Rise of China's Manufacturing Hidden Champions: A Resource Allocation Perspective
——An Explorative Case Study of Hailiya Group

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Abstract: *Hidden champions play a critical role in China's efforts to overcome technological and industrial "chokepoints". These enterprises are pivotal for breaking free from Western technological embargoes, avoiding entrapment in low-value-added production, and driving industrial upgrading. Given the distinct market environment in which China's hidden champions have emerged, it is both timely and practically significant to examine their growth trajectories and underlying mechanisms. This study adopts a resource allocation perspective to investigate the development path of Chinese manufacturing enterprises into hidden champions, using a vertical case study of Hailiya Group. The findings reveal that such enterprises achieve hidden champion status by vertically concentrating on niche markets while harnessing technological potential and horizontally diversifying their technology application scenarios. Their growth follows a "T-shaped" strategy, combining vertical specialization in a focused market with horizontal expansion into new applications. Four critical mechanisms underpin the rise of manufacturing hidden champions: market niche positioning, innovation-driven focus, application scenario expansion, and ecosystem development. Specifically, these enterprises strategically target niche markets, establish a technology-oriented competitive edge, broaden technology applications to unlock new profit opportunities, and develop collaborative ecosystems to share resources and drive industrial advancement. This paper not only extends the interpretive boundaries of resource allocation theory but also offers fresh insights into the emergence of Chinese manufacturing enterprises as hidden champions, enriching our understanding of their unique growth dynamics.*

Keywords: *Hidden champions; resource allocation; innovation assets; customer assets; growth mechanism*
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1. Introduction

Manufacturing enterprises, as key drivers of technological innovation, play a crucial role in advancing high-quality economic development and fostering new-quality productive forces.

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However, China's manufacturing sector faces intense competition, financing challenges, a lack of core technologies, and insufficient scientific research capabilities (Li, 2021). In an environment characterized by rapid market, technological, and institutional changes, these enterprises struggle to compete with established players and ascend the value chain (Wu et al., 2020). Cultivating more "hidden champions" in manufacturing is critical not only for industrial upgrading and enhancing China's manufacturing strength (Lei and Tan, 2021) but also as a strategic entry point for implementing the "domestic and international dual circulations" policy and driving high-quality economic growth (Ge and Zhao, 2022). Most importantly, this approach offers a viable path for Chinese manufacturing enterprises to overcome their current challenges (Liu, 2022).

Hidden champions are small and medium-sized enterprises (SMEs) that dominate specific market niches while remaining relatively unknown to the general public (Simon, 2013). These companies are characterized by their irreplaceability, close customer relationships, and continuous innovation (Simon, 2012). Existing research has positively explored various aspects of hidden champions, including their growth strategies (Li and Sun, 2021; Ge and Zhao, 2022b) and the internal and external factors influencing their success (Din et al., 2013; Rant and Cerne, 2017; Lei and Wu, 2022). While hidden champions in countries like Germany and Japan are well-established, their Chinese counterparts in the manufacturing sector are still in the early stages of development. Despite their deep integration into industrial chains, many Chinese hidden champions have not yet established a truly "irreplaceable" competitive edge. In the face of a highly uncertain market environment, disruptions in industrial chains can pose severe survival risks for these enterprises. This underscores the critical importance of examining how manufacturing firms can achieve hidden champion status, particularly under challenging conditions.

Chinese manufacturing enterprises, with their relatively short history, often face significant challenges in building and sustaining core competitiveness (Zhang et al., 2024). These enterprises operate under considerable market and technological pressures in their pursuit of becoming hidden champions. Market pressures encompass issues such as establishing market legitimacy, developing strong brands, navigating industrial policies, and competing with peers (Peng et al., 2022; Zhao et al., 2023). On the technological front, they contend with a shortage of skilled labor, limited control over core technologies, and insufficient R&D capabilities (Li, 2021). In this context, effective resource allocation emerges as a critical strategy for overcoming these challenges. By optimizing resources, these enterprises can mitigate inherent disadvantages, adapt to adverse conditions, and achieve sustainable growth (Vorhies and Morgan, 2003; Baker and Sinkula, 2007). Consequently, resource allocation theory provides a valuable lens for understanding the ascent of Chinese manufacturing hidden champions (Siggelkow, 2002). Exploring the unique environments in which some Chinese manufacturing enterprises have achieved hidden champion status offers meaningful insights. By examining the dual pressures of market and technology, we can better understand how these enterprises surmounted growth bottlenecks through strategic resource allocation, paving the way for their success.

Through a case study on Qingdao Hailiya Group Co., Ltd. ("Hailiya"), this paper focuses the research question on "path and mechanism for the growth of Chinese manufacturing hidden champions" from a resource allocation perspective. To this end, we created a process model to investigate the growth of manufacturing hidden champions, as well as the key mechanisms underlying such growth process, thereby broadening the boundary of theoretical interpretation for research on the growth strategies of hidden champions.

2. Literature Review and Theoretical Framework

2.1 Relevant Research on Hidden Champions and Their Growth Path

Peng et al. (2018) outlined three key paths for enterprise growth: (1) endogenous growth, driven by capable managers creatively integrating and reorganizing existing resources; (2) acquisitive growth, achieved through mergers and acquisitions (M&As) to gain "resource bundles" such as brands and

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technologies; and (3) network-based growth, facilitated by converting managers' interpersonal relationships into cross-business commercial networks and strategic alliances. In contrast to multinational corporations, hidden champions are SMEs with absolute dominance in specific market niches and annual sales below 5 billion USD (Simon, 2013). These companies are deeply integrated into their industrial chains, closely collaborating with customers and tailoring their operations to niche markets. Consequently, their growth paths exhibit distinctive traits of differentiation (Zhang et al., 2024). The research has actively examined hidden champions' growth trajectories through various lenses, including business positioning (An and Zhang, 2019), entrepreneurship (Ge and Wang, 2020), corporate value (Yu et al., 2022), corporate knowledge power (2022), and collaborative innovation (Zhao et al., 2023).

From the perspective of growth strategy, hidden champions typically adopt a focus or specialization strategy, devoting themselves over the long term to a particular niche market. They concentrate their resources on delivering products or services to specific market segments or customers (Lei and Tan, 2021), and achieve specialized development through continuous technological innovation and product iterations(Kollmann et al., 2017; Ge and Zhao, 2022a). Ge and Zhao (2022) highlight that many hidden champions adhere to a "Single-Focus Strategy", concentrating on a single category of products or services to build and sustain core competitiveness (Wang et al., 2019). Meanwhile, some hidden champions employ a "T-shaped" strategy (Li and Sun, 2021), which combines deep specialization with strategic diversification. Vertically, they remain dedicated to their core business, enhancing technological expertise and business specialization. Horizontally, they expand the application scenarios of their core technologies, enabling diverse use cases. This dual approach allows them to balance vertical specialization with horizontal business diversity, leveraging their core competencies to drive growth and innovation.

The growth of hidden champions is influenced by both internal and external factors. Internally, innovation plays a pivotal role in their success (Simon, 2009; Cao et al., 2022). By leveraging innovation to enhance technology, businesses can better meet customer needs while improving existing products and services (Din et al., 2013; Ge and Wang, 2020). Moreover, innovation often uncovers new customer demands and creates opportunities to explore untapped market spaces (Li and Li, 2008; Yoon, 2013). Additional internal drivers of success include a strong entrepreneurial focus (Ge and Zhao, 2022), market leadership (Xu and Wang, 2021), business appeal (Rant and Cerne, 2017), and the strategic vision of management (Lei et al., 2020; Lei and Wu, 2022). Externally, network relationships significantly influence the growth trajectory of hidden champions (Simon, 2009; Ge and Wang, 2020). For example, maintaining close customer relationships enhances business performance (Simon, 2012; Rant and Cerne, 2017). Other external factors, such as the market environment and policy framework, also play a crucial role in shaping these companies' development (Din et al., 2013; Cao et al., 2022).

Scholars have contributed significantly to the study of hidden champions and their growth dynamics. However, there remains a lack of comprehensive discussion on how Chinese manufacturing hidden champions can achieve sustainable growth while addressing the lock-in effects of their specialization within a specific business segment. These challenges are further exacerbated by factors such as resource constraints, technological bottlenecks, limited growth opportunities, and various external pressures.

2.2 Resource Allocation and Growth of Hidden Champions

Hidden champions achieve a relatively stable income structure by specializing in niche markets and embedding themselves within industrial chains. However, this focused approach often limits their growth potential due to insufficient external marketing insights and a lack of end-user engagement. Unlike the hidden champions of Germany and Japan, Chinese manufacturing enterprises face more severe resource constraints and have yet to cultivate truly "irreplaceable" competitive advantages. In a highly volatile market environment, any disruptions in the industrial chain could threaten their very survival.

