MARKETING STRATEGY BASED ON COMPETITIVE ADVANTAGE THROUGH ENHANCING PERFORMANCE AND CUSTOMER SATISFACTION IN CALIBRATION SERVICE COMPANIES

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Abstract

The transformation of the digital economy and the intensifying competition within the calibration services sector require the development of marketing strategies that can create sustainable competitive advantage. This study applies a bibliographic research method with a qualitative approach to analyze the relationships among marketing strategy, competitive advantage, organizational performance, and customer satisfaction in the calibration services industry. A review of academic literature published between 2019 and 2025 indicates that the implementation of marketing strategies in this sector faces unique challenges due to the intangible nature of services and high technical complexity. The findings show that quality assurance and value-based offerings are primary drivers of customer satisfaction, while organizational performance is strongly influenced by competitive advantage as a mediating factor. The study proposes an integrated marketing strategy framework that combines strategic market segmentation, value differentiation, digital transformation, and the development of partnership ecosystems. Theoretically, this research contributes a specialized conceptual model for technical service industries, while practically, it provides a strategic implementation guideline for calibration service providers seeking to achieve sustainable competitive advantage.

Keywords: Integrated Marketing Strategy, Sustainable Competitive Advantage, Customer Satisfaction Optimization

INTRODUCTION

The increasing intensity of global business competition requires companies to develop marketing strategies that create sustainable competitive advantage, which is particularly important in the highly technical calibration service industry. Guided by the Holistic Marketing Concept (Kotler & Keller, 2021), competitive advantage is achieved through the integration of relationship marketing, integrated marketing, internal marketing, and performance marketing. This approach emphasizes delivering superior customer value and aligning all organizational functions to support customer satisfaction and long-term loyalty.

The calibration services market is expanding, driven by technological development and the growing need for measurement standardization, with global market value projected to grow from USD 6.22 billion (2023) to USD 9.92 billion (2032). Digital transformation and Industry 4.0 have reshaped competitive dynamics, shifting advantage from physical assets to adaptability and service innovation. For calibration service firms, adopting digital tools such as IoT, AI, and blockchain is now essential to remain competitive. However, marketing challenges arise due to the intangible and credibility dependent nature of calibration services. Therefore, sustainable competitive advantage must be built not only through technical accuracy but also through superior service quality and the ability to meet evolving customer expectations.

The growing complexity of global supply chains has shifted calibration services from a support function to a strategic contributor in value chain optimization. Demand fluctuations driven by reshoring and nearshoring, along with stricter international standards on quality, environment, and safety, have increased reliance on accredited calibration providers, positioning them as strategic partners in risk reduction and competitive positioning. To meet these expanded expectations, calibration companies must develop broader capabilities, including consultancy, predictive maintenance, and integrated quality management solutions. In service marketing, sustainable competitive advantage is achieved through value creation and differentiation, where competition is based on service quality, reliability, and the ability to meet specific customer needs. This requires integrating traditional marketing mix elements with process, people, and physical evidence (Rahmaini & Warastuti, 2021). Company performance plays a key role, reflected not only in financial outcomes but also in operational accuracy, timeliness, professionalism, and adaptability; improved performance ultimately enhances customer satisfaction (Listyowati et al., 2021). Since customer satisfaction strongly influences loyalty, pricing and service assurance also significantly affect perceived value, especially given recent declines in overall customer satisfaction across industries (Hasyim Abdulloh, 2022).

Digital transformation has increased customer expectations for calibration services, requiring not only technical accuracy but also efficiency, transparency, and accessible digital interaction. Competitive value is increasingly created by integrating traditional technical capabilities with digital innovation (Chiu, 2019). Diverse industrial segments require differentiated marketing approaches rather than a uniform strategy, while compliance with international standards such as ISO/IEC 17025 strengthens market credibility. Sustainability considerations and ESG criteria have also become key determinants in vendor selection, giving strategic advantage to calibration providers that adopt environmentally responsible operational practices (Febriana Putri Wahyono & Waluyo, 2024). Despite these developments, empirical research linking marketing strategy, competitive advantage,

