order consumer needs for health, convenience, and personalized experiences (Liang & Wei, 2024). By establishing novel usage scenarios—such as food inventory management, dietary health monitoring, and smart kitchen coordination—companies can provide distinctive value that is challenging for budget competitors to imitate, therefore charging a substantial price premium (Guo, 2022). The integration of patent-protected technologies in areas like intelligent control, food management, and energy efficiency further solidifies this competitive moat.

B. Case Studies: Pricing Strategy Practices in Polarized Segments

1) Case one: Haier's Casarte – how "scenario branding" supports premium pricing

Haier, through its high-end sub-brand Casarte, exemplifies a successful value-based, differentiated pricing strategy in China's premium segment of the smart refrigerator market. Launched in 2006 after five years of extensive research involving over 80,000 high-end consumers across 12 global cities, Casarte was deliberately positioned to compete with established foreign luxury appliance brands (Wang, 2019). Faced with a competitive environment where traditional hardware differentiation is more challenging to maintain, H Group has strategically shifted its smart refrigerator business towards a differentiation strategy focused on user scenarios and ecosystem integration (Liang & Wei, 2024).

The foundation of Casarte's pricing power extends beyond superior hardware specifications, such as the cell-level preservation technology in its "Conductor" series. While such technical excellence is a prerequisite, the brand's true value proposition is anchored in "Scenario Branding," which repositions the refrigerator from a passive storage unit to the active central hub of a comprehensive smart kitchen ecosystem. This is vividly manifested in products like the Casarte IoT dual-screen refrigerator. By wirelessly connecting to a smart body fat scale, the refrigerator automatically records the user's physiological data, analyzes their nutritional needs, and generates a customized weekly dietary plan (Zhang, 2020). This proactive health management service transforms the appliance into a personal wellness consultant, thereby justifying a significant price premium through enhanced perceived value—functional (superior multi-zone preservation), emotional (peace of mind regarding family health), and social (status associated with a design-centric lifestyle) (Wang, 2019).

Underpinning this scenario-based value proposition is a formidable technological moat. A comparative review of patent portfolios in the smart home appliance sector indicates that Haier has secured a notably robust position in fundamental smart refrigerator technology (Guo, 2022). Unlike competitors who may focus on isolated features, Haier's patent applications demonstrate a deep and broad commitment to foundational areas such as intelligent temperature control, food ingredient management, and energy efficiency optimization (Guo, 2022). This extensive intellectual property portfolio serves a dual strategic purpose. First, it protects Haier's high-end innovations from rapid imitation, ensuring that the unique "scenario" experiences enabled by its hardware-software integration remain exclusive to the Casarte brand. Second, it reflects a long-term corporate commitment to R&D, both a cause and a consequence of its premium pricing strategy. By generating superior profits from high-margin products, Haier can reinvest heavily in its global R&D network—comprising 14 design centers and 28 collaborative research institutions (Wang, 2019)—thereby creating a self-reinforcing cycle of innovation, differentiation, and value capture. This sharply contrasts with budget-segment competitors, whose asset-light operational frameworks sometimes depend on supply chain partners for essential component innovation (Li, 2021). In essence, Casarte's ability to command premium prices is not merely a marketing achievement; it is structurally embedded in a technological ecosystem that continuously raises the bar for what a smart refrigerator can be (Liang & Wei, 2024).

2) Case two: Xiaomi ecosystem brands – how "ecosystem efficiency" defines budget smart appliances

In stark contrast to Haier's premium approach, Xiaomi's foray into smart refrigerators and other IoT appliances leverages an "ecosystem efficiency" model to dominate the budget segment. Xiaomi's strategy is deeply rooted in an asset-light operational model, reflected in its financial structure: fixed assets account for less than 4% of total assets, a stark contrast to the 20% or more typical of traditional manufacturers (Pei, 2021). By maintaining a minimal fixed asset base and employing a "quasi-financial" strategy to leverage supplier credit and customer prepayments, Xiaomi achieves remarkable operational flexibility and working capital efficiency, with inventory turnover consistently around 60 days—significantly faster than the industry average (Pei, 2021; Li, 2021).

