

# The Growth Path of the Hidden Champion in the Dental Medical Industry: A Vertical Single Case Study from An Innovation Ecosystem Perspective

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## **Abstract:**

Hidden champion companies have attracted widespread attention around the world due to its high growth. In the context of anti-globalization, Chinese enterprises are facing many technical bottlenecks. Therefore, hidden champion enterprises play a key role and are a powerful propulsive force for achieving high-quality economic development in the "dual circulation" strategy and the wave of digital transformation. The growth mechanism of hidden champion enterprises has gradually become a hot issue in academic circles. Dental medical companies how to deal with the acceleration of technological innovation, the ecologicalization of business logic and the diversification of user needs under the VUCA background? This paper analyzes the various populations in the growth process of hidden champions in China's oral medical industry and the interaction mechanism between them from the perspective of innovation ecosystem. The study finds that the innovation ecological orientation of hidden champion enterprises can achieve specialization, refinement, specialization and novelty. Furtherly to form its own core competitiveness. This paper theoretically explains the growth mechanism of hidden champion enterprises, which is of great significance for guiding and enlightening how to cultivate more hidden champion enterprises.

**Keywords:** *Innovation ecosystem, Hidden champions, Growth mechanism.*

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## I. INTRODUCTION

With the continuous improvement of residents' living standards, more and more people have begun to pay attention to oral health, and the demand of the oral medical device industry is increasing rapidly. Ningbo Lanye Medical Equipment Co., Ltd. (hereinafter referred to as "Lanye Medical") has become a leader in the field of well-known oral equipment in China, which is developed from an unknown small enterprise of dental accessories. The equipment produced by Lanye includes almost all the equipment and instruments required for modern oral medicine. At present, Lanye Medical has established China's first international dental industrial park with oral digitization as the core, linking the entire industrial chain including dental industry, oral culture and oral medical care. Lanye Medical improved and grew up step by step, from an application-oriented enterprise and a platform-oriented enterprise to an ecological enterprise, finally becoming a hidden champion in the field of oral equipment in China. Lanye has already achieved a lot of titles, such as A national high-tech enterprise, an industry standard setter with a strong voice, a "hidden champion" in the field of dental equipment.

## II. LITERATURE REVIEW

The "hidden champion" was first proposed by Simon (1996) [1-2]. In the subprime mortgage crisis in 2008 and the European sovereign debt crisis in 2010, as the main force, German SMEs played a key role in economic growth. For the above reason, these less well-known in the international market. Small and medium-sized enterprises with a very high share SMEs are defined as "hidden champions". As one of them, SIMON is also called "the father of hidden champions". Based on the connotation of Siemens invisible champion, this paper points out that the hidden champions are small and medium-sized enterprises that occupy a leading position in a certain sub-industry and market, and whose products or services have core competitiveness and are difficult to imitate and surpass. James Moore (1933) first proposed the concept of "ecosystem", pointing out that an ecosystem, similar to a biological system, is a network formed by the interaction between organizations and individuals[3]. On the basis of Moore's concept, Follow-up scholars focus on the constituent elements, construction and evolution of the innovation ecosystem.

The innovation ecosystem was first proposed by the US Commission on Competitiveness (PCAST) in 2004. It refers to a unified whole system formed by the interaction of various innovation entities in a certain area, based on common goals, under the influence of the innovation environment. The country's technology and innovation leadership depend on a vigorous and dynamic innovation ecosystem. Due to the complexity and dynamics of innovation, the research of systems theory continues to show new developments. At present, it is mainly divided into national innovation ecosystem, regional innovation ecosystem and enterprise innovation ecosystem. This paper mainly adopts the perspective of enterprise innovation ecosystem. The enterprise innovation ecosystem refers to that the interaction and mutual influence of the elements of the enterprise, among the elements and with the environment, and finally forms an organic whole. Padmore, Schuetze and Gibson (1998) classified the knowledge sources of innovation activities and divided the enterprise innovation ecosystem into innovation subjects such as the enterprise itself, suppliers, competitors, consumers and the public sector [4]. On the basis of biological ecosystem, this paper divides the structure of enterprise innovation ecosystem into core population, support population, parasitic population and innovation environment (see Table I).