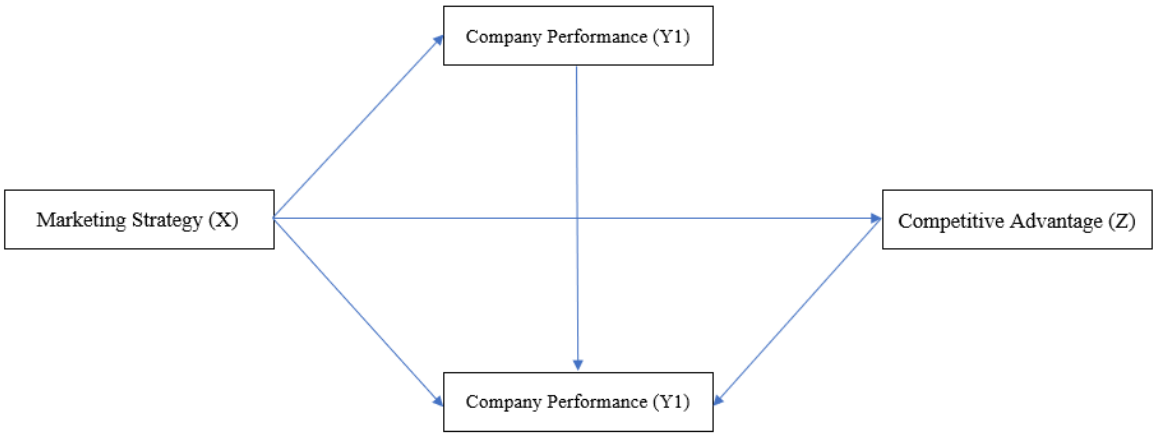
company performance, and customer satisfaction in the calibration service industry remains limited, highlighting the need for further study. Additionally, advances in artificial intelligence and predictive analytics offer significant competitive benefits but require substantial investment, creating a divide between technologically advanced firms and traditional providers.

REVIEW OF LITERATURE

This study aims to identify an optimal marketing strategy model for calibration service companies to achieve sustainable competitive advantage. The objectives include: assessing current marketing strategy practices, competitive advantage levels, company performance, and customer satisfaction; analyzing the influence of marketing strategies on competitive advantage; evaluating the effect of company performance on customer satisfaction; and examining the causal relationship between competitive advantage and customer satisfaction. The study also formulates an integrated marketing strategy model that enhances competitive advantage by optimizing performance and customer satisfaction. The findings are expected to contribute theoretically to marketing strategy development in high technical service industries and provide practical guidance for calibration service companies in designing more effective and efficient strategies in an increasingly competitive market.

Conceptual Framework of Marketing Strategy in Calibration Service Companies

The conceptual framework illustrates how theoretical constructs are interconnected and influence one another within the context of marketing strategy in calibration service companies.



RESEARCH METHOD

This study employs a library research approach, which is a qualitative research method that utilizes library sources to obtain research data. Library research is selected for its ability to explore complex phenomena in depth through comprehensive and systematic document analysis. This method enables the researcher to collect data from various verified and credible academic sources to build a strong theoretical understanding of marketing strategies based on competitive advantage in the calibration services industry.

The type of research used is descriptive-analytical with a qualitative approach, which aims to describe, analyze, and interpret library data related to marketing strategy, competitive advantage, company performance, and customer satisfaction in calibration service companies. This approach is appropriate for explaining existing conditions and

analyzing relationships between variables based on findings from relevant literature. It allows the researcher to identify patterns, trends, and conceptual relationships and then synthesize them into a comprehensive knowledge framework. The data in this study consist of secondary data obtained from academic literature, including scientific journals, textbooks, research reports, conference proceedings, and other relevant publications. The criteria for selecting data sources include relevance, publisher credibility, citation level, and publication period within 2019–2025 to ensure up-to-date information. Priority is given to publications from nationally and internationally accredited journals and reputable research institutions. Document analysis provides flexibility in exploring diverse theoretical and empirical perspectives to support the development of a comprehensive conceptual framework.

Data collection was carried out through document studies using academic databases such as Google Scholar, Scopus, ResearchGate, ScienceDirect, and accredited national journal databases. Literature searches used keyword combinations in Indonesian and English, including "strategi pemasaran," "keunggulan kompetitif," "kinerja perusahaan," "kepuasan pelanggan," "jasa kalibrasi," "marketing strategy," "competitive advantage," "company performance," "customer satisfaction," and "calibration services," with Boolean operators (AND, OR, NOT) to optimize search specificity. The collected documents were then classified according to research variables to facilitate analysis. Data analysis employed qualitative content analysis to identify patterns, themes, and key concepts present in the literature. The analysis process involved reading and understanding all gathered documents, coding the data according to research variables, and then conducting thematic analysis to determine conceptual relationships and develop a theoretical framework explaining the linkage between marketing strategy, competitive advantage, company performance, and customer satisfaction in calibration service companies.

