Innovation in Cooperation Models between Medical Aesthetic Product Manufacturers and Healthcare Institutions

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Abstract: With the continued growth in medical aesthetic market demand, collaborative development between medical aesthetic product manufacturers and healthcare institutions has become increasingly important. Based on value chain theory and business ecosystem theory, this study thoroughly explores innovations in cooperation models between medical aesthetic product manufacturers and healthcare institutions. Through literature review and case analysis methods, the study systematically examines existing problems in current cooperation models, including lack of full-chain integration, information asymmetry, and insufficient risk management. To address these issues, the study proposes two innovative cooperation models: full-chain collaborative development and digital empowerment. The full-chain collaborative development model emphasizes deep integration from R&D and production to clinical application; the digital empowerment model focuses on building digital platforms to achieve optimal resource allocation. To ensure effective implementation of these innovative cooperation models, the study establishes comprehensive safeguard mechanisms addressing institutional norms, risk management, and benefit distribution. The research findings have significant theoretical value and practical guidance for promoting high-quality development in the medical aesthetic industry.

***Keywords*:** Medical aesthetic products; Healthcare institutions; Cooperation models; Model innovation; Safeguard mechanisms

1. Introduction

The medical aesthetic industry, as a crucial component of health services, has shown vigorous development in recent years. Statistics indicate that the global medical aesthetic market size exceeded 300 billion USD in 2023, with an expected average annual growth rate of over 15% in the next five years[1]. In this context, medical aesthetic product manufacturers and healthcare institutions, as key entities in the industrial chain, have a profound impact on the quality of industry development. As market demands continue to segment and upgrade, traditional simple supply-demand relationships can no longer meet the requirements for high-quality industry development. Medical aesthetic product manufacturers and healthcare institutions urgently need to explore and establish closer, more innovative cooperation models to address increasingly intense market competition and rising consumer demands.

Research on innovative cooperation models between medical aesthetic product manufacturers and healthcare institutions holds significant importance. From a theoretical perspective, this research helps deepen the theoretical understanding of value chain integration and business ecosystem construction in the medical aesthetic industry, enriching the theoretical system of industrial collaborative innovation. From a practical perspective, innovative cooperation models can promote deep integration of medical aesthetic product R&D and clinical applications, improve product quality and service levels, enhance healthcare institutions' diagnostic and treatment capabilities, and ultimately achieve mutual benefits for upstream and downstream industry chain participants. From a policy perspective, research findings can provide reference for relevant departments in formulating industry development policies, helping to construct a more standardized and orderly medical aesthetic market environment.

2. Theoretical Foundations for Cooperation between Medical Aesthetic Product Manufacturers and Healthcare Institutions

2.1 Value Chain Theory and Industry Chain Integration

Value chain theory provides crucial theoretical support for cooperation between medical aesthetic product manufacturers and healthcare institutions. The theory posits that competitive advantage stems from the effective organization and integration of various value activities. In the medical aesthetic industry, a complete value chain extends from product R&D

and manufacturing to clinical application. Medical aesthetic product manufacturers create fundamental value through technological innovation and product development, while healthcare institutions achieve deep value transformation and amplification through professional medical services. From a value chain integration perspective, cooperation between both parties can effectively reduce coordination costs between value chain links, decrease information asymmetry, and improve resource allocation efficiency.

Industry chain integration represents an important practical manifestation of value chain theory. The deep cooperation between medical aesthetic product manufacturers and healthcare institutions essentially constitutes organic integration of upstream and downstream industry chain components[2]. Through establishing long-term stable cooperative relationships, manufacturers can timely obtain clinical demand information to guide product R&D direction; meanwhile, healthcare institutions can receive immediate technical support for new products to enhance their diagnostic and treatment capabilities. Industry chain integration creates positive interaction between product R&D and clinical applications, promoting continuous improvement in product performance and treatment effectiveness. This deep integration based on value chain and industry chain perspectives lays a solid theoretical foundation for exploring innovative cooperation models between medical aesthetic product manufacturers and healthcare institutions.

2.2 Business Ecosystem Theory Perspective

Business ecosystem theory provides a more macro-level theoretical framework for cooperation between medical aesthetic product manufacturers and healthcare institutions. This theory emphasizes that enterprise development depends not only on internal capabilities but also requires building a healthy business ecosystem[3]. In the medical aesthetic industry, medical aesthetic product manufacturers and healthcare institutions, as core ecological entities, can drive joint development of upstream raw material suppliers, downstream marketing channels, and supporting service institutions through establishing innovative cooperative relationships, forming a positively interactive industrial ecosystem.