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To navigate these challenges, it has become crucial for Chinese manufacturing enterprises to overcome resource limitations through efficient resource allocation and to make dynamic adjustments in response to external market fluctuations. Resource allocation theory highlights that business competitiveness depends not simply on the quantity of resources but on their effective allocation and strategic combination to align with specific external conditions (Siggelkow, 2002; Fang et al., 2011). From a resource allocation perspective, the emergence of manufacturing enterprises as hidden champions can be viewed as a continuous process of recalibrating resource allocation strategies in response to dynamic external pressures. Investigating how Chinese manufacturing enterprises navigate this journey under varying external conditions provides both theoretical insights and practical guidance.

In corporate resource allocation, customer assets and innovation assets are two of the most critical resources for businesses (Fang et al., 2011; Xu and Shan, 2019). Customer assets encompass resources used to identify and meet customer needs, including channel management, customer relations, and marketing tools. Innovation assets, on the other hand, refer to resources dedicated to technology development and application, such as product knowledge, technological expertise, and production management know-how (Fang et al., 2011; Zhang et al., 2017). Excessive reliance on innovation assets can lead to R&D efforts that deviate from customer needs and preferences, increasing the risk of failure. Conversely, over-reliance on customer assets may result in stagnation in product and technology development, restricting a company to customer-driven improvements or imitative innovation (Xu and Shan, 2019). To thrive in a dynamic external market environment, companies must strike a delicate balance between customer assets and innovation assets in their resource allocation. However, existing research has largely overlooked the resource allocation strategies employed by manufacturing "hidden champions", i.e., exceptionally successful, yet often little-known, companies, during their growth trajectories. There is a pressing need for further exploration into the processes and mechanisms through which these manufacturing enterprises achieve success by effectively allocating both customer assets and innovation assets in response to external pressures.

2.3 Case Study Framework

Based on the above analysis, we have developed a theoretical framework titled "External Pressures, Resource Allocation, and the Growth Performance of Hidden Champions" (see Figure 1) to address the core research question: How do Chinese manufacturing enterprises evolve into hidden champions through resource allocation strategies? Within this framework, external pressures encompass the technological and market challenges that manufacturing enterprises face throughout their growth journey. Resource allocation refers to the strategic distribution of key resources, specifically innovation assets and customer assets, which firms utilize to navigate these external pressures. Finally, growth performance of hidden champions refers to the measurable improvements that companies achieve by successfully responding to external pressures, with a focus on advancements in both market position and technological capabilities.

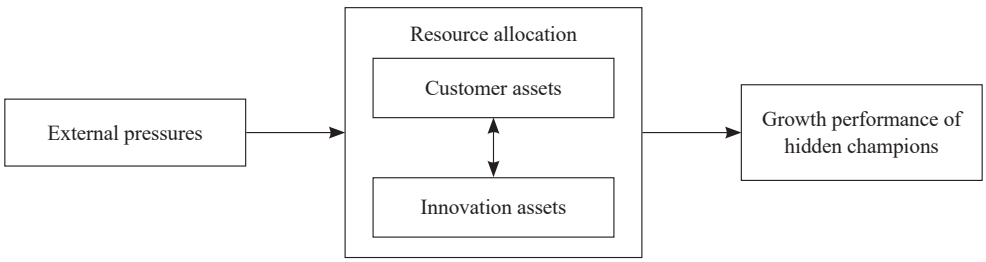

Figure 1: Theoretical Analysis Framework

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3. Research Design

3.1 Methodology

In this paper, we adopt a vertical explorative single case study approach for two key reasons. First, our research question, i.e., how Chinese manufacturing enterprises have evolved into "hidden champions" through strategic resource allocation, aligns with the case study method's ability to address the questions of "how" and "why" questions (Eisenhardt, 1989). Second, the vertical explorative design allows us to trace the chronological sequence of pivotal events in the enterprise's development, offering a detailed and nuanced analysis of its growth amid external pressures. This approach not only ensures a deeper exploration of the case but also provides insights that can enhance our understanding of similar enterprises in comparable contexts (Yin, 2014).

3.2 Case Selection

This study aims to identify and analyze the process and underlying mechanisms through which Chinese manufacturing enterprises have emerged as "hidden champions". Following the principle of theoretical sampling (Eisenhardt, 1989), we selected Qingdao Hailiya Group Co., Ltd. ("Hailiya") as our case study.

Founded in 1922, Hailiya is one of the pioneering enterprises in Qingdao, renowned for its specialization, innovation, and technical sophistication. Originally established as the Qingdao Xiecheng Lace Factory, the Company was renamed Qingdao Haili Lace & Ribbon Co., Ltd. in 1997. Initially focused on hair ties, Hailiya has since evolved into a leading "hidden champion" in the production of specialized ropes and cables for marine equipment, military applications, and safety/emergency response sectors. Hailiya has made significant contributions to major national scientific research projects, particularly in the marine equipment sector. Notable achievements include its involvement in the manned submersible *Jiaolong*, the scientific expeditions to the 10,000-meter-deep ocean trench, and the real-time data transmission of deep-sea submersible buoys. These projects underscore Hailiya's expertise in developing high-performance cables that excel in undersea depth, precision, strength, and temperature tolerance. In the military sector, Hailiya has demonstrated its technological prowess by developing specialized ropes and cables for the United Nations Peacekeeping Forces, the *Tianwen-1* Mars lander, and the return capsule of China's new-generation manned spacecraft test ship, overcoming complex international technical challenges. Hailiya has also been a trailblazer in China's safety and emergency response sector. The Company has introduced innovative products such as high-rise building escape devices and fireproof aprons, while also spearheading the adoption of "experiential" safety training programs. These initiatives have significantly boosted public awareness and emergency preparedness. Given Hailiya's remarkable achievements and its leadership across multiple high-tech sectors, its emergence as a hidden champion is a fitting example for theoretical sampling.

Since 1997, over a span of nine years, Hailiya has leveraged its expertise in the lace and ribbon sector to develop high-end rope products. Another eight years of intensified research and development in specialized ropes solidified Hailiya's position as a top choice for its customers. In 2014, the Company expanded the application of its specialized rope and cable technologies into the safety and emergency response sector. By introducing an innovative "experiential" training methodology, Hailiya has established itself as a leader in this field, pioneering new approaches to emergency preparedness and safety. Hailiya's transformation from a traditional manufacturing enterprise into a hidden champion offers valuable insights into the strategic development and innovation that drive success (Eisenhardt, 1989).

3.3 Data Collection

Our primary data source consists of semi-structured interviews, as outlined in Table 1. During five site visits to Hailiya, our research team conducted interviews with 13 individuals, with each interview involving at least three team members. After each interview, the team transcribed the audio recordings

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and carefully reviewed the responses for consistency, particularly in relation to the same questions. To ensure the completeness and accuracy of the data, follow-up interviews were conducted to address any gaps or discrepancies identified during the initial round of interviews.

Table 1: Semi-structured Interview Information and Code

Source	Position	Number of persons	Total duration	Code	Content of interview
Semi-structured interview (S_n)	Board chairman	1	167 minutes	S_1	(1) Corporate development journey, strategic change, and adjustment of the management structure; (2) main problems, challenges and countermeasures in different periods of time; (3) core technologies, product categories, and technological advantages; (4) extension of application scenarios, technological innovation and commercialization, and external cooperation; (5) brand development and customer relations management.
	General manager and deputy general managers	3	340 minutes	S_2	
	Director and deputy directors of the technology center	3	361 minutes	S_3	
	Managers of branding, publicity and business development departments	3	280 minutes	S_4	
	Other relevant employees	3	210 minutes	S_5	

In addition to the semi-structured interviews, we employed a range of diverse and complementary data sources (as detailed in Table 2) to ensure a well-rounded analysis. These include: (1) Internal information, such as Hailiya's meeting records, archival materials, and management speeches; (2) External information, including updates from the official website and coverage from mainstream media outlets; and (3) Non-participatory observations, which involved site visits to Hailiya's facilities and exhibition halls, as well as participation in Hailiya's centennial celebrations. These multiple data sources were cross-referenced to validate and enrich our findings.

Table 2: Data Sources and Code

Source	Description	Category	Quantity	Code
Internal information	Archives, management speeches, and meeting records	Document	11	T_1
External information (F_n)	Hailiya's official website, Sohu, Sina and Tencent news	News information	92	F_1
	China's top rope maker, Hailiya: Transformative journey of a centennial enterprise	Ariticle	23	F_2
	China's top rope maker: Story of Hailiya's centennial innovation and development	Book	1	F_3
	Hailiya: Forerunner in the emergency response and safety sector; Hailiya: Manufacturer of cables for ships and spacecraft	Video	18	F_4
Non-participatory observations (C_n)	Visits to Hailiya's venues, participation in Hailiya's centennial ceremony, etc.	Site visits	3	C_1

3.4 Data Analysis and Coding

We have systematically integrated, refined, and summarized case data using a vertical single-case design methodology. The process began with organizing and screening the collected information to eliminate any irrelevant content. This allowed us to identify key events in the development of the Company. Next, we created a timeline of significant events and selected critical indicators to categorize the company's growth into distinct stages. Using secondary data, we identified 67 key events in Hailiya's history since 1997. Although Hailiya was founded in 1922, it only began operating as a commercial

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enterprise in 1997 with the establishment of Qingdao Hailiya Lace & Ribbon Co., Ltd., which marks the starting point of our study. During interviews, we invited respondents to review and supplement the information, asking them, particularly members of the management team, to divide the Company's development into stages, based on the changing external pressures it faced over time. Our findings suggest that Hailiya has undergone several development stages, each characterized by significant technological shifts. Initially focused on laces and ribbons, the Company expanded into specialized ropes, cables, and emergency response products. The majority of respondents agreed on the Company's key milestones, leading us to classify Hailiya's evolution into three distinct phases: "Business Focus", "Technological Exploration", and "Extended Applications" (as illustrated in Figure 2).

