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Green innovation drives globalization: a longitudinal case study of Angel Yeast's evolution from a start-up to a world-class manufacturer

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Abstract

In the increasingly competitive global market, emerging market companies, represented by China, have shown mixed performance during their development process. Many companies grow rapidly in the early stages of development but cannot maintain long-term growth. How to achieve sustainable development has become a major challenge for emerging market companies, and green innovation is considered an effective way to address this issue. Based on the resource-based view, this paper conducts a longitudinal case study on Angel Yeast as the research subject, dividing the development process of Angel Yeast into three stages: the start-up period (1986-2000), the growth period (2000-2010), and the maturity period (2010-present), discussing how Angel Yeast has grown from a small start-up company to a world-class manufacturer. The study finds that Angel Yeast has utilized its unique resources at different stages of development for green technology innovation, green product innovation, green management innovation, green marketing innovation, green supply chain management, and green organizational culture construction, enabling Angel Yeast to gain a sustained competitive advantage and grow into a global leader in the yeast industry. This paper expands the research on the evolution of emerging market companies under the resource-based view theory and enriches the understanding of the role of green innovation in the growth process of enterprises.

Keywords: Green Innovation, Resource-based view (RBV), Evolution, Longitudinal case study

La innovació verda impulsa la globalització: un estudi de cas longitudinal de l'evolució d'Angel Yeast d'una start-up a un fabricant de primer nivell mundial

Resum

En el mercat global, cada cop més competitiu, les empreses de mercats emergents, representades per la Xina, han mostrat un rendiment diferent durant el seu procés de desenvolupament. Moltes empreses creixen ràpidament en les primeres etapes de desenvolupament, però no poden mantenir el creixement a llarg termini. Com aconseguir el desenvolupament sostenible s'ha convertit en un repte important per a les empreses de mercats emergents, i la innovació verda es considera una manera eficaç d'abordar aquest problema. A partir de la visió basada en recursos, aquest article realitza un estudi de cas longitudinal sobre Angel Yeast com a tema d'investigació, dividint el procés de desenvolupament de Angel Yeast en tres etapes: el període d'inici (1986-2000), el període de creixement (2000). -2010), i el període de maduresa (2010-present), parlant sobre com Angel Yeast ha passat d'una petita empresa nova a un fabricant de primer nivell mundial. L'estudi descobreix que Angel Yeast ha utilitzat els seus recursos únics en diferents etapes de desenvolupament per a la innovació tecnològica verda, la innovació en productes verds, la innovació en la gestió verda, la innovació en màrqueting verd, la gestió de la cadena de subministrament verda i la construcció de cultura organitzativa verda, la qual cosa permet Angel Yeast obtenir un avantatge competitiu sostingut i convertir-se en un líder mundial en la indústria del llevat. Aquest article amplia la investigació sobre l'evolució de les empreses de mercats emergents mitjançant la teoria de la visió basada en recursos i enriqueix la comprensió del paper de la innovació verda en el procés de creixement de les empreses.

Paraules clau: Innovació Verda, Visió basada en recursos (RBV), Evolució, Estudi de cas longitudinal

La innovación verde impulsa la globalización: un estudio de caso longitudinal de la evolución de Angel Yeast desde una empresa emergente hasta un fabricante de clase mundial

Resumen

En el mercado global cada vez más competitivo, las empresas de mercados emergentes, representadas por China, han mostrado un desempeño mixto durante su proceso de desarrollo. Muchas empresas crecen rápidamente en las primeras etapas de su desarrollo, pero no pueden mantener el crecimiento a largo plazo. Cómo lograr el desarrollo sostenible se ha convertido en un desafío importante para las empresas de los mercados emergentes, y la innovación verde se considera una forma eficaz de abordar esta cuestión. Basado en una visión basada en recursos, este artículo lleva a cabo un estudio de caso longitudinal sobre Angel Yeast como tema de investigación, dividiendo el proceso de desarrollo de Angel Yeast en tres etapas: el período de inicio (1986-2000), el período de crecimiento (2000 -2010), y el período de madurez (2010-presente), analizando cómo Angel Yeast ha pasado de ser una pequeña empresa nueva a un fabricante de primera categoría mundial. El estudio descubre que Angel Yeast ha utilizado sus recursos únicos en diferentes etapas de desarrollo para la innovación en tecnología verde, la innovación de productos verdes, la innovación en gestión verde, la innovación en marketing verde, la gestión de la cadena de suministro verde y la construcción de una cultura organizacional verde, lo que le ha permitido a Angel Yeast obtener una una ventaja competitiva sostenida y convertirse en un líder global en la industria de la levadura. Este artículo amplía la investigación sobre la evolución de las empresas de los mercados emergentes bajo la teoría de la visión basada en recursos y enriquece la comprensión del papel de la innovación verde en el proceso de crecimiento de las empresas.

Palabras clave: Innovación Verde, Visión basada en recursos (RBV), Evolución, Estudio de caso longitudinal

绿色创新驱动全球化：安琪酵母从初创企业到世界级制造商的纵向案例研究

摘 要

在全球市场竞争日益激烈的背景下，以中国为代表的新兴市场企业在其成长过程中展现出显著的业绩差异。许多企业在初创阶段能够迅速崭露头角，但维持长期增长的稳定性却显得尤为困难。因此，实现可持续发展已成为新兴市场企业面临的一项紧迫任务，而绿色创新被视为解决这一挑战的有效策略。本文基于资源基础观的视角，选取安琪酵母企业为研究对象进行纵向案例研究，将安琪酵母的发展历程细分为三个阶段：初创期（1986-2000 年）、成长期（2000-2010 年）和成熟期（2010 年至今），探讨安琪酵母如何从一个小型初创企业成长为全球酵母行业的领军企业。研究发现，安琪酵母在不同的发展阶段利用其独特的资源进行绿色技术创新、绿色产品创新、绿色管理创新、绿色营销创新、绿色供应链管理和绿色组织文化建设，不断推动企业可持续发展，也为安琪酵母带来显著的竞争优势，并为其在全球市场中的领先地位奠定坚实基础。本研究丰富了基于资源基础观的新兴市场企业演化研究，也为理解企业成长过程中绿色创新的作用提供了新视角。

关键词： 绿色创新，资源基础观，演化，纵向案例研究

Introduction

In the global market, emerging market companies, particularly those from China, have shown mixed performance during their development process. Many companies experience rapid growth in the early stages but struggle to maintain this growth momentum in the long term (Peng 2001; Luo and Tung 2007). Gaining long-term competitive advantage and achieving sustainable development have become significant challenges for emerging market companies.

Green innovation is widely considered an effective strategy to address these challenges (Chen, Lai and Wen 2006; Saunila, Ukko and Rantala 2018; Qiu, Hu and Wang 2020), as it can not only contribute to the sustainable development of the environment but also enhance a company's competitive position by improving resource efficiency, reducing costs, and meeting the growing demand for environmentally responsible products and services (Xie, Huo and Zou 2019; Le 2022). In recent years, the concept of green innovation has received considerable attention, as it encompasses the development and implementation of environmentally friendly technologies, products, processes, and management practices (Chen, Lai and Wen 2006; Schiederig, Tietze and Herstatt 2012; Zhou et al. 2019). However, these studies have only explored the impact of one or two green innovation strategies on firm performance or competitiveness, and all have been conducted through cross-sectional data collected by survey research. This leaves a gap in our understanding of how companies leverage multiple green innovation strategies to address the unique challenges they face at different stages of development. Therefore, understanding the process of how emerging market companies utilize various green innovations to drive growth and achieve sustainable development holds significant theoretical and practical implications.