Cooperative innovation under the business ecosystem theory perspective has distinct characteristics. Entities within the ecosystem maintain symbiotic relationships rather than simple supply-demand relationships, achieving mutual development through resource sharing and capability complementation[4]. Medical aesthetic product manufacturers fulfill technological innovation and product supply functions within the ecosystem, while healthcare institutions undertake professional service and market demand guidance functions. Through deep cooperation, both parties continuously optimize their ecological niches and improve overall system operational efficiency. Meanwhile, the business ecosystem emphasizes value co-creation, enabling manufacturers and healthcare institutions to create and share greater value space through knowledge sharing and technological collaboration.

The evolution from value chain theory to business ecosystem theory reflects the deepening relationship between medical aesthetic product manufacturers and healthcare institutions. Value chain integration emphasizes vertical coordination, focusing on solving industry chain upstream-downstream connection issues; business ecosystem theory focuses on horizontal linkage, emphasizing the construction of multi-participant value networks. These two theoretical dimensions complement and support each other, jointly forming the theoretical foundation for innovative cooperation models between medical aesthetic product manufacturers and healthcare institutions. Through theory guiding practice, both parties can break through traditional cooperation model limitations, explore more innovative and sustainable cooperative relationships, and promote high-quality development of the medical aesthetic industry.

3. Analysis of Existing Problems in Cooperation between Medical Aesthetic Product Manufacturers and Healthcare Institutions

3.1 Limitations of Traditional Cooperation Models

Traditional cooperation models between medical aesthetic product manufacturers and healthcare institutions have numerous limitations that seriously constrain the improvement of industry development quality. Inefficient product supply chain management is a typical problem. Under traditional cooperation models, manufacturers and healthcare institutions lack systematic supply chain coordination mechanisms, leading to chaotic inventory management and poor supply-demand matching. Healthcare institutions struggle to accurately grasp market demand changes, often resulting in product overstocking or shortages; manufacturers cannot adjust production plans timely, causing resource waste. This supply chain inefficiency not only increases operational costs for both parties but also affects medical service quality.

An imperfect technical support system is another prominent issue. Under traditional cooperation models, manufacturers' technical support to healthcare institutions often remains at basic training levels, lacking in-depth technical exchange and experience sharing mechanisms. Technical difficulties encountered by healthcare institutions during product use cannot be

resolved promptly, affecting treatment outcomes; manufacturers also struggle to obtain clinical application feedback, lacking precise direction for product improvements. This insufficient technical support leads to persistent gaps between product performance and clinical needs, constraining innovation in medical aesthetic technology.

3.2 Analysis of Deep-seated Contradictions and Pain Points

Deep-seated contradictions in cooperation between medical aesthetic product manufacturers and healthcare institutions are primarily manifested in incomplete benefit distribution mechanisms. Under traditional cooperation models, the cooperative relationship is oversimplified, primarily linked through product purchases and sales, lacking long-term win-win benefit connection mechanisms. Against the backdrop of intensifying market competition, manufacturers tend to compete for market share through price competition, while healthcare institutions focus on procurement cost control, making it difficult to form a community of shared interests. This lack of benefit mechanisms leads to unstable cooperative relationships, affecting the overall efficiency of the industry chain.

The absence of risk management systems constitutes another deep-seated contradiction. The medical aesthetic industry has high product safety and medical risks, but under traditional cooperation models, manufacturers and healthcare institutions lack effective coordination in risk prevention and control. Product quality traceability systems are imperfect, making it difficult to accurately identify responsible parties when quality issues arise; adverse reaction monitoring mechanisms are incomplete, affecting the accuracy of product safety assessments. Meanwhile, insufficient information sharing in medical risk prevention increases the possibility of medical accidents.

Backward information technology levels are also a key factor constraining cooperation deepening. Currently, information systems between medical aesthetic product manufacturers and healthcare institutions generally operate independently and are incompatible. This information island phenomenon prevents both parties from achieving data sharing and business coordination, affecting decision-making efficiency. Key information such as product usage data and clinical effect data cannot be effectively integrated and analyzed, causing both parties to lose important decision-making bases. Delayed information technology construction not only affects daily operational efficiency but also constrains industry innovation development in the big data era.