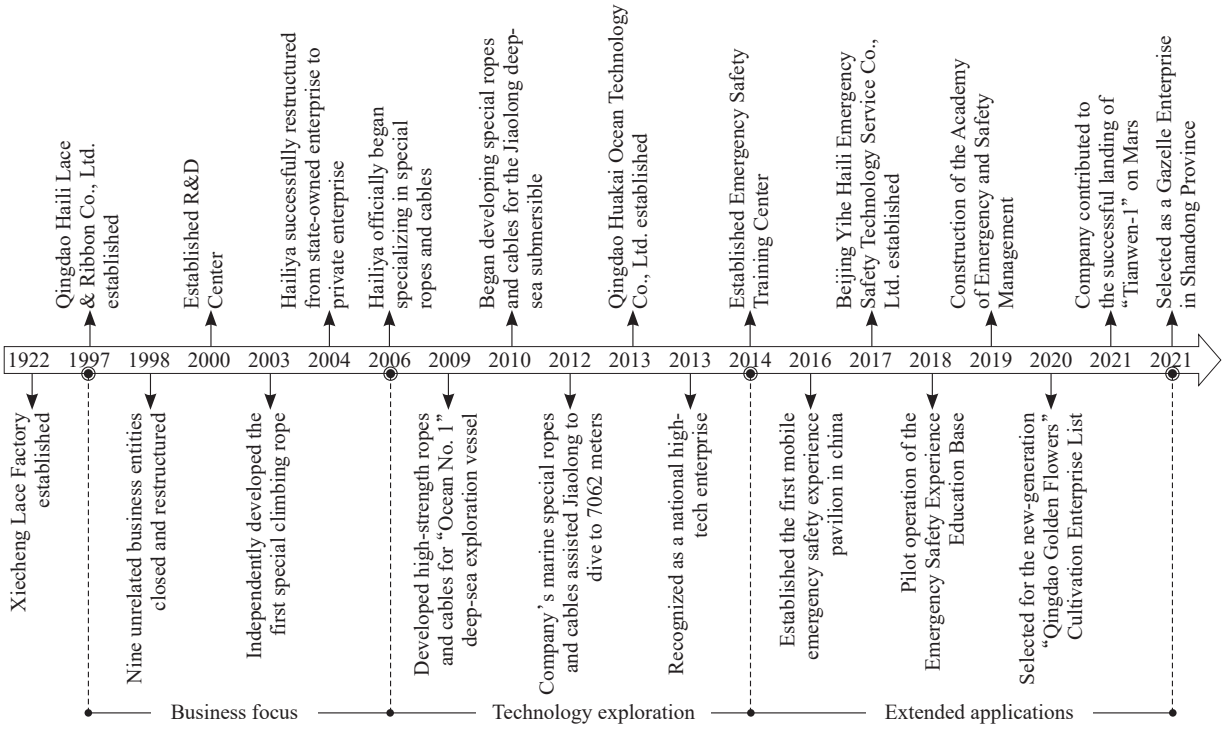

Figure 2: Hailiya's Development Journey and Key Milestones

In the second step, our research team conducted a three-tier coding analysis of the Company's data. First, we identified key elements such as external pressures, resource allocation behaviors, and the Company's hidden champion status, using the frameworks of hidden champion theory and resource allocation theory to conceptualize the findings. Specifically, we created first-order codes based on the language used by respondents, such as "business reorganization" and "establishment of the R&D center" during the business focus phase. Next, we grouped related first-order codes into second-order concepts that held greater theoretical significance. For example, the codes "establishment of the R&D center" and "technological upgrade" were categorized under the broader theme of "fostering R&D capabilities". Finally, these second-order concepts were distilled into core theoretical dimensions. For instance, the concepts "identification of niche markets" and "focus on core competencies" were synthesized into the core dimension of "customer asset allocation". To ensure the accuracy and reliability of our coding, we employed independent coding by two separate teams and held joint discussions to refine and validate the results.

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In the third step, we developed a theoretical framework informed by existing research literature and the coding results. Drawing on the analytical framework of "external pressures, resource allocation, and hidden champion status", this study identifies the key external pressures, resource allocation strategies, and growth dynamics of manufacturing hidden champions. Building upon a thorough literature review, we propose four composite dimensions that capture the growth mechanisms of these firms. The development of this framework was an iterative process, involving continuous comparisons between the empirical data and theoretical assumptions, ultimately resulting in a robust and comprehensive theoretical model.

4. Case Study: Hailiya's Emergence As a Hidden Champion

4.1 Stage 1 (1997-2006): Business Focus

4.1.1 External pressures

Founded in 1922, Hailiya was originally known as Qingdao Xiecheng Lace Factory, specializing in the production of hair-binding cords. In the 1990s, facing fierce competition in the lace and ribbon industry, the Company diversified its operations by registering 11 separate business entities across various sectors, including lace and ribbon production, hospitality, nightclubs, and restaurants. However, these ventures were barely able to sustain their operations due to inefficiencies in resource allocation and management. As a result, Hailiya faced shrinking orders and excessive inventory, severely limiting their survival space. It was also under pressure from outdated equipment, low technological content, and low product added value. Reflecting on that period, Hailiya's chairman stated, "Despite our experience in the industry, we were outcompeted in terms of policy support, taxation, labor costs, and scale. Without the necessary technology, we were making drawstrings for puffy coats for just 36 cents each. Even at such a low price, we still found ourselves having to negotiate with buyers demanding even lower rates".

4.1.2 Hailiya's customer asset allocation practices

In response to survival challenges and technical pressures, Hailiya strategically acquired customers by focusing on its core business and identifying niche markets. First, focusing on the core business: In a turbulent market environment coupled with internal resource constraints, Hailiya concentrated on its most competitive business domain with the highest market potential to enhance its competitiveness and market position. In 1997, Hailiya's Lace and Ribbon Factory was acquired by Qingdao No. 8 Cotton Textiles Factory and rebranded as *Qingdao Haili Lace & Ribbon Co., Ltd.* Amid these challenging circumstances, Hailiya took decisive steps to reorganize its business. The company closed, consolidated, or transferred nine non-core operations, including a hostel and a nightclub. Additionally, it began streamlining its market resources by discarding obsolete equipment and leasing out surplus factory space to refocus resources on the lace, ribbon, rope, and cable segments. As the Chairman of Hailiya's Board remarked, "For a small company with annual revenue under 5 million yuan, diversifying into unrelated businesses was impractical. It was essential to concentrate our financial and material resources on strengthening the core business. Only when the main business became robust would there be enough resources to explore other opportunities". Second, identifying the niche market: Identifying a niche market involves conducting market research to discover and define a segment of the market that has specific needs and is not fully satisfied. By zeroing in on the lace, ribbon, rope, and cable business, the company began to channel resources into strengthening this core area. However, due to the low technological content and modest profit margins of lace and ribbon products, along with limited R&D capabilities, Hailiya initially targeted the low-end market. The company, on one hand, served as a contract manufacturer for international clients; on the other hand, it began to pay attention to the markets overlooked by its competitors. As one respondent noted, "Whenever there was an opportunity, our sales team was there. If customers needed a

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product, no matter how challenging or small the order, we were ready to meet the demand." At the same time, Hailiya actively participated in domestic exhibitions and trade fairs, encouraging its salespeople to explore overseas markets. This proactive approach led the company to connect with leading international manufacturers of specialized marine cables. At that time, China relied heavily on imports for specialized ropes and cables, as domestic production capabilities were insufficient. Hailiya decided to upgrade its product offerings and enter the specialized rope and cable market, a sector neglected by local competitors. This move enabled the company to develop advanced technologies in rope and cable manufacturing, positioning Hailiya for future growth in a high-value segment. Recognizing this gap, Hailiya saw an opportunity to upgrade its product offerings and enter the specialized rope and cable market, a sector neglected by local competitors. This move enabled the company to develop advanced technologies in rope and cable manufacturing, positioning Hailiya for future growth in a high-value segment.

