

A Study on Innovation Strategies of Footwear Manufacturing Enterprises in the Current Era

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Abstract:

This study investigates the role of innovation strategies in the sustainable development of small and medium-sized manufacturing enterprises (SMEs), with a focus on China's footwear industry. The sector faces significant challenges, including overcapacity, low value-added production, tariff barriers, rising labor costs, and shifting global supply chains. Innovation is posited as a critical pathway for SMEs to escape homogeneous competition and enhance value creation. Through a mixed-methods approach that combines case study analysis and industry data, this research demonstrates that innovation must be approached as a systemic strategy integrating organizational, technological, and cultural dimensions. The findings suggest that specialized digitalization, brand development, and cross-industry collaboration are essential for SMEs to achieve deterministic growth. This study contributes to the theoretical discourse on industrial innovation and offers practical insights for SMEs navigating contemporary market challenges.

Keywords: Innovation Strategy; SMEs; AI Empowerment; Footwear Industry Development; Digital Transformation; Sustainable Development.

1. Introduction

The global manufacturing sector is undergoing significant transformation, driven by technological advances, geopolitical shifts, and evolving consumer demands. Within this context, small and medium-sized enterprises (SMEs) in traditional manufacturing sectors such as footwear face mounting pressures. These include international trade disputes, rising production costs, and stringent environmental and social compliance requirements (Wang & Li, 2022)ⁱ. The Chinese footwear industry, while possessing a comprehensive industrial chain, is characterized by weak brand influence and limited technological innovation, leaving it vulnerable to external shocks and internal inefficiencies.

This paper argues that innovation—when strategically implemented—can enable SMEs to transition from competing on cost to competing on value. Rather than treating innovation as a series of isolated initiatives, firms should adopt an integrated innovation strategy encompassing product design, organizational structure, corporate culture, and supply chain collaboration. The following sections explore this approach through a case study of Anbu Footwear, supplemented by empirical data from the broader industry.

2. Literature Review and Theoretical Framework

Innovation in manufacturing has been widely studied, yet its application within traditional, labor-intensive industries such as footwear remains underexplored. Schumpeterⁱⁱ (1934) originally framed innovation as "new combinations" of existing resources, emphasizing its role in economic development. More recently, Teece (2010)ⁱⁱⁱ highlighted the importance of dynamic capabilities, allowing firms to adapt to changing environments through strategic innovation.

In the context of Chinese SMEs, innovation is often constrained by limited resources and a focus on short-term survival. However, as Porter (1998) argues, firms can achieve sustainable advantage through strategic positioning and value chain optimization. For footwear manufacturers, this implies a shift from OEM production toward brand building and technological upgrading (Zhang & Liu, 2021). Furthermore, the concept of open innovation^{iv} (Chesbrough, 2003) suggests that firms can leverage external knowledge and partnerships to overcome internal constraints.

This study integrates these perspectives to develop a framework for innovation strategy in footwear manufacturing, emphasizing the interplay between internal capabilities and external collaboration.

3. Research Methodology

A hybrid research design was employed, combining qualitative case study analysis with quantitative survey data.

3.1 Case Study

Anbu Footwear, a representative SME in Eastern China, was selected for in-depth analysis. Founded in 2010, the company employs approximately 200 people and has transitioned from OEM production to developing its own brand. Data were collected through company reports,

semi-structured interviews with managers and staff, and direct observation of production processes between 2019 and 2024.

3.2 Industry Survey

To contextualize the case findings, a survey was conducted among 50 footwear SMEs in Guangdong and Zhejiang provinces. Data on R&D investment, profit margins, and innovation outcomes were analyzed using SPSS to identify correlations between strategic orientation and business performance.

4. Case Analysis: Anbu Footwear

4.1 Product Innovation: Beyond Cost Leadership

Anbu Footwear's shift from competing on price to competing on value illustrates the potential of product-level innovation. The company integrated customer feedback with AI-driven trend analysis to develop functionally advanced footwear, such as shoes with 3D-printed customized insoles. This approach allowed the firm to achieve a 20% price premium while reducing production waste through lean manufacturing techniques.