An imperfect standardization system is another important aspect of deep-seated contradictions. The construction of core standard systems, such as medical aesthetic product application standards, clinical operation specifications, and service quality evaluation standards, lags behind, leaving manufacturers and healthcare institutions without unified codes of conduct and evaluation standards in their cooperation. This low standardization status not only increases communication costs in cooperation but also affects the improvement of overall industry service levels. The lack of standardization systems makes it difficult to form unified requirements for key links such as product quality management and clinical application specifications, hindering orderly industry development.

The root cause of these existing problems lies in traditional cooperation models' failure to adapt to new industry development situations, urgently requiring breakthrough development bottlenecks through model innovation. Only by deeply analyzing the deep-seated contradictions behind these problems can clear improvement directions be provided for constructing innovative cooperation models, promoting the establishment of closer, more dynamic cooperative relationships between medical aesthetic product manufacturers and healthcare institutions.

4. Construction of Innovative Cooperation Models between Medical Aesthetic Product Manufacturers and Healthcare Institutions

4.1 Design of Full-Chain Collaborative Development Model

The full-chain collaborative development model is an innovative cooperation model built on the concept of value chain integration. This model focuses on product lifecycle management, achieving deep collaboration across R&D, production, and application stages. In the product R&D phase, medical aesthetic product manufacturers establish joint product innovation laboratories, inviting clinical experts from healthcare institutions to participate in the product design process, ensuring high alignment between product performance and clinical needs. Manufacturers can adjust product parameters based on clinical expert feedback, shortening product optimization cycles. Meanwhile, they jointly conduct clinical research to provide scientific basis for product efficacy evaluation.

In the production and supply phase, demand forecasting and inventory coordination mechanisms are established. Healthcare institutions regularly provide detailed usage forecast data to manufacturers, who optimize production plans and inventory layouts accordingly. Through jointly building intelligent warehousing systems, real-time sharing of product inventory information is achieved, improving supply chain response speed. Product traceability systems are established,

forming complete quality traceability chains from raw material procurement to clinical use, effectively preventing product quality risks. In the clinical application phase, manufacturers assign technical support teams to provide professional technical guidance and training services, ensuring safe and standardized product use. Through establishing clinical effect evaluation systems, product usage feedback is collected promptly, providing basis for continuous improvement.

4.2 New Digital Empowerment Cooperation Model

The new digital empowerment cooperation model is an innovative solution proposed in response to industry digital transformation trends. This model uses digital platforms as carriers to build collaborative systems covering the entire product lifecycle. Through establishing digital product archives, systematic management of product-related information is achieved. Manufacturers digitize product technical parameters, instructions, training materials, and other documents, allowing healthcare institutions to access needed information at any time. Meanwhile, clinical data analysis systems are established to conduct intelligent analysis of product usage effects, providing data support for product improvement and clinical application optimization.

The digital platform also integrates supply chain management functions, achieving intelligent operation of procurement, distribution, inventory, and other links. Healthcare institutions can directly initiate procurement demands through the platform, with the system automatically generating distribution plans, achieving standardized and transparent procurement processes. The platform includes intelligent warning functions, automatically triggering replenishment mechanisms when inventory reaches warning levels, avoiding stockout risks. Remote technical support systems are established, providing convenient technical services to healthcare institutions through online training, remote consultations, and other means.

The core advantage of digital cooperation platforms lies in deep data application. By collecting and analyzing multi-dimensional information including product usage data, patient feedback data, and market demand data, powerful support is provided for both parties' decision-making. Manufacturers can optimize product structures based on data analysis results, developing new products that better meet market demands; healthcare institutions can improve treatment plans and enhance service quality through data analysis. The platform also features AI-assisted decision-making capabilities, able to predict market trends, optimize resource allocation, and improve operational efficiency.

Implementation of innovative cooperation models needs to progress in stages. The initial phase focuses on improving infrastructure construction, including technical platform building and management system formulation. The middle phase strengthens operational capability improvement through training exchanges to enhance personnel professional levels. The later phase emphasizes model optimization and upgrading, continuously improving based on practical effects. Through implementing innovative cooperation models, medical aesthetic product manufacturers and healthcare institutions will form closer cooperative relationships, achieving complementary advantages and mutual benefits. This deep cooperation not only helps improve product and service quality but will also promote innovative development of the entire medical aesthetic industry.