**TABLE I. Innovation ecosystem structure**

<b>SORT</b>	<b>GROUPS</b>
Innovation community	Core groups: leading enterprises and supporting enterprises
	Supporting populations: government, universities and scientific research institutions
	Parasitic Populations: Intermediaries
Innovation environment	Policy environment, market environment, technical environment, cultural environment, etc.

In the context of the digital economy, industries are often highly concentrated[5], and in the face of external uncertain shocks such as the new crown epidemic, trade wars and technology wars, the cluster effect generated by the innovation ecosystem can accelerate the development of enterprises[6]. There are

also many scholars who study the system in the initial stage[7-8], the growth stage[9], and the mature stage [10]according to the construction path of the innovation ecosystem. How to promote the sustainable development of the innovation ecosystem by continuously improving its own organizational structure and operation mode. At each stage of the evolution of innovation ecosystem, the research focus is different(see Table II). From the perspective of capability, dynamic capability is one of the important ways for enterprises to overcome organizational inertia and adapt to the new environment [11-12]. From the perspective of learning, organizational learning is an endogenous innovation way for enterprises to adapt to environmental changes [13-14].

**TABLE II. Evolution of innovation ecosystem**

<b>Development stage</b>	<b>Phase I</b>	<b>Phase II</b>	<b>Phase III</b>
Describe	Internal resource integration	Construction of simple enterprise ecosystem	Construction of complex enterprise ecosystem
Research focus	Factor integration	Outer join	Co evolution
Theoretical basis	Enterprise resource view, core competence view  Dynamic ability view, knowledge view, etc	Organizational relationship theory, enterprise cooperation theory, etc	Organizational relationship theory, organizational network theory, complexity theory, etc

### III. RESEARCH DESIGN

According to the research question, this paper chooses a vertical single case study design. Based on the innovation ecosystem theory, the growth path of hidden champions is a dynamic process, and single case studies are helpful for in-depth management practice of representative cases, and in-depth analysis and interpretation of corporate behavior combined with rich corporate background and information [15], and then to refine the understanding and laws of events in hidden champion enterprises [16-18]. At the same time, vertical case studies can present the staged changes of case companies at different time points [19], which is convenient for tracking the growth process of hidden champion companies throughout the process. To summarize, this paper focuses on the theme of the hidden champion's growth mechanism, combined with the perspective of innovation ecosystem, and regards the growth experience of Lanye Medical how to realizes the hidden champion as a relatively independent and yet interconnected research unit.

#### 3.1 Case Selection

Yin (2003) pointed out that the research case must be representative and feasible at the same time, so finally chose China Ningbo Lanye Medical Equipment Co., Ltd. as the case study sample. On the principle

of representation, Lanye Medical was established in 2000, focusing on the research of oral medical equipment. After more than 20 years of development, it has become a hidden champion of China's dental industry ecosystem from a small company that only produces dental accessories. have a good representation. In terms of feasibility, Lanye Medical is adjacent to the author's unit, which is convenient for organizing field research and in-depth interviews.

### 3.2 Data Collection

This paper study draws on Patton's "data triangle" and uses three methods of interview records, literature collection and field investigation to improve the reliability of the research case (see Table III). In the interview records, our study adopted the layer-by-layer interview method, and a research team to track the development of the company is built in 2019. The interviewees mainly involved Xu Buguang, general manager of Lanye Medical, sales director, financial director and office director, etc. The average interview time is 120 minutes, and the interview is recorded. At the same time, our team will supplement the information that is not involved in the interview and need to be confirmed by means of telephone and WeChat. In terms of documents collection, we mainly collect relevant information of Lanye Medical through CNKI, the official website of Lanye Medical, the website of medical industry associations, and the website of government departments. Finally, our team visited the Lanye Medical Dental Industrial Park on the spot.