Data triangulation was conducted by comparing findings across various literature sources to ensure the validity and reliability of results. Source triangulation included literature from different countries, industry contexts, and time periods, while theoretical triangulation involved multiple theories and conceptual models to strengthen construct validity. This approach aligns with qualitative research guidelines emphasizing rigor and relevance in generating deep, human-centered insights into complex social phenomena (Rahmawati & Yuliawati, 2022). The main limitation of this study lies in its reliance on secondary data, which may not fully represent specific conditions in the calibration services industry in Indonesia, and potential publication bias in the reviewed literature. However, library research remains appropriate for this study due to its strength in providing a solid and comprehensive theoretical foundation for developing marketing strategy models based on competitive advantage in the calibration services industry.

RESULTS AND DISCUSSION

1. Conditions of Marketing Strategy Implementation and Customer Satisfaction in the Calibration Services Industry

The implementation of marketing strategies in the calibration services industry demonstrates unique characteristics in comparison to other service sectors, particularly in terms of the approach required to build customer trust and credibility. According to findings in the literature, calibration service companies face significant challenges in developing effective marketing strategies due to the highly technical nature of the services, which require continuous demonstration of competence. Belhaj et al. (2025) found that a shipyard company

providing calibration services experienced a decline in marketing performance and a weaker external market segment compared to its internal segment in 2022, indicating the need for a more comprehensive and integrated marketing strategy reformulation.

Analysis of current conditions shows that marketing strategy implementation in calibration services still encounters structural and operational barriers that affect market targeting effectiveness. One critical factor identified is the complexity of obtaining permits to access calibration laboratory sites, which involves excessive bureaucracy. This issue discourages customers from returning, with an influence score of 0.45 in the internal and external factor evaluation matrix. This reflects that accessibility and process simplicity are essential components of marketing strategy that require greater managerial attention.

Customer satisfaction in the calibration services industry displays different patterns than in conventional service industries, where technical aspects and quality assurance act as primary determinants. Watugilang and Heikal (2021), in a study of a geomatics survey calibration service company in Jakarta, found that only two factors significantly affected customer satisfaction: assurance ($p = 0.009$) and price ($p = 0.030$). This indicates that calibration service customers emphasize reliability and economic value, differing from general service expectations that prioritize responsiveness and empathy. Customer satisfaction is also influenced by the company's ability to maintain consistent quality standards, especially during crises. Abhijith et al. (2021) showed that accredited laboratories were able to improve customer satisfaction during the pandemic by implementing appropriate strategies. This suggests that flexibility and adaptability in marketing strategy implementation are key to sustaining and increasing satisfaction under uncertain conditions.

Evaluation of marketing strategy performance indicates the need for a holistic approach to understanding customer expectations. Darwish et al. (2024) found that dissatisfaction with calibration services in a shipyard laboratory was rooted in the tangible dimension, specifically the adequacy of calibration equipment, with a gap score of -2.78 and a sigma score of 1.16. This highlights that infrastructure and equipment capabilities are fundamental priorities in both marketing and operational strategies. The integration of marketing strategy and service quality management shows a strong correlation in creating a sustainable value proposition. Abhijith et al. (2021), in ISO 17025-accredited laboratories in Saudi Arabia and Bahrain, confirmed that sustainable service quality dimensions positively influence customer satisfaction using the Stimulus-Organism-Response theoretical framework. This provides a new perspective on how marketing stimuli influence customer responses through cognitive and emotional processes in highly specialized technical services.

2. The Influence of Marketing Strategy on the Creation of Competitive Advantage

Marketing strategy in the calibration services industry plays a strategic role in achieving sustainable competitive advantage through value differentiation and unique market positioning. The literature indicates that competitive advantage in this sector depends not only on technical superiority, but also on the company's ability to integrate strategic marketing elements to create a value proposition that is difficult for competitors to replicate. Eka Aprilia Shofiyanti et al. (2023) emphasized that customer satisfaction is vital for achieving competitive advantage, confirming that the marketing mix positively influences customer satisfaction, which in turn drives loyalty and contributes to corporate sustainability.