This paper adopts the resource-based view (RBV) as its theoretical foundation (Peteraf 1993) and conducts a longitudinal case study on Angel Yeast's green innovation behavior at different stages. RBV has not been widely used to analyze the green innovation of emerging market companies. In this study, RBV allows us to gain a more comprehensive understanding of how companies leverage their unique resources to develop and implement green innovation strategies, thereby achieving sustainable growth and competitive advantage.

Angel Yeast is a leading yeast manufacturer that has successfully addressed the long-term growth challenges faced by emerging market companies, achieving globalization and becoming a world-class manufacturer. This study examines the development history of Angel Yeast: the startup period (1986-2000), the growth period (2000-2010), and the maturity period (2010-present). The aim is to explore how the company has leveraged green innovation at different stages of development, transforming from a small start-up enterprise into a world-class manufacturer.

Literature review and theoretical foundations

Green Innovation

In recent years, environmental laws and regulations have prompted companies to gradually raise environmental awareness during the production process. A growing number of consumers with green consumption concepts are willing to pay a premium for more environmentally friendly products, and consumer demand for environmental protection drives corporate green innovation

(Sarkis 2010). Currently, there is no unified definition of green innovation; experts and scholars generally consider green innovation as ecological innovation and environmental innovation.

Regarding the driving factors of green innovation, some empirical experiences show that policy pressure, market pressure, internal organizational pressure, and stakeholder pressure all promote companies to carry out green innovation (Shen, Zhang and Zhang 2017). Factors driving companies to carry out green innovation come not only from within the company but also from outside the company, including government strategies, customer demands, suppliers, etc. (Huang et al. 2016; Xie, Huo and Zou 2019). Green activities of core companies in the supply chain can guide their partner companies to conduct green innovation, thereby driving the green innovation activities of the entire supply chain (Xie, Huo and Zou 2019). This will effectively promote suppliers to adjust product quality promote, and implement green production to meet manufacturer's green requirements (Zailani et al. 2015). As a product innovation or process innovation that realizes customer value and reduces the negative impact on the environment, green innovation capability is a manifestation of corporate innovation capability.

When discussing the types of green innovation, previous scholars have focused on green technology innovation (Chen, Lai and Wen 2006), green product innovation (Amores-Salvado, Martin-de-Castro and Navas-Lopez 2014), green process innovation (Chang 2011), green management innovation (Schiederig, Tietze and Hestatt 2012), green marketing innovation (Fiore et al. 2017), green supply chain management (Chiou et al. 2011; Xie, Huo and Zou 2019), and green organizational culture (Qu et al. 2022).

This paper, combining the characteristics of the selected case and previous research on green innovation, explores how green technology innovation, green product innovation, green management innovation, green marketing innovation, green supply chain management, and green organizational culture enable Angel Yeast to achieve sustainable competitive advantages and become a global leader in the yeast industry.

Green Innovation and enterprise development

In recent years, the concept of green innovation has attracted considerable attention, and management scholars have also widely focused on the impact of various green innovation behaviors on corporate performance. Among them, Amores-Salvado, Martin-de-Castro and Navas-Lopez (2014) conducted an empirical analysis of 157 Spanish metal companies, believing that green product innovation can help companies enhance their public image and thus improve their competitiveness in the market. Chen, Lai and Wen (2006) found that green product innovation and green technology innovation contribute to improving production efficiency, reducing energy consumption, and reducing waste emissions, thereby enhancing corporate sustainability. Schiederig, Tietze and Hestatt (2012) believe that green management innovation can create more value for companies, etc.

However, these studies usually only focus on the impact of one or two green innovation strategies on corporate performance or competitiveness, ignoring that companies may adopt multiple green innovation strategies to address the unique challenges at various stages of development. Secondly, these studies are mainly based on questionnaire surveys to collect cross-sectional data, lacking in-depth

analysis of the evolution process of corporate green innovation strategies.

Therefore, this study adopts a longitudinal case study method to systematically analyze how Angel Yeast Company uses multiple green innovation strategies and their synergistic effects to cope with the challenges faced at different periods in its development process. Longitudinal case studies help reveal the evolution process of green innovation strategies adopted by companies at various stages of development and how these strategies affect the development of companies.

Resource-based view

The resource-based view (RBV) is a theoretical framework widely used in the study of corporate strategy and competitive advantage (Barney 1991; Wernerfelt 1984). Its core idea is that the unique resources and capabilities that a company possesses are key to its competitive advantage (Peteraf 1993; Teece, Pisano and Shuen 1997). These unique resources can be tangible, such as patents, technology, and production facilities, or intangible, such as brand, corporate culture, and management capabilities (Grant 1991; Teece 2007).

Although the resource-based view has been widely applied in various research fields, such as marketing, organizational learning, and innovation management (Hitt et al. 2001; Ray, Barney and Muhanna 2004), its application in the field of green innovation is relatively limited. Green innovation requires companies to possess a set of unique resources and capabilities, which largely determine their success or failure in green innovation (Barney et al. 2011).

This study, based on the resource-based view, aims to address the shortcomings of existing research. The resource-based view helps us better understand how companies use their unique resources to formulate and implement green innovation strategies, thereby achieving sustainable growth and competitive advantage (Barney et al. 2011). This study provides new insights into the resource-based view of green innovation research by analyzing the unique resources that Angel Yeast possesses at different stages of development and how it uses these resources for green innovation.

In summary, this article provides theoretical support for the subsequent analysis of the case of Angel Yeast's green innovation-driven growth through a review and evaluation of the relevant literature and offers a new research perspective for the application of the resource-based view in the field of green innovation.

Case study methodology

Research Methodology

In this study, we choose a longitudinal single-case study method, which allows for detailed tracking and analysis of the development process of the case company, revealing the evolution of its green innovation strategy and its relationship with business growth. The longitudinal single-case study method is also suitable for studying complex dynamic processes, such as innovation activities and globalization paths. In this study, we use qualitative research to describe and analyze the coordination of green innovation activities at Angel Yeast Company.

In summary, this study aims to explore a unique and inspiring phenomenon, making the longitudinal single-case study method appropriate (Yin 2009). This method allows us to gain a deep understanding of the evolution of Angel Yeast Company's green innovation strategy, providing new insights for theoretical development and practical experience for other emerging market companies on how to achieve

sustainable development through green innovation.

The sample

We chose Angel Yeast as the subject of our case study for the following reasons: a) The case's inspiration. Angel Yeast's successful experience in coordinating green innovation is highly inspiring. As a company that has achieved remarkable success in the global market, Angel Yeast's green innovation strategy can provide a valuable reference for other companies. b) The accessibility. The research team has maintained a long-term close cooperative relationship with Angel Yeast Company and continuously followed up, understanding its motivations, processes, and challenges for green innovation development, and obtaining a wealth of public and internal information with rich and detailed research materials. At the same time, the executives and department heads of Angel Yeast Company are willing to participate in multiple interviews and allow recording, which facilitates the acquisition and organization of first-hand interview data and further triangulation of case analysis data.

Data collection

In this study, we used a longitudinal single-case study method and used in-depth interviews, on-site observations, internal company documents and archives, and secondary data sources to collect relevant data. Data from different sources form a triangulation and complement each other (Yin 2009), ensuring sufficient detail in argumentation and the reliability and validity of the research.

(1) Preparation. The project leader conducted a preliminary understanding of Angel Yeast through journal articles, media information, and company promotional materials. The research team held seminars, designed the company's research plan and interview outline, and revised and improved the outline multiple times based on the literature and research situation.