5. Safeguard Mechanisms for Innovative Cooperation Models between Medical Aesthetic Product Manufacturers and Healthcare Institutions

5.1 Institutional Norms and Risk Control

Establishing a comprehensive system of institutional norms is fundamental to ensuring effective operation of innovative cooperation models. These norms should cover multiple aspects including cooperation agreement management, product quality control, and technical standard implementation. At the cooperation agreement level, clear rights, responsibilities, and obligations of both parties are specified, with detailed cooperation rules and process standards established. Product quality management systems are established to standardize operational requirements for product acceptance, storage, and usage. Technical service specifications are developed to clarify technical support content, methods, and quality standards. Through the establishment and implementation of institutional norms, institutional guarantees are provided for innovative cooperation model operation.

Risk control mechanisms are an important component of institutional norms. A product quality risk prevention and control system is established, including raw material quality control, production process control, and product acceptance control. Adverse reaction monitoring and emergency response mechanisms are constructed to promptly identify and address safety hazards during product use. Medical risk prevention systems are improved, clinical operation specifications are formulated, and medical safety training is strengthened. Joint quality assessment mechanisms are established with regular quality audits to promptly identify and resolve issues. Through multi-level risk control, safe, standardized, and orderly cooperation processes are ensured.

Medical aesthetic product manufacturers and healthcare institutions should establish joint risk management committees responsible for daily operation of risk control systems. These committees regularly assess risk conditions, update risk control measures, and organize risk prevention training. Risk information sharing mechanisms are established to achieve timely transmission and effective response to risk information. Through systematic risk management, security guarantees are provided for stable operation of innovative cooperation models.

5.2 Benefit Distribution and Incentive Mechanisms

Scientifically reasonable benefit distribution mechanisms are key to sustaining innovative cooperation models. Value contribution-based benefit distribution systems are established, incorporating contributions from product R&D, clinical application, market development, and other links into assessment scope. Flexible pricing mechanisms are designed, determining reasonable price ranges based on factors such as product innovation level, market response, and usage effects. Sales commission systems are established to incentivize healthcare institutions to expand product usage scale. Through reasonable benefit distribution, dynamic balance of both parties' interests is achieved.

Incentive mechanism design should emphasize long-term effects. Product innovation incentive systems are established, providing technology development profit sharing for healthcare institutions participating in product R&D and improvement. Clinical application innovation rewards are set up to encourage healthcare institutions to conduct new technology application research. Long-term cooperation return mechanisms are established, providing differentiated cooperation conditions based on cooperation duration and contribution level. For quality partners, exclusive support policies are formulated, including priority technical support and market development support.

Performance evaluation is an important basis for benefit distribution. Multi-dimensional performance evaluation systems are established, including product quality indicators, service satisfaction indicators, and innovation contribution indicators. Regular performance assessments are conducted, with results directly linked to benefit distribution. Dynamic adjustment mechanisms are established to timely adjust distribution plans based on market changes and cooperation effectiveness. Through scientific performance evaluation, fair and just benefit distribution is achieved.

Talent cultivation and team building are important supports for safeguard mechanisms. Joint talent training systems are established to conduct professional technical training and management capability training, improving team professional levels on both sides. Talent exchange mechanisms are established to strengthen team integration through short-term exchanges and project cooperation. Special training funds are set up to support key position personnel capability improvement. Through continuous talent investment, talent guarantees are provided for innovative cooperation models.

Establishing long-term communication mechanisms is an important link in the safeguard system. Joint working groups are formed to regularly hold coordination meetings and promptly resolve issues arising during cooperation. Information feedback channels are established to collect opinions and suggestions from all parties and continuously optimize cooperation models. Through effective communication mechanisms, mutual understanding and trust are enhanced, promoting continuous deepening of cooperative relationships. This complete safeguard mechanism will provide strong support for successful implementation and long-term development of innovative cooperation models between medical aesthetic product manufacturers and healthcare institutions.

6. Conclusion

The construction of innovative cooperation models between medical aesthetic product manufacturers and healthcare institutions is an important measure to promote high-quality development of the medical aesthetic industry. Based on value chain theory and business ecosystem theory, through in-depth analysis of problems existing in traditional cooperation models such as low supply chain efficiency, insufficient technical support, and lack of benefit mechanisms, two innovative cooperation models - full-chain collaborative development and digital empowerment - are proposed. The full-chain collaborative development model achieves deep integration of product R&D, production, and application links, while the new digital empowerment model improves cooperation efficiency and decision-making levels through digital platform construction. To ensure effective operation of innovative cooperation models, a complete safeguard system containing elements such as institutional norms, risk control, and benefit distribution has been constructed. Implementation of innovative cooperation models will effectively improve medical aesthetic product quality and service levels, promote coordinated development of industry chain links, and inject new momentum into sustainable innovation and healthy development of the medical aesthetic industry.

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