Effective marketing strategy implementation requires deep understanding of market characteristics and specific customer needs across industry segments. Laelatul Fitria and Nurul Janatim Majid (2020) identified four alternative strategies using SWOT analysis: SO,

WO, ST, and WT, with the WT strategy prioritized (weight = 5.11) using AHP. The prioritized strategies include periodic inspections, calibrator forecasting to maintain optimal condition, and forming partnerships with institutions requiring calibration services to improve sales and marketing effectiveness. Competitive advantage also derives from the company's ability to maintain high and consistent quality standards, particularly through international accreditation and certification. Laboratory accreditation is a formal recognition of technical competence to perform specific testing or measurements according to standards such as ISO/IEC 15189/17025, helping personnel remain quality-conscious and improving service quality for end users.

Strategic differentiation can further be achieved through innovative process and technology enhancements that improve operational efficiency and accuracy. Ikhwana and Nurhamdani (2023) proposed integrating Service Quality and Six Sigma methods to enhance calibration service quality, recommending solutions such as replacing non-repairable calibrators, simplifying service authorization procedures, and adding calibration personnel. Marketing strategies focused on long-term relationship building also contribute significantly to sustainable competitive advantage. Salam et al. (2023) demonstrated that appropriate strategies during the pandemic increased customer satisfaction across all service dimensions, indicating that adaptability is a key competitive factor during crises.

Optimal competitive advantage can additionally be achieved through tailored marketing mix strategies aligned with the technical characteristics of calibration services. Salam et al. (2023) also utilized SERVQUAL, Importance Performance Analysis, and Potential Gain in Customer Value to identify service improvement priorities, suggesting applicability for calibration services to bridge perception gaps and establish superior service value. Furthermore, digitalization and technological integration play essential roles in achieving competitive advantage in the Industry 4.0 era. The Stimulus Organism Response model provides insight into how digital marketing stimuli shape customer perceptions and responses, supporting the creation of sustainable competitive advantage.

3. The Relationship Between Company Performance and Customer Satisfaction

Company performance in the calibration services industry has a highly significant correlation with customer satisfaction, where operational, technical, and managerial dimensions work synergistically to shape customer perceptions and evaluations of the service quality received. The literature indicates that performance in calibration service companies cannot be measured solely through financial indicators, but must also include comprehensive dimensions such as calibration accuracy, timeliness of service completion, workforce professionalism, and the capability to handle various measuring instruments under strict international standards. Salam et al. (2023) found that their predictive regression model achieved a 75% accuracy rate in classifying customers as satisfied or dissatisfied based on their perceptions of assurance and pricing, suggesting that the quality assurance dimension of performance has a complex influence on customer satisfaction.

The operational performance dimension significantly affects customer satisfaction, particularly regarding the reliability of equipment and consistency of test results. Studies indicate that a major source of dissatisfaction in calibration services lies in the tangible dimension, specifically related to adequacy of calibrator equipment, showing a gap score of -2.78 and a sigma score of 1.16. These findings highlight that maintaining and providing adequate calibration equipment is a key determinant of customer satisfaction. Suboptimal

equipment conditions not only affect measurement accuracy but can also cause service delays and reduce customer confidence in the company's technical competence.

Human resource performance has a direct impact on customer satisfaction through technical competence, responsiveness, and professionalism during customer interactions. Salam et al. (2023) emphasize that laboratory accreditation processes help staff maintain awareness of quality and consistently deliver optimal service, indicating that investing in personnel competency development and certification is critical for building long-term customer satisfaction.

Process management performance and quality system implementation also demonstrate a strong correlation with customer satisfaction, especially in the company's ability to maintain service consistency under varying operational conditions. Salam et al. (2023), in a case study of the CMPFA laboratory, showed that customer satisfaction increased across all service dimensions during the pandemic when appropriate strategies were applied, indicating that flexibility and adaptability in process management are essential components of performance in maintaining customer satisfaction.

Technological performance and innovation also significantly influence customer satisfaction by improving efficiency, accuracy, and accessibility of services. Darwish et al. (2024), using the Stimulus-Organism-Response model, confirmed the relationship between sustainable service quality and customer satisfaction, demonstrating that technological integration and sustainability practices generate positive stimuli that shape customer perceptions and satisfaction.