(2) On-site observations and interviews. The research team visited Angel Yeast Company for on-site observations, interviewed staff, and requested documents and archives from Angel Yeast employees. Interview methods and duration: each person was interviewed

TABLE 1. DATA COLLECTION

Type	Profile
Interview transcripts	Including interview outline, interview notes and summaries, interview recordings and data coding, etc., totaling about 81,500 words
Internal information	Through field investigation and relevant information provided by the enterprise, compile information about the development history, corporate culture, development philosophy, management methods and awards received by Angel Yeast, totaling about 138,300 words
Second-hand information	Through the internet and corporate website, collecting data about Angel Yeast's annual reports from 2015-2023 and accumulating more than 30 relevant news reports downloaded for subsequent analysis

Source: Own elaboration

TABLE 2. THE ARRANGEMENT AND RESULTS OF THE INTERVIEW

Time	Contents	Interviewees	Results
2017/09/07	Interview Visit the company Other information	Publicity director, etc.	3.7 thousand words interview transcript
2017/09/08	Interview Visit the company Other information	General manager, chief engineer, division manager, etc.	45.4 thousand words interview transcript
2017/09/09	Interview Visit the company Other information	Managers of quality, risk control, supply chain, purchasing, sales, etc.	32.4 thousand words interview

Source: Own elaboration

TABLE 2. THE ARRANGEMENT AND RESULTS OF THE INTERVIEW

Position	Duration	Date	Main question
Publicity Director	1h	2017/09/07	A general introduction to Angel and the course of Angel's globalization
Director of the quality department	1h10min	2017/09/08	The advantage in production efficiency and production process; Innovation and SCM in Angel
Purchasing manager	1h	2017/09/08	Angel's customers and suppliers' management; Innovation in SCM; The role of the supply chain in internationalization
Chief engineer –	1h30min	2017/09/08	R&D in Angel; Process and Product Innovation in Angel; Management of the R&D group
General Manager –	2h	2017/09/08	The motivation for internationalization; Steps and initiatives to achieve internationalization; Angel's international competitiveness
Manager of the international business department	1h	2017/09/08	International business innovation initiatives; The role of the department in the path of globalization;
Financial manager	1h	2017/09/08	The proportion of investment in product R&D and innovation; The balance of payments; Financial support for supply chain management and internationalization
Sales manager –	1h	2017/09/08	Angel's international marketing; Achievements in international market exploitation
Minister of Tech. and Quality	1h30min	2017/09/09	Innovation in production technology; Quality control and management

Source: Own elaboration

individually, typically within 1-2 hours, over a total of 3 days (Table 2). Interviewees included the chairman, general manager, and managers responsible for R&D, production and quality, procurement, sales, international business, finance, and human resources, as well as various departments.

(3) Secondary data collection and data supplementation. In the subsequent data analysis process, our research team utilized secondary materials to supplement relevant information, such as materials on the company's official website, public literature, related news reports, internet news media's related reports on Angel, and related statements by managers (Table 3).

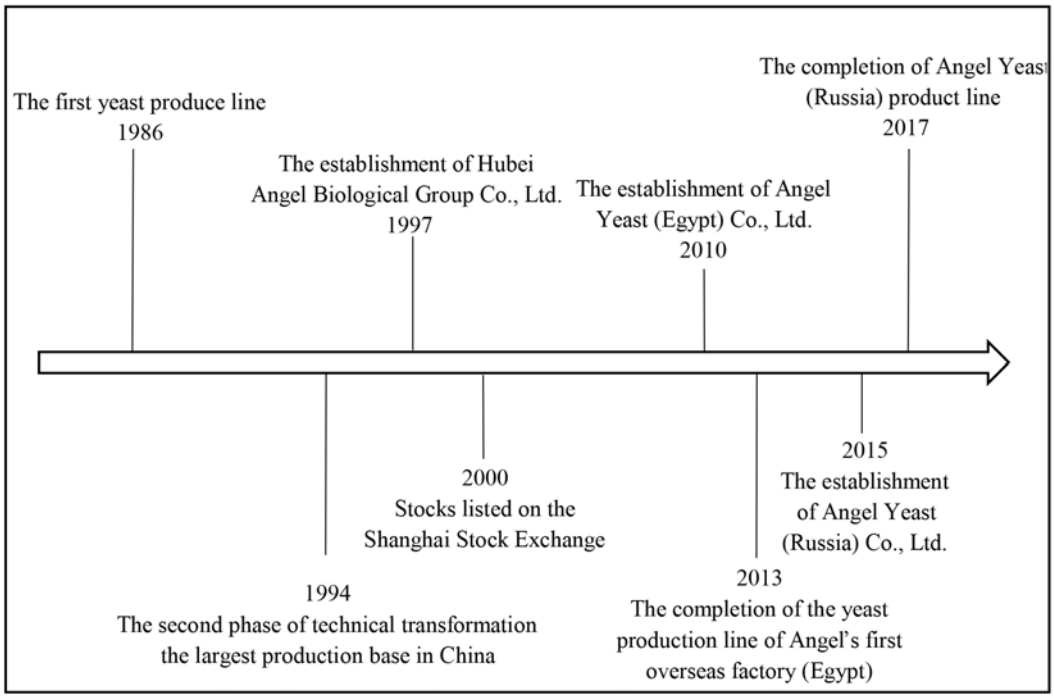
Case description and analysis

Case description

Angel Yeast Co., Ltd. is a national key high-tech enterprise specializing in the production, operation, and related technical services of yeast biotechnology products. It is one of the first national technology innovation demonstration enterprises and the leading enterprise in the domestic yeast industry, ranking as the third-largest yeast company globally. The company was established in 1986, with its headquarters in Yichang, Hubei. It has regional headquarters in Beijing and Shanghai, and seven holding subsidiaries in Hubei, Xinjiang, Guangxi, Inner Mongolia, Shandong, and Henan.

Relying on yeast technology and product advantages, Angel has established a closely related industrial chain with upstream and downstream enterprises, built multiple business areas centered around yeast, and formed a strategic layout of multiple products, businesses, and operations. The company's products are diverse, well-structured, and comprehensive. The products are widely used in fields such as baking fermented pasta, food

FIGURE 1. THE DEVELOPMENT HISTORY OF ANGEL YEAST



Source: Own elaboration

flavorings, microbial fermentation, animal nutrition, human nutrition and health, brewing, and bioenergy. The company has also invested in areas such as biofertilizers, enzyme preparations, sugar making, plastic soft packaging, and the dairy industry.

In terms of production capacity distribution, the total global yeast production capacity is about 1.5 million tons, with Lesaffre, AB Mauri, and Angel ranked as the top three in the industry. The yeast industry's production capacity is mainly concentrated in Europe and the United States, accounting for more than half of the total production capacity. In recent years, China has become the region with the fastest growth of global yeast production capacity, driving the rapid growth of yeast production in the Asia-Pacific region and the world. The development process of Angel Yeast since its establishment in 1986 is shown in Figure 1.