4.2 Organizational Innovation: Empowering Employees

The company reorganized its structure to foster innovation at all levels. Cross-functional teams were established, and an employee suggestion system led to significant efficiency gains—for instance, logistics optimizations proposed by drivers reduced fuel costs by 8% annually. These changes demonstrate that innovation is not limited to R&D departments but can emerge from daily operations (Nonaka & Takeuchi, 1995)^v.

4.3 Cultural and Strategic Alignment

Anbu's leadership prioritized a culture of experimentation and learning. Regular innovation workshops and a tolerance for failure encouraged creative problem-solving. This cultural shift, supported by strategic investments in digital tools and staff training, enabled the firm to increase its R&D expenditure from 3% to 10% of revenue within five years.

5. Discussion: Strategic Pathways for Innovation

The case study findings align with broader industry trends indicating that successful SMEs adopt multi-faceted innovation strategies that integrate technological capabilities with market intelligence. The transformation of footwear manufacturing SMEs requires a systematic approach that spans digital integration, brand development, sustainable practices, and collaborative ecosystems. What follows is an in-depth exploration of these strategic pathways with specific, actionable methods and contemporary case examples.

5.1 Digital Integration: Advancing Design, Production, and Customization

Digital integration represents a paradigm shift from traditional manufacturing to a smart, data-driven operation. It encompasses the entire value chain, from initial concept to final product delivery, enabling unprecedented levels of efficiency, customization, and agility.

- **AI-Enhanced Design and Concept Development:** The initial stages of product development can be significantly accelerated using generative AI tools. For instance, designers can use platforms like **DeepSeek** or **即梦 AI (JiMeng AI)** to generate mood boards and conceptual sketches by inputting detailed prompts such as, "Generate product concepts for a unisex running shoe inspired by urban architecture, using sustainable materials, in a monochromatic color scheme." Similarly, video creation tools like **CapCut**'s AI features or **DreamFace** can be employed to produce realistic marketing videos or 3D model animations of the shoe in various environments before a physical prototype even exists. This reduces time-to-market and allows for rapid consumer feedback on concepts, mitigating the risk of investing in unpopular designs (Porter & Heppelmann, 2015).^{vi} This approach aligns with the concept of a *digital twin*, where a virtual prototype can be tested and refined extensively.
- **3D Modeling and Printing for Rapid Iteration:** The adoption of software like **ICAD3D** for precise 3D modeling, combined with 3D printing technology, revolutionizes the R&D process. Functional prototypes can be produced in-house within hours instead of the weeks required for traditional sample-making, which often depends on external suppliers. This allows for:
 - 1).Ergonomic Testing,3D-printed soles can be immediately tested for comfort and pressure distribution.
 - 2).Design Validation,The fit, form, and aesthetic of the design can be physically assessed and adjusted iteratively at a minimal cost.
 - 3).Mass Customization,The ultimate application is the production of customized goods. Using data from 3D foot scanners (available in retail stores or even via smartphone apps), companies can manufacture shoes or, more feasibly for SMEs, personalized insoles that perfectly match an individual's foot morphology. This moves the value proposition from mass production to mass customization, creating a powerful competitive advantage^{vii}.

- **IoT and Data Analytics in the Smart Factory:** On the production floor, Internet of Things (IoT) sensors can be installed on cutting and stitching machines to monitor performance in real-time. This data, analyzed by AI algorithms, can predict maintenance needs, preventing costly downtime. Furthermore, data analytics can optimize material nesting patterns on leather or fabric, minimizing waste and reducing production costs. This digital thread connecting design, production, and logistics creates a leaner, more responsive, and sustainable operation.

5.2 Brand Development: Strategic Storytelling and Direct Customer Engagement

For SMEs long trapped in the OEM model, building a distinct brand is the most critical step toward escaping price-based competition. A strong brand is built on a compelling narrative and direct, meaningful engagement with the target audience.

- **A Differentiated Social Media Strategy:** A one-size-fits-all approach to social media is ineffective. Each platform should serve a distinct purpose in the marketing funnel (Tuten & Solomon, 2017)^{viii}.