4.1.3 Hailiya's innovation asset allocation practices

First, identifying technology gaps: Identifying technology gaps refers to the process of systematically assessing and determining the differences and deficiencies between one's own technology (such as technical capabilities, product performance, production processes) and the advanced technologies of industry benchmarks or competitors, both internally and externally, thereby clarifying the priorities and improvement directions for the enterprise in terms of technological development. In the case of Hailiya, a significant technology gap was identified between the performance of its products and those of leading international manufacturers, despite its strong position within the Chinese market. Through technological benchmarking, Hailiya discovered that a foreign competitor had advanced rope and cable coating and post-finishing technology, which could improve product appearance, increase service life, and add value. However, Hailiya was unable to import or acquire this technology. As one respondent explained, *"Since foreign companies refused to sell the technology to us, we decided to develop it on our own".* After numerous trial and error, Hailiya succeeded in developing the first post-finishing equipment in China. This innovation enhanced its production process, enabling integrated cold and hot drawing, dyeing, and coating treatments for ropes and cable*s.* Second: fostering R&D capabilities: *Fo*stering R&D capabilities requires a sustained commitment to innovation, the allocation of resources, and the implementation of strategies aimed at improving product quality and competitiveness. After refining its rope and cable manufacturing process, Hailiya realized the importance of acquiring core technologies and establishing independent R&D capabilities to meet customer demands. As the company's board chairman stated, *"Despite our financial constraints and challenges, we were determined to overcome technological bottlenecks and enhance product performance".* Driven by this resolve, Hailiya established an R&D center, built a professional research team, and focused on manufacturing and technological innovation. In 2003, Hailiya successfully developed its first special rope: a mountaineering rope. This marked the beginning of a series of innovations, leading to the development of specialized ropes and cables for marine and industrial safety applications, each tailored to meet specific market needs.

4.1.4 Business growth performance

During this stage, Hailiya successfully entered the specialized rope and cable market, launching a range of products crafted using various advanced technical processes. The Company adopted a customer asset allocation strategy focused on "core business prioritization" and "identifying niche markets". From a technological standpoint, Hailiya independently upgraded its manufacturing equipment, optimized production processes, and introduced post-finishing techniques to enhance manufacturing efficiency and increase product value. As a result, the Company expanded its product portfolio, developed special ropes and cables tailored to market demands, and made significant strides in establishing its R&D capabilities.

Hailiya's growth strategy during this period is depicted in Figure 3.

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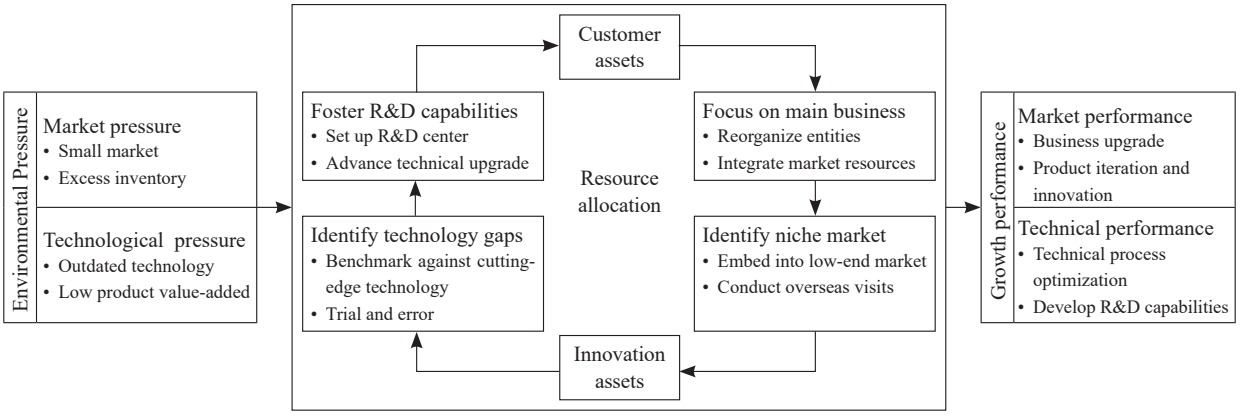

Figure 3: Hailiya's Growth Mechanism during the Business Focus Stage

Table 3: Typical Quotations and Coding Results during the Business Focus Stage

Theoretical dimension	Second-order theme	First-order concept	Quotation of typical evidences
External pressures	Market pressure	Small market	*"Many textile enterprises in South China leveraged advanced technologies from Japan and South Korea, providing them with a significant competitive edge."* (S_3)
		Excess inventory	*"During the 1990s economic downturn, as a state-owned enterprise, we struggled with a substantial backlog of unsold products."* (S_1)
	Technological pressures	Low technology content	*"At that time, our safety ropes were basic, with minimal technological innovation. They were sold by weight at razor-thin margins amidst intense market competition."* (S_3)
		Low product value-added	*"Previously, we produced drawstrings for puffy coats, priced at just 36 cents per piece, with very little added value."* (S_2)
Resource allocation strategy	Customer assets	First, focusing on the core business.	*"At one point, we operated 11 separate business entities, spreading our focus too thin. We eventually closed, terminated, consolidated, or transferred nine of them, narrowing down to our core business areas"* (S_1).
		Identifying the niche market	*"The Company encouraged employees to explore overseas markets to identify new directions for business transformation."* (F_3)
	Innovation assets	Identifying technology gaps	*"Our R&D team frequently studied overseas rope products to understand their superior qualities and explore possibilities for similar innovations."* (S_1)
		Fostering R&D capabilities	*"Recognizing the importance of innovation, Hailiya established an R&D center in 2000 and implemented a talent-driven strategy to accelerate technological advance-ments."* (F_3)
Growth performance	Market performance	Business transition and upgrade	*"Hailiya embarked on developing specialized ropes and cables, aiming for high-end markets through technological innovation and business transformation."* (F_2)
		Product iteration and innovation	*"Building on conventional rope and cable offerings, Hailiya expanded into high-value-added products, including marine and military-grade ropes, as well as industrial safety solutions."* (F_2)
	Technological performance	Process optimization	*"We designed a semi-automatic rubber-cutting machine to enhance our production process and efficiency."* (S_3)
		Initially established R&D capabilities	*"By prioritizing R&D and establishing our innovation center, we, then operating as Haili, successfully initiated the production of high-tech, high-value-added ropes and cables."* (S_1)

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4.2 Stage 2 (2006-2014): Technological Exploration

4.2.1 External business pressures

Although Hailiya had developed initial capabilities to manufacture special ropes and cables during its business focusing stage, it did not gain recognition in the marketplace. Customers often harbored ingrained stereotypes, believing that domestic manufacturers could not produce high-quality special ropes and cables at competitive prices. As one respondent noted, "*At the time, there were no notable rope manufacturers in China. All special ropes and cables, whether for military or scientific research purposes, were imported from abroad*." As a newcomer to the ropes and cables market, Hailiya faced skeptical customers who questioned its credibility. The market was dominated by overseas manufacturers equipped with advanced technology, which allowed them to maintain a monopoly. These foreign producers also imposed export restrictions on critical technologies and raw materials, widening technological gaps and hindering the development of China's special ropes and cables industry.

4.2.2 Hailiya's customer asset allocation practices

First, connecting with key customers: It refers to the process of purposefully establishing close cooperative relationships with clients within the industry who possess high influence, reputation, or expertise, in order to promote product recognition, enhance corporate reputation, and increase market share. Hailiya adopted this approach by actively seeking endorsements from key customers to shift stereotypical perceptions and boost brand awareness. One key tactic was offering free trials of its products to high-profile customers, particularly large scientific expedition teams and research organizations. These partnerships not only allowed Hailiya to demonstrate the reliability of its products but also created a platform for word-of-mouth promotion. As one respondent noted: "We provided our product free of charge to the national scientific expedition ship 'Ocean No.1', requesting only their endorsement of its performance." In addition, Hailiya continued to provide tailored products, such as custom-made ropes and cables, to further secure customer endorsements and strengthen relationships. Such products include 9,000-meter lifesaving ropes, long-baseline positioning devices, and recyclable cables for the service support system of China's Jiaolong deep-sea submarine. Second, exploring niche markets: Exploring niche markets involves offering highly specialized or customized products and services, fostering strong brand recognition and customer loyalty within a targeted segment. The endorsements from high-profile projects like the "Ocean No.1" expedition and the Jiaolong submarine helped Hailiya overcome common industry perceptions of special ropes and cables, increasing both market visibility and credibility. After the Jiaolong submarine successfully reached a depth of 7,062 meters using Hailiya's specialized cables, the Company capitalized on this achievement by branding its products as *Jiaolong* special cables. This strategic move not only distinguished Hailiya's product line but also helped establish a premium brand and portfolio. As one respondent explained: "We are confident that our 'Jiaolong' special cables will fully replace imported cables and enable us to expand into international markets".