Green innovation driving global growth

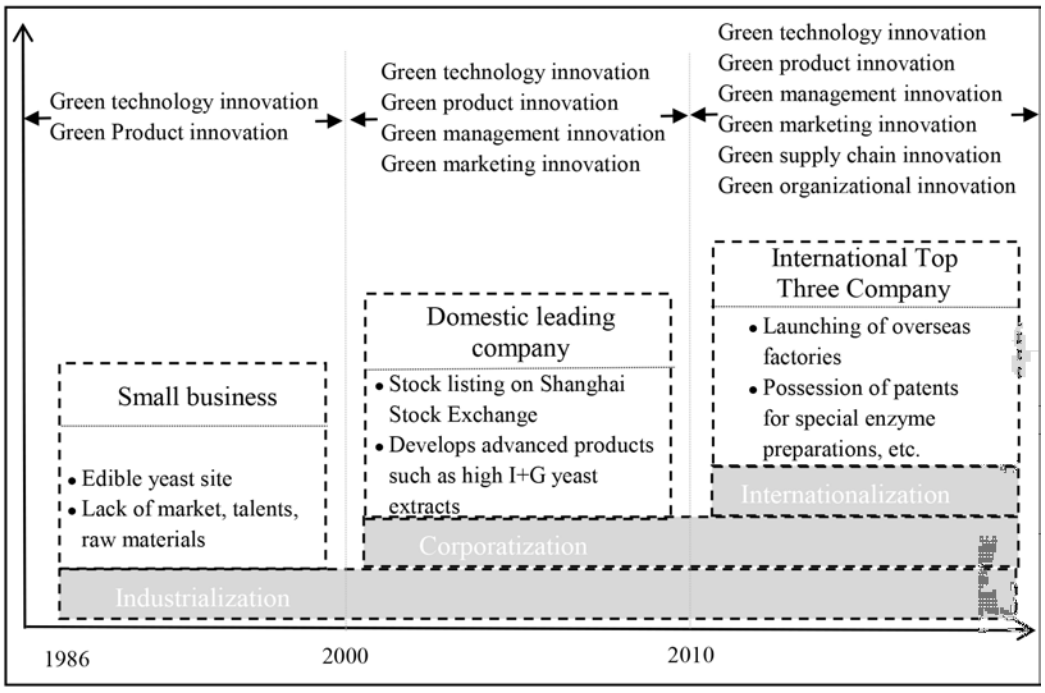
To more clearly present the evolution of Angel Yeast from a startup to a world-class manufacturer driven by green innovation, we divide the development process of Angel Yeast into three stages based on different business scenarios and green innovation: Start-up Stage (start a small business); Growth Stage (become a domestic leading company); Mature Stage (become one of the top three yeast producers in the world) (Figure 2).

These three stages represent the evolution of Angel Yeast from a startup to a world-class manufacturer, driven by a focus on green innovation strategies and their evolution in different areas.

Start-up Stage (1986-2000): start a small business

During the start-up stage of Angel Yeast (1986-2000), the company stood out in the market by meeting consumers' environmental needs through green technology innovation and green product innovation, achieving rapid initial growth.

FIGURE 2. ANGEL YEAST DEVELOPMENT STAGE AND GREEN INNOVATION TYPE



Source: Own elaboration

(1) Green technology innovation

In the early stage, Angel Yeast had focused on green technology innovation, including overcoming resource constraints, implementing green technology measures, investing in technology R&D, effectively utilizing and integrating limited resources, increasing the value of resources, and forming a unique competitive advantage in the market.

First, Angel Yeast used waste molasses from sugar production as raw materials to produce active dry yeast, achieving comprehensive utilization of resources. Second, the company began to adopt green technology measures, such as improving production processes and reducing transportation costs, which helped to improve environmental performance. Third, during this time, Angel Yeast valued technical and human resources, focused on its R&D capabilities, and laid the foundation for subsequent green technology innovation.

(2) Green product innovation

In this stage, Angel Yeast focused on green product innovation, including overcoming market challenges, developing green products, and obtaining government policy support to fully utilize and integrate internal resources, develop green products to meet market demand, and stand out in the competition.

First, Angel Yeast overcame market challenges by meeting market demand through internal resources and capabilities, such as launching high-temperature resistant distiller's grain products to improve grain conversion rates. Second, the company developed green products, such as special flour for pasta products, using biological enzyme preparations instead of chemical brighteners. Third, Angel Yeast obtained government policy support, such as loans, financing, and business training

TABLE 4. TYPICAL EVIDENCE OF GREEN INNOVATION AT THE START-UP STAGE OF ANGEL YEAST

Stage	Themes	Concepts	Typical evidence cited
Start-up Stage (1986-2000)	Green technology innovation	Overcoming resource constraints	· Angel's products are a kind of waste utilization of the raw material, using molasses, the remaining waste from sugar production, as raw material to produce active dry yeast, realizing comprehensive utilization of resources and extending the industrial chain of sugar production enterprises.
		Green technology measures	· Next is the problem of energy saving and emission reduction. We developed this wine fermentation to solve the problem of this industry: high-temperature resistance, energy saving, and emission reduction. · In terms of procurement and stocking methods, storage equipment and tanks are prepared by the company. It reduces both the cost and the loss caused by breakage. · Liquid ammonia is also homemade, which will volatilize and is a hazardous product. We do this ourselves and save a lot of money.
		Investing in technology R&D	· We are also thinking that we may be more advanced, and pay more attention to this kind of human resources, that is, if you do not have material resources, then you are relying on human resources, we are relying on human resources to promote, mobilize the enthusiasm of people.
	Green product innovation	Overcoming market challenges	· At that time, in 1994, our high-temperature resistant wine lees products were introduced into the national science and technology key achievements to promote the countryside, at that time, the high temperature of liquor production in summer was not aspect, after using our wine lees, it can continue to produce in summer. Then we chased out the remaining lees starch through our yeast, which improved the conversion rate of grain.
		Developing green products	· Research and development of special flour for traditional noodle food: we have researched new technology of special flour making and developed special flour for steamed buns, dumplings, noodles, etc. Replaced chemical whitening agent with biological enzyme preparation. · In 1997, "Development and promotion of the application technology of high temperature resistant brewing active dry yeast".
		Government policy support	· Relying on the state's $9.5 million is relying on debt, loans, and financing. · Plant manager operating training courses, learning for more than three months. This experience has been a great help.

Source: Own elaboration

courses, to help implement green innovation.

Growth Stage (2000-2010): Become a domestic leading company

At that time, based on the continuous promotion of green technology innovation and green product innovation, the company further carried out green management innovation and green marketing innovation, promoting sustainable development.

(1) Green technology innovation

During the growth period, Angel Yeast continued to focus on green technology innovation, including green technology measures, green technology integration, and technology innovation capability enhancement. By developing core technologies with independent intellectual property rights, the company achieved effective resource utilization and environmentally friendly production. This attracted more consumers and partners, providing continuous growth momentum.

First, Angel Yeast adopted several core technologies with independent intellectual property rights, promoting the development of the company's clean production process. Second, Angel Yeast achieved a seamless transition of green technologies through technology integration and applied advanced green technologies to its existing operations. Third, Angel Yeast increased R&D investment, collaborated with multiple universities and research institutes, attracted and cultivated technical talents, and established a shareholding mechanism for technical staff.

(2) Green product innovation

During this period, Angel Yeast continued to focus on green product innovation, including green product development, green product differentiation, and green packaging and logistics. By closely paying attention to market demand and consumer preferences, and combining its resources and capabilities, the company developed a series of green products, achieving a combination of environmental governance and comprehensive resource utilization. This not only met the market's demand for environmental protection and sustainability but also enhanced the company's core competitiveness and further consolidated its market position.

First, Angel Yeast successfully researched aluminum-free food leavening technology for fried dough sticks and pioneered the introduction of new aluminum-free leavening agent products, as well as developing animal nutrition as an alternative to antibiotics. Second, through a green product differentiation strategy, Angel Yeast developed a series of yeast-based organic fertilizer products, achieving a combination of environmental governance and comprehensive resource utilization. Third, Angel Yeast promoted packaging automation, achieving the goal of saving human resources and reducing transportation costs.