- **TikTok and Video Channels:** These platforms are ideal for building brand awareness and authenticity. Content should focus on "edutainment"—showing the craftsmanship behind the shoes, the durability tests of materials, or the story of the designers. Short, engaging videos that demystify the manufacturing process can generate significant interest and brand loyalty.

- **LinkedIn:** This platform is crucial for B2B relations and establishing thought leadership. SMEs can share case studies on their sustainable practices, whitepapers on the benefits of 3D printing in footwear, and announcements of new industry partnerships. This builds credibility with potential international buyers, investors, and research collaborators.

- **Facebook/Instagram:** These visual platforms are key for community building and aspiration. High-quality photos, user-generated content campaigns, and targeted advertising help in showcasing the final product and building a community around the brand's lifestyle image.

- **WeChat Official Account / WhatsApp:** These platforms are essential for CRM (Customer Relationship Management) and direct sales. They provide a channel for personalized customer service, after-sales support, and even facilitating transactions, fostering a direct and trusted relationship with the end-consumer.

5.3 Sustainable Practices: From Regulatory Compliance to Market Leadership

Sustainability is no longer an optional add-on but a core component of modern manufacturing strategy. Proactive SMEs can turn this challenge into a significant market opportunity.

- **Innovative Material Sourcing:** The most visible aspect of sustainable footwear is material choice. SMEs can actively source and incorporate recycled materials (e.g., recycled polyester from plastic bottles for uppers, recycled rubber for outsoles), bio-based materials (e.g., algae-based EVA foam, mushroom-based leather alternatives), and sustainably harvested natural materials. Collaborating with specialized material startups can provide access to innovative, eco-friendly fabrics that become a unique selling proposition.

- **Implementing Circular Economy Principles:** Forward-thinking companies can explore circular models, such as implementing a take-back program. Customers are incentivized to return their worn-out shoes, which are then either refurbished for resale or broken down into raw materials for new products. This not only addresses the end-of-life environmental impact but also creates a new stream of customer interaction and reinforces the brand's commitment to sustainability, aligning with the principles of a circular economy (Geissdoerfer et al., 2017)^{ix}.

5.4 Collaborative Ecosystems: Amplifying Innovation through Partnerships

Innovation is increasingly "open," relying on networks rather than isolated internal efforts. SMEs can leverage external expertise to overcome resource constraints.

- **Supplier Co-creation:** Moving beyond a transactional relationship, SMEs can involve material suppliers and equipment manufacturers early in the R&D or design process. This collaboration can lead to the development of exclusive, proprietary materials that offer unique performance or aesthetic benefits, and Create an efficient production processs, differentiating the final product.

- **Academic and Research Institution Partnerships:** Forming partnerships with universities provides access to cutting-edge research, high-end laboratory equipment, and talented graduate students. Jointly applying for government innovation grants can fund R&D projects that would be too risky or expensive for an SME to undertake alone, such as developing advanced biometric sensors for smart shoes.

- **Industry Consortiums:** Participating in pre-competitive consortiums with other SMEs or even competitors to tackle industry-wide challenges—like standardizing recycling protocols for footwear or sharing best practices for reducing water usage—can elevate the entire sector's capabilities and reduce individual R&D burdens.

In summary, digital integration, brand development, sustainable practices, and collaborative ecosystems are deeply interconnected. A digitally integrated supply chain enables cost - effective customization for a strong brand story, which is amplified via social media and relies on authentic sustainable credentials. These advancements are accelerated by collaborative ecosystems. Collectively, these strategies require long - term commitment to strategic planning, continuous capability development, and a cultural shift towards open, customer - centric innovation. For footwear SMEs, this holistic approach is essential for survival and relevance in the evolving global market.

6. Conclusion and Implications

This study demonstrates that innovation, when embedded in a holistic strategy, can enable footwear SMEs to overcome structural constraints and achieve sustainable growth. The case of Anbu Footwear illustrates the importance of aligning product innovation, organizational structure, and corporate culture toward common goals.

For policymakers, supporting SME innovation requires facilitating access to technology, finance, and international markets. For entrepreneurs, success depends on adopting a strategic, long-term perspective and fostering a culture of continuous improvement and collaboration.

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