Company performance related to accessibility and ease of service processes also impacts customer satisfaction. Darwish et al. (2024) found that excessive bureaucracy in obtaining permission to access calibration laboratory locations discouraged customers from returning, with an influence score of 0.45. This indicates that simplifying processes and improving service accessibility are important factors in creating a positive customer experience.

The integration of performance dimensions shows a strong synergistic effect on customer satisfaction. Ikhwana and Nurhamdani (2023) used SERVQUAL, Importance Performance Analysis, and Potential Gain in Customer Value to identify six indicators in Quadrant A as priority areas for service quality improvement. This holistic approach demonstrates that company performance must be evaluated comprehensively across both tangible and intangible aspects to achieve optimal and sustainable customer satisfaction.

4. Analysis of Competitive Advantage as a Mediator of Customer Satisfaction

Competitive advantage in the calibration services industry functions as a strategic mediator linking internal company capabilities to customer satisfaction outcomes by creating unique value that is difficult for competitors to replicate. The literature shows that competitive advantage not only directly influences customer satisfaction but also acts as a transformative mechanism that converts company assets and capabilities into relevant and attractive value propositions. Darwish et al. (2024), in a systematic analysis of 148 articles, confirmed that the marketing mix positively affects customer satisfaction, which subsequently drives customer loyalty and contributes to corporate sustainability, with competitive advantage serving as the mediating mechanism that translates marketing strategies into measurable customer outcomes.

The mediation of competitive advantage occurs through several reinforcing pathways. The first pathway is technical differentiation, where superiority in accuracy, reliability, and

calibration service scope creates higher perceived value. Abhijith et al. (2021) explain that laboratory accreditation provides formal recognition of technical competence, enhancing credibility and trust, which in turn improves overall service quality. Competitive advantage in accreditation and international certification acts as a mediator by communicating technical competence in a tangible and credible form. The second pathway involves operational efficiency and service responsiveness, which create superior customer experiences. Integrating Service Quality and Six Sigma methods can identify dissatisfaction sources and guide systematic improvements, particularly in tangible and responsiveness dimensions that strongly influence satisfaction. Competitive advantage in quality management and continuous improvement mediates the conversion of infrastructure investment into customer perceived service value.

A further mediating mechanism is the company's ability to manage customer expectations regarding its value proposition. Research findings show that increased customer perception of assurance may decrease satisfaction if expectations become unrealistic, while pricing has a positive effect, with predictive accuracy reaching 75%. This suggests that competitive advantage in the assurance dimension must be managed carefully to avoid over promising. Innovation and adaptability also serve as mediating sources of competitive advantage, particularly in dynamic environments. Abhijith et al. (2021) found that the ability to adopt appropriate strategies during the pandemic improved satisfaction across all service dimensions. Competitive advantage in adaptability allows companies to maintain satisfaction even under challenging conditions.

Competitive advantage also mediates satisfaction by creating barriers to entry and customer switching costs. Belhaj et al. (2025), using the Stimulus-Organism-Response model, showed that sustainable service quality enhances satisfaction, with sustainability driven competitive advantage contributing to emotional connection and long term loyalty. Integrated analysis indicates that sustaining competitive advantage as a mediator requires a holistic approach that combines operational excellence, strategic partnerships, and continuous improvement. The prioritization of WT strategies with a weight of 5.11, involving periodic inspections, calibrator forecasting, and strategic partnerships, shows that sustainable competitive advantage converts strategic initiatives into tangible customer value, positively impacting long term satisfaction and loyalty.

5. Integrated Marketing Strategy Model for Optimizing Competitive Advantage

The development of an integrated marketing strategy model in the calibration services industry requires a comprehensive synthesis of strategic elements, including positioning, differentiation, value creation, and customer relationship management within a holistic and sustainable framework. Based on an in depth literature analysis, the optimal model must be able to integrate the technical characteristics inherent in the calibration industry with strategic marketing principles that have been proven effective in creating sustainable competitive advantage. Belhaj et al. (2025), through systematic analysis, emphasize the importance of developing effective marketing strategies to enhance customer satisfaction and loyalty, which in turn drives increases in market share and profitability, with an integrated approach that aligns all marketing-mix elements with the company's strategic objectives.