(3) Green management innovation

In terms of green management innovation, Angel Yeast has achieved comprehensive resource utilization and environmental governance through the implementation of organizational change practices, green investment guidance, and green management culture. This enables the company to better integrate internal resources and achieve a win-win situation for green production and environmental protection.

First, Angel Yeast established a management guidance philosophy focused on clean production and becoming an environmentally friendly enterprise, starting from the company's top leadership. Second, when entering certain

regions, Angel Yeast also considers environmental protection as an important condition for investment. Third, the leadership of Angel Yeast practices the values of "being a good Angel employee and a good citizen of society," allowing all employees to deeply understand and grasp the company's vision, mission, and values, internalizing them and turning them into conscious actions.

(4) Green market innovation

Angel Yeast uses green marketing strategies to establish a strong brand image, promote green product differentiation, and adopt channel management to reduce costs, making the company stand out in the market. This attracts more consumers and partners, providing continuous growth momentum for the enterprise.

First, Angel Yeast publicizes the state of China's economic development through various channels and participates in the formulation of national clean production evaluation indicator systems, green products, and green factory evaluation standards. Second, Angel Yeast's technical personnel visit customers to adjust application formulas and introduce the advantages of low oil absorption rates for aluminum-free fried dough sticks, helping customers with their cost calculations. Third, Angel Yeast reduces costs by managing inventory centrally to offset demand fluctuations.

Mature Stage (2010 to present): Become a Top Three producer in the world

In this stage, we observed six aspects of green innovation initiatives: green technology innovation, green product innovation, green management innovation, green marketing innovation, green supply chain management, and green organizational culture. This section will display how Angel Yeast coordinated these green innovation initiatives to ultimately grow into a world-class manufacturer.

(1) Green technology innovation

During this stage, Angel Yeast maintained its leading position in technology innovation through continuous optimization of green technologies, construction of a global R&D network, and intellectual property and patent strategies. This provided Angel Yeast with a competitive advantage in the global market, promoted its development in international markets, and established it as an industry leader.

First, Angel Yeast already possessed four core technologies and invested in R&D of advanced environmental technologies and applied international best practices to enhance its green technology level. Second, Angel Yeast built an industry-leading R&D team, established a broad technology cooperation network, and vigorously attracted external high-level talent to participate in the company's innovation activities through "internationalization". Third, Angel Yeast promoted sustainable development through clear corporate development strategies, strong organizational and individual learning abilities, and robust environmental governance and innovation capabilities while accumulating international patents and technologies to protect core technologies and intellectual property.

(2) Green product innovation

During its mature stage, Angel Yeast fully utilized and integrated internal and external resources through global market green product development, compliance with international environmental regulations, and production of

TABLE 5. TYPICAL EVIDENCE OF GREEN INNOVATION IN THE GROWTH STAGE OF ANGEL YEAST

Stage	Themes	Concepts	Typical evidence cited
Growth Stage (2000-2010)	Green technology innovation	Green technology measures	·We have core technologies with independent intellectual property rights throughout the whole process, such as high-density fermentation technology, thick mash fermentation technology, yeast wastewater standard treatment technology and microbial control technology. ·We are vigorously promoting clean production processes, such as research on yeast high-concentration fermentation, water reuse, comprehensive wastewater treatment and recycling development.
		Green technology integration	·Angel has also developed organic fertilizer series products and implemented cogeneration projects, thus forming a resource recycling industrial chain of crop cultivation → sugar beet production → waste molasses → yeast raw materials → yeast → yeast nutrient solution → waste → land → crops.
		Technology innovation capability enhancement	· We have many research bases in technology, and we have cooperated with many universities and research institutes in China, especially those that are good at industrialization. ·Based on the principle of "respecting labor and innovation", we should establish sound incentives or policies for innovative activities and achievements in the fields of R&D technology, production technology and engineering technology, and establish shareholding mechanisms for scientific and technological personnel.
	Green product innovation	Green product development	·The project research on aluminum-free donut food expansion technology, the industry's first to launch a new aluminum-free donut bulking agent product, from the source to completely solve the problem of aluminum damage to doughnuts (aluminum-free and health-related, aluminum products will pollute the environment). ·Animal nutrition is also our newly developed product. Antibiotics are used in aquaculture, animal breeding and even people in China. We have developed this product to replace antibiotics.
		Green product differentiation	·The project team insists on the road of combining environmental protection treatment and resourceful comprehensive utilization, making full use of the rich content of organic matter, nitrogen, phosphorus and potassium, amino acids in yeast fermentation mash, etc. Relying on the company's advanced technical advantageous resources and R&D platform, we have developed granules, powder, full water soluble and another yeast source organic fertilizer type products, which solve the company's environmental protection problems while ensuring the continuous and stable production of yeast line.
		Green packaging and logistics	·Promoting packaging automation is one of the important technical innovations of the company to build manufacturing advantages, and has made a breakthrough. It has achieved a cumulative labor saving of more than 300 people and generated benefits of nearly 32 million.

Stage	Themes	Concepts	Typical evidence cited
			·We specifically emphasize the quality aspect of packaging, and after the quality organization has been optimized over these years, our production center has established more than N standard methods for each professional module.
	Green management innovation	Organizational change practices	·The company's top management put forward the business guiding concept of clean production and environment-friendly enterprise in 2000, and continued to invest heavily to achieve the comprehensive utilization of resources and environmental management goals. ·The company promotes the clean production concept of controlling at source and cutting pollution sources in the process.
		Green investment guidance	·However, when entering these places, we have some investment high-pressure lines: environmental protection, the local area should have a sewage treatment plant or there should be a plan to establish a sewage treatment plant. If not, we are determined not to invest. Before the investment in Yili, Xinjiang, this was one of the main factors. ·The company has the largest investment in environmental protection in the same industry in China, with annual environmental protection operating costs reaching 90 million yuan.
		Green management culture	·We take the lead in practicing the value of "being a good employee of Angel and a good citizen of the society". ·The company has set up a special corporate culture team to carry out various promotional activities in each business unit and each subsidiary so that all employees can deeply understand and grasp the company's vision, mission and values, and internalize them into the conscious behavior of employees.
	Green market innovation	Green Branding	·We make CD-ROMs and picture books to publicize the development of China's economy, including the various strict measures taken by the Chinese government to ensure food safety, etc. We also make use of various forms of publicity, such as customer delivery bodies, city street signs and subway advertisements, which have a very good publicity effect. ·We actively participate in the formulation of the national clean production evaluation index system, green products and green factory evaluation norms, and accumulate the technical competitive advantage of the company's green development by promoting clean production and comprehensive utilization of resources.
		Green Marketing Communications	·The company's technical personnel have helped doughnut users to calculate the total accounts by going to the donut users' sites, adjusting the application formula, introducing the advantages of the low oil absorption rate of aluminum-free donuts, and giving the users of aluminum-free doughnuts a license to promote..... At the same time, they have also conducted technical training courses on aluminum-free doughnuts with local food regulatory authorities.
		Channel Management	·Before 2008, the company set up warehouses in every province in China, and each warehouse kept a certain amount of stock to meet the local market. 08 years later, the company gradually abolished the warehouses in each office and merged them to establish a logistics center to take the big logistics route.

Source: Own elaboration

high-value-added green products. This enabled the company to occupy an important position in the global market and expand its market share in the green product field.