Xiaomi's core competitive advantage lies in its

"investment + incubation" approach to building a vast ecosystem of interconnected companies, often described as a "bamboo forest" ecology (Li, 2021). This ecosystem synergy creates a powerful network effect for consumers, increasing the utility of each Xiaomi device and locking them into the Mi Home platform. Xiaomi's strategic cost management encompasses its entire value chain, including the utilization of ecosystem partners for shared supply chains and reduced procurement costs, as well as an efficient online-centric sales model and community marketing that significantly lowers sales and distribution expenses (Li, 2021; Dong, 2021). This operational efficiency enables Xiaomi to offer smart refrigerators at aggressive price points, focusing on volume and ecosystem lock-in rather than premium hardware margins. The effectiveness of this model is evidenced by the steady improvement in Xiaomi's gross margin, which rose from approximately 4% in 2015 to nearly 15% by 2020, all while adhering to its core "value for money" pricing philosophy (Pei, 2021; Li, 2021). The value proposition is thus "good enough" smart functionality at an unbeatable price, seamlessly integrated into the broader Mi Home ecosystem.

3) Comparative analysis: the strategic logic and applicable conditions of the two paths

The divergent strategies of Haier and Xiaomi represent two distinct and viable paths in a polarizing market. Haier's strategy follows a "value-push" logic: it invests heavily in R&D, brand building, and scenario-based services to construct a premium value proposition that compels a higher price. This path requires strong brand equity, deep technological and service capabilities, and a corporate structure that supports a long-term differentiation strategy (Liang & Wei, 2024). It is applicable for firms aiming to capture high-margin, high-loyalty consumers in the premium segment.

Xiaomi's strategy employs a "efficiency-pull" approach, optimizing operational and ecosystem efficiencies to attain cost leadership, while attracting price-sensitive consumers with an appealing value-for-money proposition. This path is contingent on mastering asset-light operations, building and managing a synergistic ecosystem of partners, and excelling in digital channel management (Pei, 2021; Li, 2021). It is highly effective for rapidly gaining market share in the volume-driven budget segment.

The strategic divergence between the two firms is not merely conceptual but is quantifiable across key financial and operational metrics. Haier's differentiation strategy necessitates higher R&D intensity, with annual R&D expenditure consistently exceeding 3% of revenue, fueling a patent portfolio that reinforces its premium positioning (Liang & Wei, 2024). This investment is recovered through higher gross margins, which, for its high-end Casarte line, are estimated to exceed 30%, and through a dominant market share of approximately 40% in China's refrigerator sector (Liang & Wei, 2024). In contrast, Xiaomi's cost-leadership model is predicated on operational efficiency rather than technological depth. Its gross margin, while steadily improving, hovers around 15%, but its net profitability is amplified by ecosystem revenues—including advertising, internet services, and sales of complementary IoT devices—and the sheer volume of connected devices, which exceeded 589 million by 2022 (Li, 2021). The differing financial profiles highlight that selecting between premium and budget strategies is essentially a decision between margin-focused and turnover-focused profitability models. For traditional manufacturers like C Company, which have historically been trapped in a mid-range positioning with aging brand images and homogenous products, the case studies of Haier and Xiaomi offer starkly different blueprints for transformation through either premium scenario-building or ecosystem-driven efficiency (Dong, 2021).

Table 1 summarizes the divergent strategic logics underpinning the two paths. Haier's premium approach necessitates sustained investment in brand equity and scenario-based R&D, while Xiaomi's budget model thrives on operational agility and ecosystem synergies. The choice between these paths is not merely tactical but reflects fundamentally different resource allocations and value creation philosophies (Liang & Wei, 2024; Zhang, 2020).

Table 1. Comparative analysis of Haier (Casarte) and Xiaomi: strategic logic in a polarized smart refrigerator market