4.2.3 Hailiya's innovation asset allocation practices

First, introducing technical standards: The introduction of technical standards involves adopting a set of established rules, guidelines, specifications, and procedures within a specific field or industry to guide and regulate the design, manufacturing, testing, and quality assurance processes of products. . Hailiya has adopted standardized management procedures to ensure the high-quality production of special ropes and cables that meet rigorous technical requirements. The Company also embraced an operational excellence management model, a quality management system, and an environmental management system, resulting in improved R&D and manufacturing performance. Moreover, Hailiya has integrated best practices and managerial models from Japan and Germany, underscoring its commitment to operational efficiency and quality. For example, the Company holds monthly meetings with its mid-level management team to foster continuous improvement and alignment on key objectives. Second,

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establishing an R&D network: Collaborating with universities and research institutions can accelerate technology development and innovation, enhancing both the quality and efficiency of new products. Hailiya has actively cultivated such partnerships to advance the application and commercialization of R&D results. Beyond establishing internal technical standards, the Company has recruited leading experts in the field, including China's first PhD in rope and cable technology, and worked with Dr. Hu Dunxin, an academician of the Chinese Academy of Sciences (CAS), as well as other renowned experts from the Chinese Academy of Engineering (CAE). As Hailiya's board chairman aptly puts it, "Whenever we enter a new business, we must find a vantage point and work with the smartest people". Through these collaborations, Hailiya has carried out extensive joint research in critical rope and cable technologies, basic materials, technical standards, and technology commercialization. A notable example of this is the Company's partnership with a leading university to apply cutting-edge anti-corrosion technology in the production of specialized cables for China's manned deep-sea submersible *Jiaolong*. Such collaboration underscores Hailiya's commitment to staying at the forefront of innovation while contributing to critical technological advancements.

4.2.4 Business growth performance

In this phase, Hailiya implemented a customer-centric asset allocation strategy, focusing on prioritizing key customers and targeting niche markets. This approach garnered recognition and endorsements from major national R&D teams and other critical clients. Thanks to the exceptional performance of its Jiaolong special cables, which outperformed international competitors, Hailiya successfully built its own brand, overcoming initial customer skepticism about domestic special cables and establishing a strong presence in the market niche. On the technical front, Hailiya adopted an innovative asset allocation strategy by setting high technical standards and developing its own R&D network. Internally, the Company implemented rigorous management systems and cultivated a forward-thinking business mindset. Externally, Hailiya attracted top industry experts and formed partnerships with leading research institutions to advance the development of cutting-edge cables and ropes. Notably, after providing cables for the Ocean No. 1 and Jiaolong manned deep-sea submersibles, Hailiya played a crucial role in advancing China's scientific expedition projects, contributing to high-profile vessels such as Xuelong, Kexue and Tansuo-1. These contributions set new records in undersea depth, precision, strength, and temperature tolerance. As a result, Hailiya now holds a commanding 60%-70% share of China's market for special ropes and cables, establishing itself as a global leader in the rope and cable industry. The growth mechanism of Hailiya during this stage is detailed in Figure 4, with supporting data and evidence presented in Table 4.

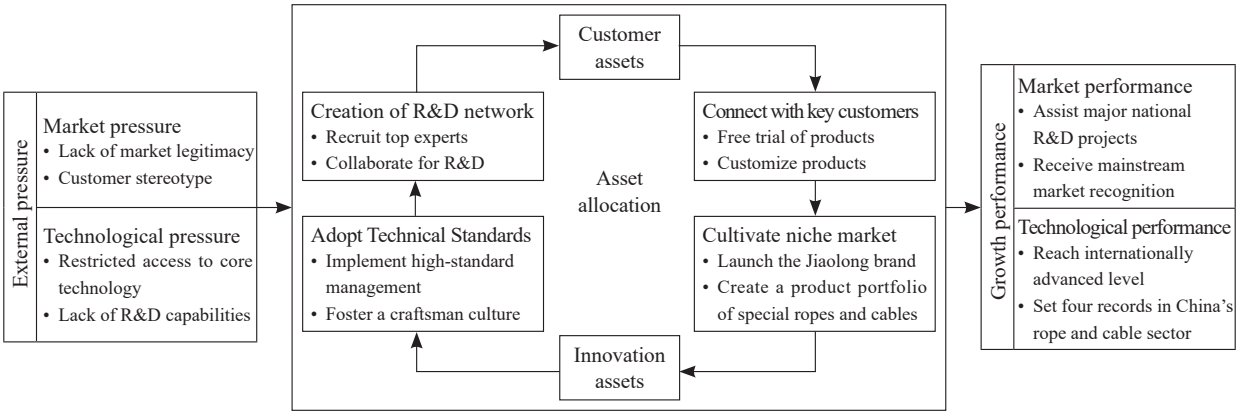

Figure 4: Hailiya's Growth Mechanism during the Technology Exploration Stage

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Table 4: Typical Quotations and Coding Results during the Technology Exploration Stage

Theoretical dimension	Second-order theme	First-order concept	Quotation of typical evidences
Environmental pressure	Market pressure	Lack of market legitimacy	*"All special ropes and cables in China were imported due to the lack of qualified domestic suppliers at the time."* (C_1)
		Customer stereotype	*"Is it safe to switch to Hailiya, a domestic cable manufacturer? Despite having the best technology in China, can they meet the required standards?"* (F_3)
	Technological pressures	Lack of access to core technology	*"Initially, we struggled with two major challenges: first, we had no access to the latest raw materials, only those that had been discarded by foreign companies; second, our braiding machines were far behind international standards."* (S_3)
		Inadequate R&D capabilities	*"At the beginning, we were newcomers in this competitive market. We lacked the advanced technology and equipment needed to succeed."* (S_1)
Resource allocation strategy	Customer assets	Reaching out to key customers	*"To gain the trust of our customers, our chairman personally delivered ropes to them for free trials. It was a way to show our commitment and quality."* (S_2)
		Exploring the niche market	*"Once we established the Jiaolong brand, we developed a highly efficient and convenient special cable system under this name."* (S_3)
	Innovation assets	Introducing technical standards	*"Hailiya will not survive into the next century unless it significantly raises its standards and improves quality."* (S_1)
		Establishing an R&D network	*"We couldn't develop everything on our own. We sought help from experts and research institutions for certain technologies. That's why we've maintained strong partnerships with Tsinghua University, the Chinese Academy of Sciences, and Qingdao University."* (S_3)
Growth performance	Market performance	Assisting major national scientific research projects	*"Hailiya Group supplied Jiaolong special cables for critical national scientific projects, such as the Ocean No.1, Jiaolong, and Xuelong manned deep-sea submersibles."* (F_3)
		Winning mainstream market recognition	*"After Hailiya's involvement in these major national projects, many large customers turned to us. They realized that domestic special cables could be just as reliable and high-quality as imported ones."* (S_1)
	Technical performance	Reaching internationally advanced technology	*"Hailiya's ocean locator cable for the Ocean No.1 deep-sea submersible marks our achievement in attaining internationally advanced marine cable technology."* (F_2)
		Setting four new records in China	*"In China's rope and cable industry, Hailiya is renowned for its 'four records' in terms of undersea depth, strength, temperature tolerance, and precision. Our specialized cables are designed to withstand extreme pressures at depths of up to 8,000 meters. With a strength 2-5 times greater than steel cable of the same size, they also resist both high and low temperatures and maintain zero sheath slippage."* (F_3)

4.3 Stage 3 (2014-Present): Extended Applications

4.3.1 External business pressures

With the success of the Jiaolong special cable, Hailiya captured 60% to 70% of China's specialized rope and cable market. However, the company was not content with simply leading this niche segment. To sustain its growth and expand business, Hailiya was aware of the need to diversify beyond a single product category. As one of our respondents put it, "Given that the niche market for specialty ropes and cables is rather small, we've honed in too finely on this area, constricting our market scope. So our enterprise's revenue and profit margins are unlikely to see substantial increases." Faced with a constrained market, Hailiya understood it had to explore new applications for its technology and expand into broader sectors to unlock further growth opportunities.

4.3.2 Hailiya's customer asset allocation practices

First, seeking growth opportunities: Seeking growth opportunities is a process aimed at achieving sustainable development, whereby companies expand their business scope and market share by identifying and leveraging new industry trends, policy changes, and market demands, based on their

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existing technological capabilities. In 2014, the State Council listed the emergency safety industry as a strategic emerging sector. The Qingdao municipal government also issued relevant policies to nurture leading enterprises and emergency industry demonstration bases aimed at enhancing the city's preparedness for emergencies. This created a fresh opportunity for Hailiya to broaden its focus beyond special ropes and cables. In partnership with local fire and emergency response departments, Hailiya launched public education and safety awareness programs, including over 200 fire safety sessions that reached more than 50,000 residents in Qingdao. Additionally, the Company distributed emergency rescue kits to low-income households, raising overall awareness of emergency preparedness and safety. Second, cultivating a niche market: To cultivate a niche market, companies introduce innovative products or services and adopt tailored strategies to meet the emerging needs of that market. At the time, China's emergency response and safety sector was still in its early stages. While working to increase public awareness, Hailiya began developing a unique business model to serve this nascent industry. In addition to offering emergency response and safety products, Hailiya established China's first privately-run emergency response and safety training center. The company also pioneered experiential training methods and created a mobile emergency response and safety experience pavilion. As one respondent put it, "Experiencing is believing". Combining public education, manufacturing, and hands-on experience, this integrated business model was widely praised by both government officials and the general public.