First, Angel Yeast filled domestic product gaps during this stage, surpassed competitors in certain products, and continuously improved its green products' competitiveness in the global market. Second, Angel Yeast tightly integrated production management with food Good Manufacturing Practices (GMP) standards and continuously optimized products to meet higher environmental requirements. Third, Angel Yeast was the first to develop a special bread yeast strain with high protein and high nucleic acid content, achieving an international leading level and entering high value-added fields (such as health products, cosmetics, pharmaceuticals, animal nutrition, etc.).

(3) Green management innovation

Angel Yeast focuses on green management consistency, green strategic management, and green human resource management. These green management innovation initiatives help the company continuously optimize internal resources, enhance core competitiveness, and occupy a favorable position in the global market.

First, by implementing circular economy projects at headquarters and subsidiaries, Angel Yeast has achieved efficient resource utilization, energy conservation, pollution reduction, and waste reuse. Second, Angel Yeast regards environmental protection as an essential strategy for the company's sustainable development and takes it as its responsibility to continuously promote environmental governance, energy conservation, and emission reduction. Angel Yeast has formulated global green strategic goals, integrated global resources, and implemented green strategic plans. Third, Angel Yeast is committed to cultivating a talented team with green awareness and skills. By establishing an office automation network platform, knowledge sharing and timely communication among innovation team members is achieved. In addition, the company collaborates with well-known experts at home and abroad and encourages innovative talents to actively participate in international academic exchanges, aiming to make greater breakthroughs in green human resource management.

(4) Green market innovation

Angel Yeast focuses on international green brand building, green product promotion, and global differentiated marketing through green marketing innovation. These green management innovation strategies enable the company to occupy a favorable position in the global market, laying a solid foundation for Angel Yeast's continuous development and internationalization.

First, Angel Yeast actively participates in the formulation of green products and green factory evaluation standards by promoting clean production and comprehensive resource utilization. At the same time, the company has established a green brand image in the international market. Second, Angel Yeast adopts green advertising and publicity strategies and formulates reasonable green product pricing strategies. Angel Yeast has developed a series of yeast-based feed products under the Fubon brand, such as compound yeast, selenium yeast, and yeast cell walls, which can replace antibiotics used in animal breeding. The company also utilizes new media communication and actively adopts self-media platforms for brand communication, enhancing the efficiency of brand communication. Third, Angel Yeast closely follows the explicit and

potential market demands, enriches its yeast product portfolio, and expands its application fields. A market-oriented matrix working group has been established to promote collaborative innovation in multiple areas such as R&D, marketing, production, design, and application research.

(5) Green supply chain management

Angel Yeast implements green supply chain management strategies, including green procurement, green logistics and distribution, and supply chain green integration. These strategies help reduce environmental impact while achieving corporate development, enhancing corporate image and operational efficiency, and laying the foundation for the company's competitiveness and position in the global market.

First, Angel Yeast selects environmentally friendly raw material suppliers and formulates green procurement policies and standards. Angel Yeast has established a joint venture with Thailand's Two Yi Group, one of the largest sugar companies in Southeast Asia, ensuring a stable supply of the company's main raw material, molasses. Second, Angel Yeast optimizes logistics networks and transportation methods to reduce environmental impact and adopts environmentally friendly packaging and sustainable distribution methods. To ensure food safety, Angel Yeast uses box trucks to transportation goods for industrial customers, reducing food safety risks during transit. In response to the problem of container cargo collapse, the logistics department has standardized container loading methods. Angel Yeast has also merged planning management and logistics management, establishing a planning and logistics department to more effectively improve logistics management and on-time order delivery. Third, Angel Yeast promotes supply chain environmental standards and reduces overall environmental impact, contributing to sustainable development. Angel Yeast comprehensively utilizes waste molasses to reduce its pollution. The yeast industry is important in reducing waste pollution from sugar factories and is crucial for implementing clean production and a circular economy. Angel Yeast achieves the unification of customer value and corporate value by promoting the convergence of objectives, interests, and values among upstream and downstream partners in the industry chain, forming a green business circle closed-loop.

(6) Green organizational culture

During this stage, Angel Yeast achieves sustainable development, enhances competitiveness, and stands out in the global market by focusing on green values, organizational structure and processes, and employee participation and incentives.

First, Angel Yeast establishes a green development strategy for the enterprise and promotes green concepts and environmental awareness. Adhering to the product development philosophy of "natural, nutritious, healthy, and delicious," Angel Yeast follows the "four musts" principle of "health benefits, international trends, laws and regulations, and customer value." In 2013, Angel Yeast proposed the idea of managing the three major production concerns: food safety, production safety, and environmental safety. Second, Angel Yeast has established a comprehensive technical system integrating product technology, application technology, production technology, engineering technology, and management technology. At the same time, Angel Yeast innovatively carries out the construction of leadership for two levels of management and persists in promoting organizational improvement and process

reengineering according to market changes and strategic needs. Third, Angel Yeast encourages employees to participate in green activities and establishes reward mechanisms for green behaviors. The company has established a review system for middle and senior-level R&D personnel, production process improvement management processes, and engineering project management processes, providing channels for the front-line production process, technical, and management personnel to fully utilize their knowledge and wisdom. Meanwhile, Angel Yeast has introduced and cultivated a group of experts and high-quality talents in the fields of applied basic R&D, engineering technology, and production technology, providing a standardized and innovative environment for innovative talents.

Discussion and Conclusion

Research findings

This study focuses on how green innovation drives corporate growth and the evolution of companies from startups to world-class manufacturers. Through a longitudinal case study of Angel Yeast, we explore the relationship between green innovation and corporate evolution under the theoretical background of a resource-based view, providing a theoretical framework for green innovation-driven corporate development. The specific research conclusions are as follows:

In this study, we analyzed the performance of green innovation in Angel Yeast in three stages: “Start-up Stage, Growth Stage, and Mature Stage” (as shown in Figure 2).

Start-up Stage (1986-2000): Angel Yeast integrates limited resources to improve corporate competitiveness through green technology and product innovation. At this stage, Angel Yeast establishes a competitive advantage, builds China’s largest yeast production base, establishes a limited company and goes public, laying the foundation for future development.

At this stage, a symbiotic relationship existed between green technology innovation and green product innovation. Green technology innovation provided technical resources that enabled the development of environmentally friendly products. This could have included new processes, materials, or techniques to reduce environmental impact. Conversely, the pursuit of green product innovation stimulated further advancements in green technology, creating a reverse promotion effect. This means that the challenge of creating green products often drove technological innovation, fostering a cycle of continuous improvement. This mutually beneficial relationship between green technology and product innovation likely laid a robust foundation for Angel Yeast's sustainability-focused growth and its evolution into a global industry leader.

Growth Stage (2000-2010): Angel Yeast carries out green management and marketing innovation based on green technology and product innovation. The company continuously strives for sustainable development, successfully breaks through international green trade barriers, and expands overseas markets. In 2004, it implemented the global SAP ERP system and established its first overseas subsidiary in 2010.