A fundamental component of the integrated marketing strategy model is strategic segmentation based on industry characteristics and the specific needs of customer sectors requiring calibration services. This segmentation must consider not only demographic and geographic aspects but also technical complexity, regulatory intensity, and the criticality of

each segment's instrument applications. Salam et al. (2023) identified that SWOT and AHP can be used to prioritize strategic alternatives based on a systematic analysis of strengths, weaknesses, opportunities, and threats, with the WT strategy obtaining the highest weight of 5.11, including periodic inspection, equipment forecasting, and formation of strategic partnerships. The integrated model must incorporate a systematic approach to segmentation and targeting that enables customized strategies for each segment without compromising operational efficiency.

The value proposition dimension within the integrated marketing strategy model must encompass not only technical aspects such as accuracy and reliability but also experiential aspects that create emotional engagement with customers. The study explains that laboratory accreditation not only provides technical recognition but also fosters greater quality awareness among personnel, enabling them to deliver superior service. This indicates that the value proposition should integrate technical excellence with service excellence. The integrated model must be able to communicate complex technical capabilities in language that is understandable to decision-makers across customer organizations while maintaining credibility and technical precision.

The customer experience management element requires special attention due to the complex customer journey and multiple touchpoints involved in calibration services. Salam et al. (2023) identified that integrating SERVQUAL and Six Sigma can optimize service quality by systematically identifying gaps between customer expectations and perceptions, with emphasis on tangible and responsiveness dimensions as priority improvement areas. Therefore, the integrated model must incorporate continuous monitoring and improvement mechanisms that enable adaptation to evolving customer expectations and changing market conditions.

Technology integration and digital transformation are increasingly essential in the era of Industry 4.0 and the digital economy. Using the Stimulus Organism Response model, Salam et al. (2023) demonstrated how sustainable service quality influences customer satisfaction, indicating the importance of understanding psychological and behavioral dimensions in the customer decision-making process. The integrated model must incorporate digital tools and platforms that enable enhanced interaction, real-time monitoring, and data-driven decision-making, while maintaining the human touch necessary for building trust and credibility in technical services. Strategic partnerships and ecosystem development are critical components that allow calibration service companies to expand capabilities and reach without proportional increases in investment and risk. Salam et al. (2023) show that adaptability and strategic flexibility are key success factors in maintaining customer satisfaction even under challenging conditions such as the pandemic. Thus, the integrated model must incorporate partnership strategies that include upstream partnerships with equipment manufacturers and technology providers, as well as downstream partnerships with industry associations and regulatory institutions to facilitate market access and credibility building.

The measurement and evaluation framework of the integrated model must be comprehensive and multidimensional, including not only traditional financial metrics but also customer-centric indicators and operational excellence measures. The integrated model should adopt a balanced scorecard approach that integrates financial, customer, internal process, and learning-and-growth perspectives, emphasizing leading indicators that support proactive management and continuous optimization of strategy implementation. The

implementation roadmap and change management strategy serve as the final essential components of the integrated marketing strategy model, given the complexity and interdependencies of the various strategic elements that must be executed in a coordinated and phased manner. Salam et al. (2023) applied a combination of SERVQUAL, IPA, and PGCV methods to develop systematic improvement priorities, indicating the need for a structured approach to implementation planning. Therefore, the integrated model must incorporate a phased implementation approach with clear milestones, success metrics, and contingency plans that allow flexible adaptation to changing conditions while maintaining progress toward strategic objectives.

CONCLUSION

A comprehensive investigation into the formulation of marketing strategies oriented toward creating competitive superiority in the calibration service sector reveals multifaceted complexities that necessitate the adoption of a holistic approach to optimize organizational performance. The essential findings demonstrate that the implementation of marketing strategies within the calibration service industry faces significant structural barriers, where elements of technical credibility and operational accessibility serve as primary determinants in achieving customer satisfaction.

An in-depth review of the literature indicates that competitive supremacy is not exclusively dependent on technological advantage, but requires a systemic integration of value differentiation, operational excellence, and sustained customer relationship management. Corporate performance shows a significant positive correlation with the level of customer satisfaction through a complex mediation mechanism, in which the dimensions of quality assurance and economic value propositions emerge as the most critical factors. The formulated integrated marketing strategy model consolidates strategic segmentation, holistic value propositions, customer experience management, digital transformation, ecosystem-based alliance development, and multidimensional evaluation frameworks as synergistic components for achieving sustainable competitive superiority in a dynamic and competitive business environment.

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