4.3.3 Hailiya's innovation asset allocation practices

First, promoting technology integration: Technology integration involves merging various technologies, tools, and business processes to solve specific challenges and improve operational efficiency. With the rise in outdoor sports and the growing number of high-rise buildings, ropes have become indispensable for rescue operations, which has driven the need for advancements in rope technology. As one respondent noted, "In rescue operations, particularly in confined spaces, there was virtually no precedent to follow in our country". To address this gap, Hailiya has developed the Jiaolong Rescue Rope Technology System, which combines rescue equipment, technical training, and drills, building upon its existing expertise in specialized group and cable technologies. By leveraging its robust product testing capabilities, Hailiya established an emergency response and safety product testing center. This center serves as a comprehensive hub for research, development, manufacturing, and testing of emergency response and safety products.

Second, pooling resources to develop a digital platform: A digital business platform integrates various functions such as data processing, information sharing, business collaboration, and service innovation. By pooling resources from multiple stakeholders, companies can create digital platforms that significantly enhance business efficiency and responsiveness. In line with this vision, Hailiya has developed an online emergency resource database to improve disaster preparedness and response efforts, aligning with national initiatives to strengthen emergency management systems. This database provides real-time visibility into available resources, including inventory and delivery schedules, which helps improve the emergency preparedness of member companies. Additionally, in partnership with Teamsun Technology, Hailiya has launched an industrial Internet platform designed specifically for emergency response and safety equipment enterprises. This platform fosters digital transformation by driving upgrades in management, technology, and data systems. It also facilitates the digitization and intelligent evolution of industries such as advanced manufacturing, emergency logistics, fire and security, and maritime emergency response. The goal is to boost industry efficiency, promote high-quality development, and support both national and local community needs.

4.3.4 Business growth performance

Hailiya's customer asset strategy, focused on driving growth and targeting niche markets, has been instrumental in its successful expansion into the emergency response and safety sector. This approach has garnered widespread recognition, positioning Hailiya as both a key player and an innovator within

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China's emergency and safety industry. The company has strategically leveraged an advanced asset allocation model, combining cutting-edge technologies with the development of digital platforms. This has resulted in a comprehensive ecosystem of integrated online and offline emergency safety solutions, such as the *Jiaolong* rope rescue system, an emergency safety equipment testing center, an online emergency resource database, and an industrial internet platform. By aligning its efforts with national priorities and setting new industry benchmarks, Hailiya has established the "Qingdao Model", which has expanded the reach of its products and services from specialized applications to everyday life. Such expansion has contributed significantly to the company's growth and market presence.

The growth mechanism for this phase is depicted in Figure 5, with supporting data and evidence outlined in Table 5.

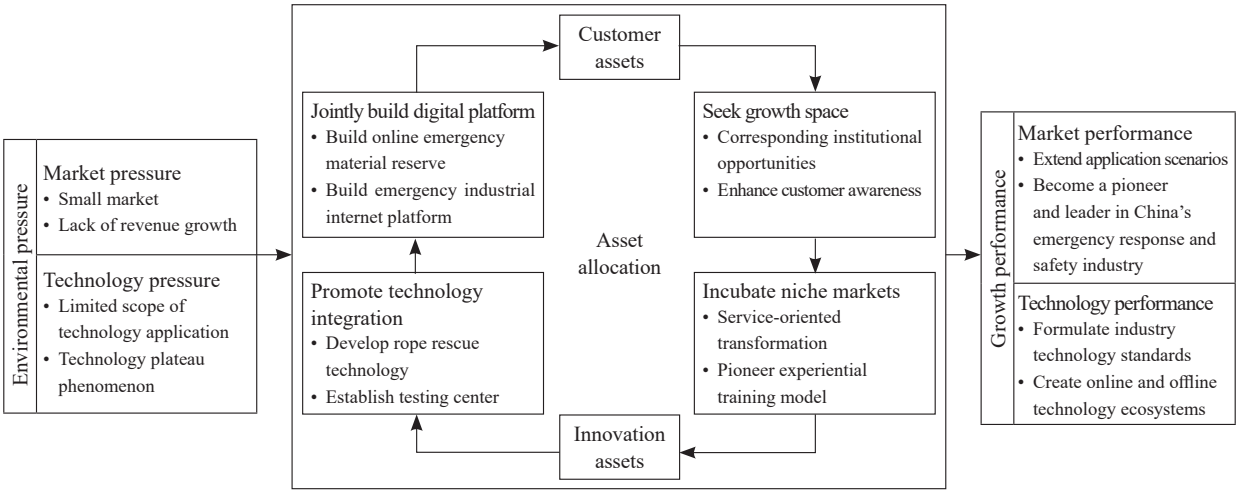

Figure 5: Hailiya's Growth Mechanism during the Extended Application Stage

Table 5: Examples of Typical Quotations and Coding Results during the Extended Application Stage

Theoretical dimension	Second-order theme	First-order concept	Quotation of typical evidences
Environmental pressure	Market pressure	Small market	*"If we only focus on ropes and cables, we'll limit ourselves to a niche market. To grow, we need to diversify and explore new customer segments and applications for our products."* (S_5)
		Market saturation limited business growth	*"We won't make significant progress if we only specialize in ropes. Expanding our product range is essential for sustainable growth."* (S_2)
	Technical pressures	Limited scope of technology applications	*"National projects don't come around every day, so we need to leverage our technology in other sectors to ensure steady growth."* (S_3)
		Technology plateau phenomenon	*"While national projects push us to advance our technology, we face limitations if we remain confined to specialized ropes and cables."* (S_3)
Resource allocation strategy	Customer assets	Seeking growth space	*"Our work in the emergency response industry has been a real eye-opener, revealing exciting new possibilities for using our ropes and cables in civilian applications."* (F_1)
		Incubating the niche market.	*"We started with an emergency training site in Qingdao to test our approach. From there, we hope to scale it nationally."*(S_2)
	Innovation assets	Promoting technology integration	*"By having our own testing center, we can test our own safety equipment quickly and not have to depend on outside companies"* (S_3)
		Pooling resources to develop a digital platform.	*"Hailiya's industrial Internet platform for emergency response is a first in China. It's a pioneering platform for safety and emergency response industries in Shandong."* (F_1)

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Table 5 Continued

Theoretical dimension	Second-order theme	First-order concept	Quotation of typical evidences
Growth performance	Market performance	Achieving extended applications	*"Beyond special ropes and cables, Hailiya has pioneered a unique emergency response culture, entering both the safety and emergency sectors."* (S_1)
		Becoming an explorer and leader in China's emergency response and safety industry	*"While emergency self-rescue training is becoming more common, we've developed a unique, replicable, and scalable model for the emergency safety industry."* (S_3)
	Technical performance	Formulating technical standards	*"We set the standards for Shandong during the 12th Five-Year Plan, and on a national scale during the 13th Five-Year Plan."* (F_4)
		Creating an online technology ecosystem	*"We place great emphasis on building a robust industrial ecosystem. Physically, we focus on R&D for equipment, technical training, and application scenario development. Digitally, we prioritize the integration of digital and intelligent technologies."* (S_1)

5. Further Discussions

5.1 "T Strategy" for the Growth of Manufacturing Hidden Champions: A Resource Allocation Perspective

This paper examines the growth trajectory of Hailiya Group from 1997 to 2022, using a longitudinal case study to explore how the company emerged as a hidden champion in the manufacturing sector. We develop a process model that explains this transformation, specifically from the perspective of resource allocation strategies (see Figure 6).