At this stage, the relationship between green technology and green product innovation was enhanced by the addition of green marketing and green management innovation. Green marketing innovation offered market resources to green product innovation, potentially driving customer awareness and acceptance of their eco-friendly products. Meanwhile, green management innovation fostered a supportive

TABLE 6. TYPICAL EVIDENCE OF GREEN INNOVATION IN THE MATURE STAGE OF ANGEL YEAST

Stage	Themes	Concepts	Typical evidence cited
Mature Stage (2010 to present)	Green technology innovation	Continuous optimization of green technologies	• In environmental protection treatment, the company possesses four core technologies - water reuse technology, clean sewage diversion technology, anaerobic treatment technology, and concentrated fertilizer production technology. • After more than 20 years of development, the company has established a perfect technological innovation system.
		Global R&D Network Building	• It has created a first-class R&D team in the industry, with 2 State Council allowance experts, 5 provincial experts, 6 foreign experts, and 216 full-time R&D technicians. • The company has had a good system to cooperating with foreign experts for a long time, and we have been growing and improving through the exchange with foreign experts. • Internationalization is also an important way for the company to strengthen its innovation team. In addition to encouraging innovative talents to actively participate in international academic exchanges, the company's innovative talents are also introduced to the top scientists in related fields abroad.
		Intellectual Property and Patent Strategy	• We continue to strengthen the investment of human and financial resources in R&D, and take the declaration and operation of "National Yeast Engineering Technology Research Center" as the driving force to comprehensively strengthen the construction of R&D platform and create a first-class enterprise R&D and achievement transformation platform. • The strategic advantages of the company in sustainable development are: clear corporate development strategy; strong organizational and personal learning ability of employees; strong environmental management and innovation ability.
	Green product innovation	Green product development for global markets	• In biotechnology we are sticking to it, and we will make many kinds of biological products in the future, like the special enzyme preparations we are making now, some of which we have filled the gaps in China. • Through continuous improvement, the vitality index of yeast is improving every year to a higher level, and the gap is narrowing when we compare our overseas competitors. At present, some of our products have surpassed our competitors.
		Meeting international environmental regulations	• In terms of production management, Angel produces all raw materials in a fully enclosed system following GMP standards for food, going through the processes of drying, sieving, iron removal, insecticide, second sieving after mixing and gold inspection, etc., which thoroughly removes impurities from the materials.
		High-value-	• Angel yeast is the first to develop and obtain the special strain of high protein and high nucleic acid baker's yeast. The product has good

Stage	Themes	Concepts	Typical evidence cited
		added green products	solubility, high translucency and suitable viscosity, and has reached the international leading level in terms of taste and aroma indexes, which have been industrialized. • We have developed to the wine industry such as white wine, rice wine, yellow wine, wine and so on also to fuel ethanol; food flavoring is also the application field of yeast; health care products are also developed based on yeast; and cosmetic field, pharmaceutical field, animal nutrition field and so on.
	Green management innovation	Green Management Consistency	• In recent years, the company has always followed the concept of circular economy in the process of independent innovation and process technology transformation, focusing on the theme of energy saving and consumption reduction, resourceful and comprehensive utilization of waste and environmental protection. • The project team carries out comprehensive water conservation work in terms of process route optimization, innovation, process parameter optimization, equipment improvement and water reuse innovation. The separated nutrient solution is used in Chongzuo, Dehong, Yili, Egypt, Sanbu and Chifeng, and the daily reuse amount is 1350 cubic meters, with a benefit of 20 yuan per cubic meter and an annual benefit of 9.18 million.
		Green Strategic Management	• Angel takes environmental protection as an important strategy for the sustainable development of the company, and continues to promote environmental protection governance and energy conservation and emission reduction, taking environmental protection as its responsibility. • Intending an enterprise of "ecological protection and green development", we strive to achieve the double standard of "government standards and community satisfaction" in environmental protection governance.
		Green Human Resource Management	• In the office automation network platform, we have established a knowledge base and technical document-sharing platform, including technical standards, scientific research literature, market reports, enterprise management system, etc., which enables knowledge sharing and timely exchange among members of the innovation team. • The company has a very good system to carry out long-term cooperation with foreign experts, and we also grow and progress through communication with foreign experts.

Stage	Themes	Concepts	Typical evidence cited
	Green market innovation	International Green Branding	• We actively participate in the development of a national clean production evaluation index system, green products and green factory evaluation norms, and accumulate the technical competitive advantage of our green development by promoting clean production and comprehensive utilization of resources. • When we built a new factory in Egypt, the European Bank for Reconstruction and Development, they took the initiative to contact us, because Egypt is their recipient country, this bank is very interested in our products.
		Green Product Promotion	• In 2012, Angel developed a series of yeast source feeds such as Fubon brand compound yeast, yeast selenium and yeast cell wall, which can replace the use of antibiotics in the animal breeding process. In Japan and Korea, YE has replaced traditional seasoning and is widely used in food as a new - generation of high-grade seasoning. • The company has actively adopted new media to strengthen brand communication, and has built a business website, opened a microblog, APP and other self-media platforms to attract fans' attention and implement rapid and accurate communication.
		Global Differentiated Marketing	• Targeting the explicit and potential needs of the market, the company has continuously enriched its yeast product portfolio and expanded its application fields. From a small enterprise initially serving only the baking industry, the company has developed into a multinational group serving multiple application fields such as microbial nutrition, human nutrition and health, brewing and bioenergy, and has a global market. • The company implements market-oriented matrix working groups in R&D, marketing, production, design, and applied research, and meeting customer needs is the basic starting point for product technology innovation.
	Green supply chain management	Green Procurement	• Thailand Liang Yi Group is one of the largest sugar companies in Southeast Asia, and Angel has built a joint venture with it to ensure a stable supply of molasses, the main raw material of the company.
		Green Logistics and Distribution	• According to the need for food safety, the logistics department proposed the method of using box trucks to ship industrial customers to reduce the risk of food safety of goods in transit; to protect the quality of product packaging, the logistics department proposed to promote the way of pallet packing and shipping to reduce product breakage and improve unloading efficiency; in response to the problem of the collapse of container cargo, the logistics department standardized the method of container loading. • In 2011, to improve logistics management more effectively and increase the on-time delivery rate of orders, Angel merged planning management with logistics management and established the Planning and Logistics Department.

Stage	Themes	Concepts	Typical evidence cited
		Green Supply Chain Integration	• The best solution is to make comprehensive use of waste molasses; as the most typical industry of comprehensive use of waste molasses - yeast industry, it has made a great contribution to reducing the pollution of molasses, therefore, the yeast industry is the back-order industry chain of the sugar industry, an important industry to cut down the pollution of sugar mill waste, and is a sugar mill An important guarantee to realize clean production and circular economy. • Angel culture makes the upstream and downstream of the industrial chain converge in goals, interests and values, and internal and external consistency, forming a closed loop of green business circles and realizing the unity of customer value and enterprise value.
	Green organizational culture	Establishing Green Corporate Values	• When developing products, Angel respects the product development concept of "natural, nutritious, healthy and delicious" and follows the "four musts" of "health benefits, international trends, laws and regulations, and customer value". • 2013: The company put forward the idea of "food safety, production safety and environmental safety" as the three major production concerns control. Since then, the identification, monitoring, investigation and improvement of the three major hidden worries have become the main line of business work throughout the company.
		Green Organizational Structure and Processes	• We have established a complete technical system with organic integration of product technology, application technology, production technology, engineering technology and management technology. • The innovative leadership construction of two levels of management has promoted the improvement of the quality and ability of management personnel.
		Green Employee Engagement and Motivation	• The company has established an all-employee salary appraisal system linked to develop strategies and goals, and insists on adjusting and improving the salary appraisal system as the business of the company grows; it has established a review system for middle and senior R&D personnel to promote the continuous improvement of the quality and level of the innovation team. • We have introduced and cultivated a group of experts and highly qualified talents in the fields of applied basic R&D, engineering technology and production technology, and put high-level talents in charge of or deeply penetrated the research of major projects in related technology fields.