**Table III. Data collection source table**

Type of data	Data Sources	Data information statistics			
		Recording time	Recording effective text words	Number of interviews	Interviewee
Primary data	Depth interviews	300 minutes	25000 words	3formal interviews; 1 informal interview	The general manager, sales director and financial director
		Company internal publicity materials, official media reports, company annual reports, government department websites, etc.			
Second-hand data	Company files	Company internal publicity materials, official media reports, company annual reports, government department websites, etc.			
Other data	Field visit	Visit the Lanye Medical Dental Industrial Park and listen to the on-site explanation of the person in charge			

## IV.CASE ANALYSIS

Ningbo Lanye Medical Equipment Co., Ltd. was founded in May 2000. It is located in Jiangbei Investment and Venture C District, covering an area of more than 30,000 square meters. It is a high-tech emerging technology enterprise in the stage of rapid development. Lanye Medical focuses on the research of oral equipment. With the entrepreneurial concept of "high investment and rapid entry into small industries", it has rapidly grown into a hidden champion in the field of oral medical equipment production in China. Lanye Medical is one of the leading R&D and manufacturers of microcomputer control system in China. In 2000, it took the lead in launching dental treatment equipment and control system, which established Lanye Medical's position in the industry. In 2008, Lanye began to integrate a full range of oral equipment to provide overall solutions for dental clinics. Then in 2018, it began to explore the field of oral medical services. The company has become one of the most complete manufacturers of oral equipment in China.

In the past 20 years, Lanye Medical has grown from a small company that only makes dental accessories to a specialized and new giant company in Ningbo dental industry ecosystem. Combined with its specific business modules, the development history can be divided into three stages:

#### 4.1 Applied Enterprise (2000-2008)

Lanye medical has focused on the research and development of driving system of dental treatment chair since its establishment. After the success, Xu Buguang, the general manager of the company, realized that the sterilization and disinfection equipment in the dental clinic was bound to receive attention. Therefore, he led the team to continuously tackle technical problems, including the development of a series of safe, energy-saving and affordable intelligent dental sterilizers. The team mainly carries out technological innovation from the aspects of materials, processes and control methods.

#### 4.2 Platform Enterprise (2008-2018)

As we all know, there was a financial crisis in 2008. At that time, the oral equipment industry had some disadvantages, such as low level of professional cooperation, serious homogenization, overcapacity and so on. It is generally believed that the industrial development has encountered a bottleneck and should leave the oral medicine industry in time. However, the development momentum of Lanye medical in 2008 has not weakened. Relying on the manufacturing advantages of the enterprise, Lanye medical continues to improve the market network and dig deep into the oral medical industry. Finally, it successfully attracted global dental enterprises and established Ningbo dental Industrial Park. In this process, Ningbo dental industrial park takes the oral industry as the theme, focuses on the oral medical industry, and integrates the upstream and downstream resources of the industrial chain. The Industrial Park enables excellent dental enterprises at home and abroad to share resources. By jointly tackling common technical problems in the oral industry, domestic private enterprises and multinational corporations can realize complementary advantages and common development.

#### 4.3 Ecological Enterprise (2018-Present)

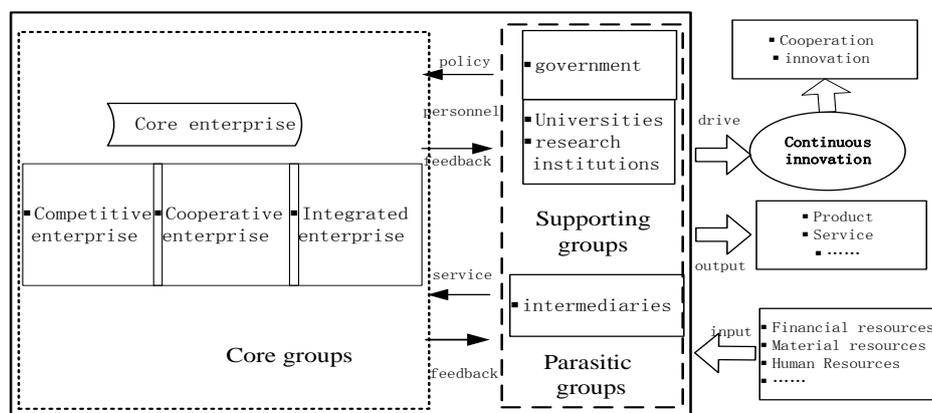
Enterprises constantly improve their comprehensive strength through innovation. When a certain