Dimension	Haier (Casarte) — Premium Path	Xiaomi (Ecosystem) — Budget Path
Core Strategy	Value-based differentiation; "Scenario Branding."	Cost leadership; "Ecosystem Efficiency."
Value Proposition	"Hardware + Scenarios + Services" (Wang, 2019)	"Good Enough + Unbeatable Price + Ecosystem Lock-in" (Li, 2021)
Pricing Power Source	Perceived health value; Seamless home integration (Zhang, 2020)	Operational efficiency; Network effects of IoT ecosystem (Pei, 2021)
Key Strengths	Strong R&D and patent portfolio (Guo, 2022); Global brand equity; Established premium manufacturing (Liang & Wei, 2024).	Asset-light model (Pei, 2021); Massive user base (Li, 2021); Superior online channels and fan marketing (Gao, 2024).
Key Weaknesses	Higher cost structure; Organizational complexity in rapid iteration (Liang & Wei, 2024).	Weak core technology R&D (Li, 2021); Quality control reliance on OEMs (Pei, 2021); Lower premium brand perception.
Cost Structure	Higher fixed costs (R&D, global R&D centers, premium materials).	Very low fixed assets (<4% of total assets); leverages supplier and customer funds (Pei, 2021).
Target Segment	Affluent, health-conscious, design-sensitive urban elites.	Young, tech-savvy, price-sensitive consumers, first-time smart appliance buyers.
Theoretical Basis	Perceived Value Theory; Differentiation Strategy.	Transaction Cost Economics: Economies of Scale and Scope.

III. Conclusion

This study set out to investigate the strategic pricing choices of companies within China's structurally polarizing smart refrigerator market. The findings, synthesized from theoretical analysis and comparative case studies, offer clear

answers to the three guiding research questions.

First, facing market polarization, major manufacturers have adopted distinctly different pricing strategies grounded in contrasting theoretical bases. Prominent premium brands such as Haier have shifted from cost-plus pricing to value-based differentiated pricing. They acquire pricing power not solely through incremental hardware enhancements, but by delineating new usage scenarios that redefine the customer value proposition as "hardware + scenarios + services." (Guo, 2022; Liang & Wei, 2024). In the budget segment, firms like Xiaomi compete on ecosystem integration and operational efficiency, leveraging a cost-leadership strategy rooted in asset-light principles and ecosystem synergy (Pei, 2021; Zhang, 2020).

Second, regarding the factors supporting premium pricing, this research highlights that while core technology is necessary, it is no longer sufficient. The most critical factors influencing consumers' willingness to pay a premium are "seamless home integration" and "proactive health services," which transform the refrigerator from a mere appliance into a central component of a healthy and convenient lifestyle (Guo, 2022; Gao, 2024). The patent strategies of leading firms confirm this trend, with significant investments in technologies related to intelligent interaction, food management, and energy optimization (Guo, 2022).

Third, the future pricing model for smart refrigerators is poised to evolve from a one-time hardware transaction toward a more sustainable, hybrid profit model featuring a "hardware base price + software/service subscription" (Li, 2021). The proportion of recurring revenue from data analytics, personalized health services, and ecosystem transactions is expected to grow, fundamentally reshaping long-term industry profitability.

The implications of this study are clear: to build sustainable pricing power and avoid the trap of pure price wars, companies must make a clear strategic choice between a value-driven premium path and an efficiency-driven budget path. A "stuck in the middle" approach is increasingly untenable (Pei, 2021).

For incumbent home appliance manufacturers navigating this polarized landscape, this study offers three actionable insights. First, avoid strategic ambiguity: firms must explicitly commit to either a premium "scenario-driven" path, which demands sustained investment in R&D and brand equity, or a budget "efficiency-driven" path, which requires mastery of asset-light operations and ecosystem synergies. Attempting to serve both segments with a single mid-range strategy invites competitive erosion from both flanks (Gao, 2024; Zhao & Zheng, 2023; Zhang, 2023). Secondly, invest in ecosystem lock-in: irrespective of strategic direction, the capacity to include the refrigerator into a wider smart home ecosystem—either via proprietary scenarios (Haier) or open platform synergies (Xiaomi)—is becoming an indispensable source of pricing power. Third, leverage data as a strategic asset: as pricing models evolve toward "hardware + service" hybrids, the capacity to collect, analyze, and monetize user health and consumption data will become a critical differentiator, potentially eclipsing traditional hardware advantages (Li, 2021; Zhang, 2020; Liu, Zhang, Wang, Chen, & He, 2017).

However, this study is not without limitations. Its conclusions are primarily drawn from publicly available secondary data and case analysis, representing a corporate-level perspective. It lacks primary consumer survey data to validate the stated drivers of willingness to pay quantitatively. Future research could address this by incorporating large-scale surveys across different consumer segments. Further investigation could also explore emerging topics such as the privacy and ethical implications of smart refrigerators as "family health data gateways," and the potential disruptive impact of cross-border competitors, such as internet and AI giants, on the existing pricing ecosystem.

Conflict of Interest

The authors declare no conflict of interest.

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