Source: Own elaboration

environment, likely encouraging further technological and marketing innovation within the company. This broadening of Angel Yeast's innovation cycle to encompass marketing and management components reflects a holistic approach to sustainability. This multi-faceted strategy has likely played a crucial role in the company's sustained growth and competitiveness.

Mature Stage (2010-present): The company focuses more on green supply chain management and organizational culture cultivation while continuing green innovation. Angel Yeast integrates corporate resources, further improves competitiveness and market share, becomes a globally renowned green yeast enterprise, consolidates its international market position, and promotes global green development.

At this stage, the relationship between green technology, green product, green marketing, and green management innovations were supplemented by the introduction of green supply chain management and green organizational culture. Green supply chain management fostered supplier and customer cooperation, enhancing the resources for green technology innovation and promoting the market acceptance of green products. Meanwhile, a green organizational culture embedded sustainability within the company, providing green value that underpinned management practices and supply chain operations. This expansion of green innovation into the supply chain and the organization's culture reflects Angel Yeast's comprehensive approach to sustainability, signifying its transition from using green innovation for competitive advantage to embodying it as a core corporate value. This strategic shift likely contributed to the company's sustained success and industry leadership.

Changes in green innovation at different stages of development, from primary technology introduction and product innovation to comprehensive green innovation integration, demonstrate that green innovation has become the core competitiveness for sustainable development. These green innovation elements influence and promote each other, jointly creating value and competitive advantage for the company.

The green innovation practice of Angel Yeast shows that companies need to attach great importance to green innovation strategies and incorporate them into their core competitiveness. By integrating green innovation elements, companies can improve resource utilization efficiency, reduce environmental risks, enhance market competitiveness, and achieve win-win economic, social, and environmental benefits.

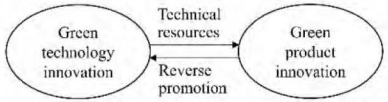
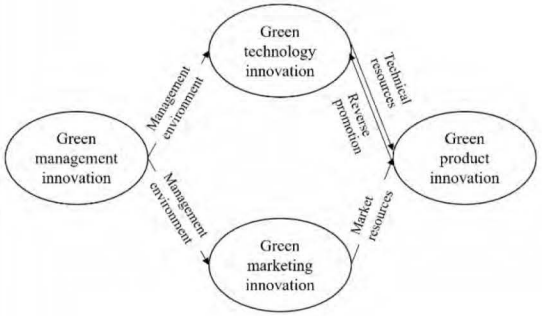
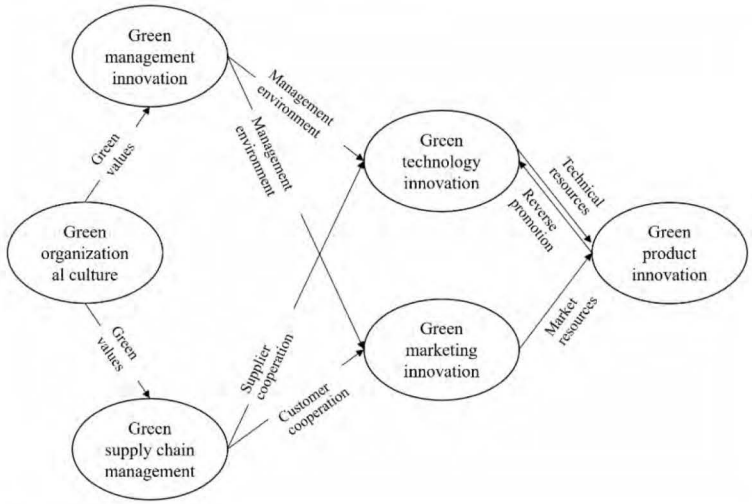
Based on the evolution of Angel Yeast, this article proposes a theoretical framework for a company relying on green development to evolve from a startup to an international large enterprise (as shown in Table 7).

This theoretical framework can help companies understand how to rely on green development at different stages to achieve the transformation from a startup to an international large enterprise. By focusing on these six green innovation measures and adjusting priorities and strategies according to the stage of the company, enterprises can achieve sustainable development and ultimately become an internationally competitive green enterprise.

Implications for Theory

First, this study expands the exploration of various green innovations driving corporate growth and achieving sustainable development. Existing research on the impact of green

TABLE 7. EVOLUTION THEORETICAL FRAMEWORK OF ANGEL YEAST'S INTERNATIONALIZATION

	Start-up Stage	Growth Stage	Mature Stage
Green innovation evolution map			
Objectives	Understand market demand Create suitable products Ensure company survival	Improve efficiency Expand market Enhance brand influence	Establish green innovation ecosystem Achieve large enterprise development goals
Elements	Boost R&D investment Leverage government support Capitalize on market opportunities	Organizational restructuring Policy compliance Cooperate with suppliers/customers	Integrate supply chain Build corporate culture Expand international market
Results	Establish a green strategy Gain market share Earn customer recognition	Achieve green management Improve market competitiveness Enhance social responsibility	Form green business model Unify enterprise and social value Become an industry leader

Source: Own elaboration

innovation on corporate development has only explored the influence of partial green innovation strategies on corporate performance, which leaves a gap in our understanding of how companies coordinate green innovation strategies to address the unique challenges they face at different stages of development. This study systematically investigates how emerging market enterprises use green innovation to drive growth and achieve sustainable development at different stages of development through a longitudinal case analysis. By comparing green innovation measures in the start-up, growth, and maturity stages, this study reveals the relationship between green innovation and the stages of corporate development in emerging market enterprises.

Second, this study expands the application scope of the resource-based view. Although the resource-based view has been widely applied in various research fields, such as marketing, organizational learning, and innovation management (Hitt et al. 2001; Ray, Barney and Muhanna 2004), its application in the field of green innovation is relatively limited. By studying the growth of an emerging market enterprise in the context of the resource-based view, this article enriches our understanding of the mechanisms through which green innovation influences corporate growth and development. The results of this study have significant implications for both emerging market enterprises and policymakers seeking to promote sustainable development through the adoption of green innovation strategies.

Implications for practice

The practical implications of this study are as follows: First, emerging market enterprises face different challenges and opportunities at different stages of development and should choose appropriate green innovation strategies according to their actual situation. This study demonstrates how Angel Yeast promotes growth and achieves sustainable development through green innovation strategies at different stages of development, which is the foundation for its evolution. Second, emerging market enterprises should strengthen the integration of internal and external resources to support green innovation. This study finds that Angel Yeast, during its development process, integrates internal technology, management, and talent resources, as well as collaborates with external partners for co-innovation, jointly promoting the implementation of green innovation. Third, emerging market enterprises should pay attention to the development and application of digital technology in promoting green innovation. Digital technology can improve supply chain operation efficiency, reduce costs, and achieve more environmentally friendly products and services.

Limitations and future research

Building on the existing literature on green innovation and corporate development, this study explores how green innovation drives growth and sustainable development for emerging market enterprises through a longitudinal case analysis of Angel Yeast. Although we have made some contributions to both theory and practice, there are still some limitations in this study. Firstly, this study mainly focuses on the development process of Angel Yeast, a specific enterprise, which may not be fully applicable to other enterprises and industries. Therefore, future research can be extended to other enterprises and industries to test the universality of green innovation in driving growth and sustainable development in different environments. In addition, this study focuses on the facilitating role of green innovation in the process of corporate development but does not address the challenges and risks that green innovation may

bring. Green innovation may lead to increased corporate investment costs, uncertainty in technological updates, and conflicts with existing production methods. Future research can focus on the dual nature of green innovation to more comprehensively assess the role of green innovation in corporate development.

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