number of continuously active users or transaction volume are gathered, the enterprise will enter a virtuous circle of self-renewal and self-growth. Based on the field of the industry, it extends up and down the industrial chain and starts to change from an applied enterprise with a single product variety to a platform enterprise. Then, through model innovation and cross industry innovation, enterprises will attract a large number of relevant parties to do dependent symbiosis, such as producers, investors, trade partners, social public service institutions and other stakeholders. When this internal self-reproduction and external attraction reach a certain stage, we call this organism an ecosystem, and the core enterprise of this ecosystem is an ecological enterprise. This business ecosystem has "innovative interactions" with all relevant parties, and constantly promotes the growth and development of organisms, so as to form a collective growth ecosystem. While bringing maximum value to end customers, it will also continue to feed the further development of the ecosystem through innovation.

In 2018, Lanye medical created a modern health manufacturing ecosystem, which not only covers the coordinated development of the upstream and downstream of the industrial chain, but also continues to cover the fields of production network, marketing network and innovative services. The industrial ecosystem has been preliminarily established. Lanye medical has actively carried out internal entrepreneurship. More than a dozen employees in Lanye have established sub projects, which have been valued and supported by enterprise leaders. At the same time, Lanye medical founded Jiangbei science and technology innovation park with the strong support of Ningbo Science and Technology Bureau, personnel bureau and Jiangbei District government, which also provides a good development opportunity for entrepreneurship and innovation projects from all walks of life.

### V.CASE DISCUSSION

Within the ecosystem, the interaction units, including core population, supporting population and parasitic population, interact with each other, which can promote the further growth and development of ecological enterprises (see Figure 1).



**Fig 1: Ecosystem innovation interaction**

#### 5.1 Core Groups: Leading Enterprises and Supporting Enterprises

The core group is the enterprise group, mainly including leading enterprises and supporting enterprises.

Each enterprise will carry out innovation and cooperation according to their own capital chain, technical capacity and human resources. At the same time, they will take corresponding strategic measures in combination with the state of their ecological niche.

Lanye medical took the lead in exploring and improving the level of non-clinical business support and concentrating the strength of the medical industry in order to create a new model of oral medical services. The establishment of enterprise ecosystem can effectively help enterprises empower clinics from non-clinical business aspects such as management, finance, law, operation and procurement. It can also provide support to various enterprises, so that doctors and medical institutions can have more energy to improve their own technical and clinical treatment level. By integrating social resources with alliance partners and making full use of the advantages brought by scale effect, we can promote our own brand and reduce the operation cost of the enterprise. The establishment of innovation ecosystem not only gathers the visionary elites in the oral medicine industry, but also the strong cooperation of enterprises. This move has further promoted the high-quality development of the medical industry and the progress of oral medicine. It has also realized resource integration and strategic coordination to jointly create value growth.

## 5.2 Supporting Groups: Governments, Universities and Research Institutions

In the process of the development of enterprise innovation ecosystem, it also needs the encouragement and support of universities, governments and scientific research institutions. This type of interactive units together the support groups of the ecosystem.

### 5.2.1 Government

The government provides a technological innovation environment for the enterprise innovation ecosystem and provides policy support and guidance for its innovation activities. The fiscal and investment policies formulated by the government to promote innovation provide a basic guarantee for enterprises. At the same time, it will also build innovative service platforms and other ways, which will promote the development of enterprises. In order to comprehensively improve the current situation of stomatology in China, the state has issued corresponding policies. The market potential and rising space of stomatology in China are huge. At present, China's oral medical service industry has a complete industrial chain. In terms of talent training, the government also provides a series of guarantee means for enterprises. Firstly, we can use the talent training institutions affiliated to government departments to train technical and management talents; Secondly, the government's labor training institutions and non-governmental vocational training institutions can be used to train operational talents; Third, the internal school running of the enterprise can give financial support to the internal talent training; Fourth, the government can provide preferential conditions for talents participating in training. The government should encourage enterprises to introduce high-end medical talents and teams, and give tax incentives and support for the settlement of children. Lanye medical actively communicates and cooperates with relevant government departments, and uses various innovation policies implemented by the government to break through its own development bottleneck, so as to improve the overall innovation performance of the system.