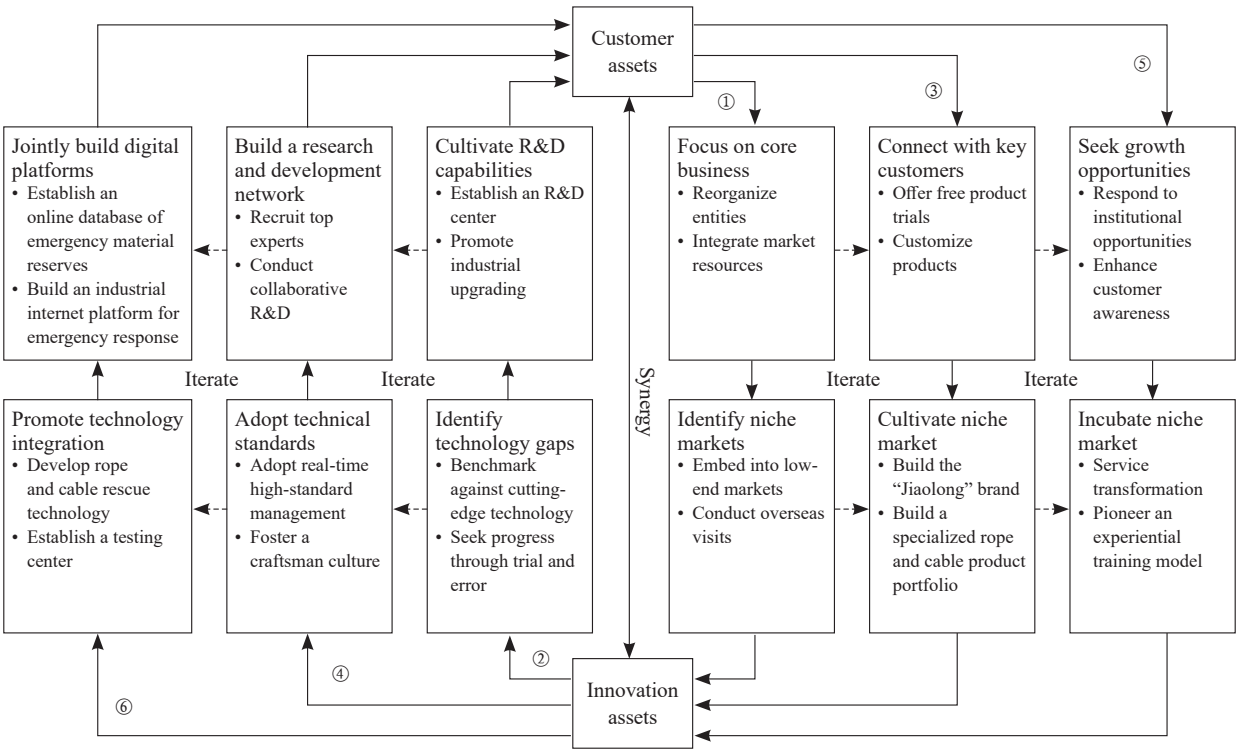

Figure 6: Process Model of Hidden Champion Growth in Manufacturing from a Resource Allocation Perspective

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Manufacturing hidden champions typically adopt a dynamic, adaptive approach to growth, rather than relying on a fixed, one-size-fits-all model. These companies are deeply embedded in niche markets and maintain strong, interconnected relationships along their value chains. Their close ties with customers enable them to adjust resource allocation and combination in response to changing market pressures and conditions. This flexibility allows them to navigate growth trajectories that align with the evolving external environment. However, the very specialization that defines hidden champions can also limit their ability to diversify product offerings. A key strategy for growth, therefore, involves broadening their technological scope and transitioning from product manufacturing to providing customized, service-oriented solutions. In essence, Chinese manufacturing firms often do not maintain a single, focused specialization strategy throughout their entire life cycle. Instead, they tend to embrace a "T-shaped strategy" (Li and Sun, 2021). This strategy involves a developmental trajectory that starts with a business focus, deepens technological expertise, and progressively expands into diverse application areas. Due to resource and environmental constraints, hidden champions typically prioritize organic growth and network-based expansion over acquisitions. Initially, they leverage internal resources to address gaps and challenges, but as they mature, they tap into external resources, forming strategic business networks and partnerships (Bargainer et al., 2013), contributing to industrial growth.

First, due to limited technological capabilities in the early business-focused stage, hidden champions often face external pressures such as low product value-added, razor-thin profit margins, and intense competition. In this high-uncertainty environment, they typically avoid diversifying their customer base (Sakharov, 2017). Instead, before entering a core mainstream market, they focus their resources on a niche market that competitors tend to overlook (Rant and Cerne, 2017; Zhang et al., 2024). By leveraging their unique resource endowments, they strategically "attack from the plank" (He et al., 2022), avoiding direct confrontation with larger competitors. When it comes to innovation asset allocation, external barriers -- such as restrictions on overseas mergers and acquisitions, joint ventures, and technology imports -- force these companies to build their own R&D capabilities on the basis of existing technologies and prior experience. Then they benchmark leading technologies to identify gaps and enhance R&D capabilities through trial-and-error. They iterate products based on existing technologies, accumulate knowledge, and develop capabilities to meet niche market needs under unfavorable conditions.

Second, during the technology exploration stage, hidden champions begin to transition from a niche market to the mainstream market. However, early movers in the mainstream market have already established dominant positions in the value chain (Bartlett and Ghoshal, 2000), creating technological barriers that make it difficult for new entrants to compete. Additionally, target customers often lack familiarity with these new market players and may hold biased views against them (Peng et al., 2022). In response to these challenges, hidden champions prioritize building strong, high-quality interactions with customers as part of their customer asset allocation strategy. Their goal is to acquire customers and create long-term customer value (Rant and Cerne, 2017; Li and Li, 2008; Xu and Wang, 2021). Specifically, they focus on establishing close relationships with key customers, aiming to build a reputable brand image and product quality that will enhance their legitimacy and attract additional customers. In terms of innovation asset allocation, hidden champions focus on improving product R&D, manufacturing processes, and service quality. They also seek to leverage external resources to accelerate growth. For example, they draw upon the R&D experience of industry leaders and collaborate with strategic partners to acquire critical knowledge and technology (He et al., 2022). To mitigate external pressures, they engage with a diverse range of stakeholders -- including other enterprises, universities, research institutions, government agencies, and end-users (Zhao et al., 2023) - to co-develop and refine core technologies.

Third, in the extended application stage, hidden champions often encounter bottlenecks earlier than other firms due to their specialized focus on particular technologies (Li and Sun, 2021; Liu, 2022).

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However, they excel in identifying and capitalizing on external opportunities (Li and Li, 2008; Zhang et al., 2024), diversifying their business investments to achieve economies of scope (Sakhartov, 2017). This strategic agility enables them to proactively explore new markets and seek fresh avenues for growth, particularly when it comes to customer asset allocation (Yoon, 2013). Hidden champions typically adopt strategies aimed at broadening their technological frontiers and incubating new niche markets through the diversification of core technology applications (Wang et al., 2019; Li and Sun, 2021). In doing so, they can attract a diverse range of target customers and secure a sustained competitive advantage. Moreover, when allocating innovation assets, hidden champions are adept at integrating multiple technologies to create comprehensive, systematic solutions. They also pursue collaborative digital and intelligent technology upgrades, which enable them to navigate bottlenecks and expand into new business domains, ultimately achieving unique and irreplicable successes

5.2 Growth Mechanism of Manufacturing Hidden Champions from a Resource Allocation Perspective

The path to success for manufacturing hidden champions involves leveraging both customer and innovation assets to drive value creation. The interplay between these two elements enables firms to develop new technologies and expand into new markets (the growth mechanism is illustrated in Figure 7). Four key mechanisms facilitate this process: Targeting niche markets, focusing on technological innovation, extending usage scenarios, and creating a robust business ecosystem.

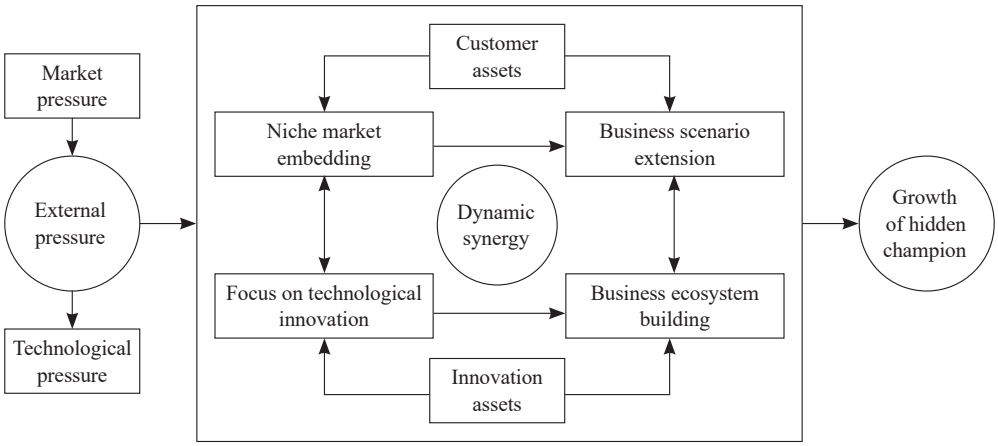

Figure 7: Growth of Manufacturing Hidden Champions: A Resource Allocation Perspective

First, targeting a niche market: In the face of external pressures and resource constraints, manufacturing enterprises often find it strategic to focus on a specific niche market as a means of driving business growth. By honing in on their core competencies, these businesses can enhance products, services, and customer relationships. This approach involves specializing in a company's primary business, fostering deep connections with key customers, and actively seeking new avenues for growth. A case study demonstrates that Chinese manufacturing enterprises gain a competitive edge by channeling their limited resources into specialized core businesses (Zhang et al., 2024). This enables them to concentrate on improving product value and meeting the distinct needs of their target customers (Liu and Mei, 2015). Additionally, these enterprises succeed by identifying growth opportunities and exploring new directions for business transformation, allowing them to adapt and thrive in a dynamic market.