### 5.2.2 Universities and research institutions

Innovation is inseparable from high-tech talents, so Lanye medical attaches great importance to the introduction and training of technical talents. The company specially employs Mr. joaouniemilio, a senior expert in the dental equipment industry from Sweden, as the executive president of Lanye medical. It has successively established technical cooperation relations with surrounding colleges and universities such as Zhejiang University, Zhejiang University of technology and Ningbo University. Fashion dentist is a publication supported by the Chinese Stomatological Association and sponsored by Lanye. Relying on the publication, Lanye medical has hired many medical doctors and professors as editors and consultants. The joining of top experts in the industry has laid a solid technical foundation for Lanye's innovation driven development.

### 5.3 Parasitic Groups: Intermediaries

Parasitic groups include many intermediaries such as entrepreneurship service center, science and technology consulting service organization, technological innovation service center and information center. As the name suggests, it is an enterprise group derived with the development and growth of enterprise innovation ecosystem. With the continuous development and growth of Lanye medical, more professional and accurate scientific and technological consulting services are needed, which provides a good environment and benefit space for the surrounding additional industries. At the same time, it can promote the development of scientific and technological consulting service institutions, entrepreneurship service centers, information and intelligence centers and other institutions. In the innovation ecosystem, intermediaries act as a bridge between innovation subjects. At the same time, it will also provide professional technical innovation, personnel training, scientific and technological consulting and other services for Lanye medical.

## **VI. LEARN FROM EXPERIENCE**

### 6.1 Talent Innovation Ecology

Lanye medical attaches great importance to the strategic cooperation with colleges and universities, and actively improves the quality of existing scientific research institutes. Thus, the integration and birth of new technologies such as cloud computing, medical devices, health food manufacturing and artificial intelligence can be realized. Relying on the Institute of industrial design of Zhejiang University, the Institute of life and health of the University of Chinese Academy of Sciences and the Ningbo Research Institute of Dalian University of technology, Lanye medical works together to tackle the key technologies of modern health industry. At the same time, it has also jointly built a cooperation and exchange platform for high-end resources and talent teams in the modern health industry at home and abroad, so as to promote the innovation and transformation of scientific and technological achievements. With the support of the state, Lanye medical actively runs schools jointly with colleges and universities, establishes training bases, and promotes the customized training of urgently needed industrial development and key talents. Lanye medical actively explores and cooperates to establish industrial classes, formulates policy guidelines and

catalogue of scarce talents in modern health manufacturing industry, and strengthens the introduction of dental talents to provide talent support for the development of dental industry. In addition, Lanye medical is also taking the initiative to establish a supply and demand docking mechanism for industry, University and research medicine, and build a medical device training demonstration application base. In this way, a virtuous circle of demonstration application - technological innovation - clinical evaluation - radiation promotion can be formed.

## 6.2 Organizational Innovation Ecology

Lanye medical extends upstream and downstream along its own industrial chain, looking for access opportunities from the original dental accessories to the sterilization and disinfection equipment in the downstream dental clinic. Lanye medical always takes users as the core and extends the demand industrial chain. By constantly tapping the potential value of users and extending the industrial chain to both ends of the smile curve, we can realize the upgrading and transformation from labor-intensive to intelligence intensive and capital intensive. At the same time, Lanye medical re optimized the profit-making mode of the industrial chain and boosted the flow and expanded the business scale by windowing the key links. Relying on scientific and technological innovation and key projects, Lanye medical has created a more dynamic innovation ecosystem of modern health manufacturing industry. This measure has enhanced the new driving force for the development of the medical industry, promoted the advantages of innovation and development, and led and supported the innovation and development of modern health manufacturing industry. Lanye medical takes the modern health manufacturing industry service complex as a new carrier for the agglomeration of high-end elements, so as to provide new impetus for industrial development. Lanye medical aims to build an innovation and Creation Center for oral medicine in the Yangtze River Delta and an international oral medicine manufacturing center, and become a new model driven by innovation in regional economic development.

## 6.3 User Innovation Ecology

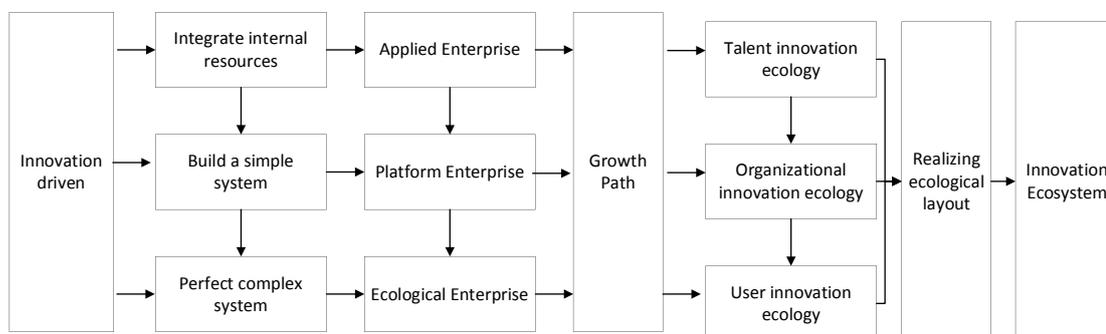
Lanye medical will continue to form a network ecology for customers, pay attention to user management and enhance user stickiness, so that enterprises can make a breakthrough in the field of industry network interaction. The most important thing is to turn the traditional idea of "customer-oriented" into "user-centered". Lanye medical is a manufacturer of oral medical devices. The medical devices manufactured by Lanye medical can reach the end users smoothly through dealers and middlemen. At the same time, the end users also include the dentists who operate the devices and the audience receiving treatment. Therefore, it is more necessary to distinguish between customers and users. The customer is the direct sales target of the enterprise, but may not be the end user of the enterprise. He may be a dealer or middleman. The products can reach the user only after they are combined or reprocessed. In the past, limited by communication costs and communication methods, enterprises often could only communicate directly with customers, but could not hear the feelings of end users. In addition, enterprises should distinguish between orientation and center. Guidance is to guide enterprises to follow customer needs in the front, while the center is to open the internal value chain to embrace the needs of users. The two concepts are very different.

## 6.4 Realizing Ecological Layout

Lanye's district government guides financial institutions to innovate credit and insurance products, develop intellectual property pledge loan business, and expand the loan scale for scientific and technological small and medium-sized enterprises in health equipment and biomedical new materials industry. During the layout of Lanye medical ecological enterprises, special actions for scientific and technological innovation of modern health industry have been formulated, and financial service schemes in line with the financing characteristics of complex enterprises have been implemented. At the same time, Lanye medical vigorously carried out science and technology finance, government bank cooperation guarantee and loan, and encouraged financial institutions to set up relevant science and technology guarantee institutions to provide professional financial services. Borrowing capital strength is a common means to complete cross-border competition. Ecological enterprises open up the growth space of enterprises through the reconstruction of business model. Through organizational remodeling, release the innovation and entrepreneurial vitality of enterprises, effectively activate the development potential of enterprises and accelerate the development of enterprises. Behind this speed, it is indispensable to promote capital. Mature financing ability is also the guarantee of capital operation of hidden champion companies.

## VII. CONCLUSION

The top-level design of the hidden champion needs to be upgraded to the industrial level or even the cross industrial level. At the same time, a series of ecological layouts built by enterprises can often lay a solid foundation for enterprises' sustainable innovation. Enterprises build talent innovation ecology, organization innovation ecology and user innovation ecology, and then realize ecological layout with the help of capital, so as to continuously feed the sustainable innovation and development of enterprises (see Figure 2). Through the construction of ecosystem, the extension of ecosystem is completed, and a win-win cooperation relationship is formed between enterprises and ecosystem subjects. In this process, users enjoy satisfactory services, and the organizers of building ecosystem can obtain corresponding value returns.



**Fig2: The growth path of the hidden champion**

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