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Second, focusing on technological innovation: Manufacturing enterprises often select a specific technological domain to explore in depth, aligning their research with both their strengths and weaknesses (Schenkenhofer, 2022). Through sustained investment in R&D, they achieve technological breakthroughs and establish leadership in their sector. This process typically unfolds in three key steps: identifying technological gaps, adopting industry standards, and fostering technology integration. As illustrated in our case study, after targeting a niche market, manufacturing enterprises assess their technological gaps relative to competitors or industry leaders. This analysis helps define clear objectives and the direction for R&D efforts. Next, they adopt advanced technological standards to benchmark product or service quality and performance, narrowing the gap with industry incumbents. Finally, by integrating technologies from various fields, they create synergistic and complementary solutions that drive business transformation, upgrade capabilities, and ensure long-term sustainability.

Third, extension of business application scenarios: While focusing on their core business, manufacturing enterprises in the growth stage strive to explore new market opportunities, acquire new customers, and promote new products and services in both horizontal and vertical directions. This strategic expansion enables them to extend their business boundaries by targeting niche markets and developing the capabilities necessary to capture market share. Our case study revealed the following insights: On the vertical front, manufacturing enterprises focus on identifying and cultivating niche markets. They target specific customer groups within these niches, maintaining close relationships to understand and address their diverse and individualized needs. By leveraging available innovation assets, companies can offer customized products, services, and technology solutions, thereby gaining a competitive advantage in the niche market. On the horizontal front, hidden champions expand their technological applications from one niche market to other customer segments. By identifying the similarities and differences in customer needs across various usage scenarios, they can effectively utilize their innovation assets to create additional value (Fang et al., 2011) and provide innovative products and services to a broader range of customer groups.

Fourth, fostering a business ecosystem. By collaborating closely with external partners, manufacturing enterprises can cultivate a dynamic business ecosystem characterized by interdependence and mutual benefit, which enhances both competitiveness and innovation. This can be achieved through the development of robust R&D capabilities, the formation of collaborative R&D networks, and the establishment of digital platforms. A case study illustrates how, when preparing to enter a specific market niche, manufacturing enterprises can form innovative and competitive R&D teams to drive research and development efforts. The next step involves creating R&D networks that facilitate collaboration with universities and research institutions (Zhao et al., 2023). Such partnerships allow for the sharing of resources, leveraging complementary strengths, and accelerating the commercialization of new technologies. Finally, manufacturing enterprises can implement digital platforms to centralize the management, analysis, and application of data, thereby promoting industrial clustering and facilitating greater operational efficiencies (Zhang et al., 2024).

6. Concluding Remarks and Policy Recommendations

6.1 Concluding Remarks

This paper explores the growth trajectories and mechanisms of hidden champion enterprises in Chinese manufacturing, with a focus on resource allocation strategies. Through an exploratory case study of Hailiya, we derive several key conclusions: First, Chinese manufacturing hidden champions follow a distinctive growth path characterized by a combination of vertical and horizontal strategies. Vertically, these firms initially concentrate on a core business and develop essential technologies. Horizontally, they

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later expand the application of these technologies across diverse usage scenarios. This dual approach - focusing on technology development while extending its range of applications - forms a "T-shaped" strategy for their growth. Second, these enterprises adopt varying resource allocation strategies in response to different external pressures. In terms of customer asset allocation, they undergo a progressive journey: First, targeting a core niche market, then establishing connections with key customers, and ultimately seeking opportunities for further growth. After initially targeting a niche market, they concentrate resources on developing capabilities to cultivate and expand that niche. Regarding innovation asset allocation, these firms typically start by identifying technology gaps, then move towards adopting industry standards, and finally work to integrate and promote technological innovation. Third, the emergence of manufacturing hidden champions is driven by four critical mechanisms: focusing on a niche market, prioritizing technological innovation, extending usage scenarios, and fostering a business ecosystem. Initially, these enterprises target a specific niche market, which guides their technological development. As they build technological competitiveness, they extend the use of their innovations to create additional value. Over time, they share resources and collaborate within a broader ecosystem to support mutual growth and advance the entire industry.

6.2 Theoretical Contributions

First, this paper investigates the critical contextual factors that drive the growth of manufacturing enterprises, focusing on both market and technology dimensions, as well as the mechanisms and pathways through which these factors exert their influence. Drawing inspiration from Peng et al. (2018), who emphasized the importance of understanding the context and dynamics of enterprise growth, the study examines the challenges manufacturing enterprises face in navigating technological and market dilemmas, as highlighted by Peng et al. (2022) and Lehmann et al. (2019). Through an in-depth case study, this research uncovers the dynamic process by which manufacturing enterprises integrate and balance market and technological considerations to achieve growth. These findings build on and extend the insights of Simon (2012), Li and Li (2008), offering a valuable contribution to the literature on enterprise growth.

Second,this paper unveils the dynamic growth trajectory of manufacturing hidden champions, offering valuable insights into their growth mechanisms. Our analysis sheds light on the unique growth path of these hidden champions within China's specific context, addressing the critical question of "How can manufacturing enterprises overcome chokepoints and secure leadership in a niche market?" This opens a new avenue for research on the growth trajectories and mechanisms of hidden champions (Simon, 2012; Liu, 2022). Our findings reveal that hidden champions employ a "T-shaped" strategy, focusing on vertical cultivation of a niche market while simultaneously expanding technology applications horizontally. This strategic approach, which has not been previously highlighted in the literature, is central to their success. While concentrating on their core business, enhancing technological advantage, and building brand recognition, hidden champions also extend the applications of their technology to acquire unique competitive advantages (Li and Sun, 2021). Moreover, our research deepens the understanding of the "T-shaped" strategy's evolutionary process: Hidden champions first solidify their position in a niche market by deepening technological expertise, and only then do they expand the horizontal application of their technologies. This growth trajectory offers deeper insights and experiences for Chinese manufacturing enterprises aspiring to become "specialized, sophisticated, unique, and innovative" hidden champions.

Third, this paper identifies the growth process model and underlying mechanisms for China's manufacturing "hidden champions", enriching the research scope of resource allocation theory and contributing to the advancement of this field. Manufacturing enterprises are fundamental drivers of a country's international competitiveness, and their ability to effectively allocate customer and innovation

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assets remains a critical and underexplored topic in the literature (Fang et al., 2011; Li, 2021; Lei & Tan, 2021). While some manufacturing firms achieve a dominant position in niche markets, they often face significant market and technological pressures. However, existing research offers limited insight into how these firms manage resource allocation under such conditions. Through a detailed case study, this paper articulates the process model and mechanisms through which manufacturing firms evolve into hidden champions, addressing the call for expanding the theoretical boundaries of resource allocation (Siggelkow, 2002; Fang et al., 2011).

6.3 Practical Insights

This paper presents several practical insights. First, Chinese manufacturing enterprises face a paradox between technological sophistication and business diversification. Hidden champions - companies that dominate niche markets with highly customized products - gain a competitive edge through specialized expertise and technological strength. However, this focus on niche markets can limit their growth potential, as the demand for customer-specific solutions may restrict broader business expansion. To overcome this challenge, these hidden champions can explore growth opportunities through dynamic management of customer and innovation assets. Vertically, they can enhance customer loyalty and drive greater value creation by advancing technological innovation and standardization. Horizontally, they can expand the applications of their technologies to tap into new growth areas.

Second, Chinese manufacturing enterprises may need to shift towards service-based solution models to overcome market growth limitations, developing tailored solutions that leverage both innovation and customer assets effectively. In this transition, 'hidden champions' in Chinese manufacturing face the critical challenge of moving from a product-centric to a service-oriented approach. The transformation requires a deep understanding of customer needs, a customer-centric value proposition, and a clear strategic vision. Moreover, it demands a careful allocation of resources to both sustain core operations and explore new business avenues, ensuring strategic renewal and long-term growth.

Third, the advent of next-generation digital technologies and their widespread adoption across industries has revolutionized the development landscape and resource allocation capabilities within the manufacturing sector. This transformation presents a significant opportunity for hidden champions to explore new avenues for growth. For China's manufacturing hidden champions, this could mean expanding beyond their traditional niche markets and integrating into broader business ecosystems. By forging close partnerships with diverse stakeholders, enterprises will foster new business models through multi-agent value co-creation, deepening industrial chain collaboration, and driving the formation of new-quality productivity.

6.4 Research Limitations and Future Outlook

This paper examines the growth trajectory of China's manufacturing enterprises in their rise to become "hidden champions" from the perspective of resource allocation, while highlighting several areas for future research. First, the paper investigates the growth path and mechanisms of hidden champions through a longitudinal case study grounded in the principle of theoretical sampling, emphasizing the theoretical implications drawn from the case. In addition to addressing the broader business growth paradox, the case study offers valuable insights into the unique success of a manufacturing enterprise that ascended to the status of a hidden champion. Future research could expand upon this theoretical framework by examining hidden champions across various sectors and types within China's manufacturing landscape. As these companies transition toward becoming service solution providers, they encounter a range of challenges, including strategic oscillation, the reshaping of their value proposition, organizational restructuring, and shifts in corporate culture, which could be the key constraining factors in their future growth. Future studies could explore these dimensions in greater depth, focusing on how such challenges impact the long-term development of these companies.

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