ISSN 2616-5902 Vol. 5, Issue 16: 126-132, DOI: 10.25236/AJBM.2023.051617

Research on Digital Transformation in Whole Industrial Chain of Dairy Enterprises from the Perspective of Dynamic Capability

Qing Xin

School of Economics and Management, Guangxi Normal University, Guilin, China
qing_xin_2008@163.com

Abstract: *With the integration and development of China's digital and real economy, digital transformation is a crucial strategic deployment for enterprises. The dairy industry involves the first, second and third industries, and the successful cases of digital transformation of dairy enterprises are worthy of reference. In addition, the rapid update of digital technology makes it imperative for companies to have the ability to respond to continuous changes in the external environment. From the perspective of dynamic capability, this study analyzes the capability basis of digital transformation in the whole industrial chain of dairy enterprises through case study. The dimensions of dynamic capability are subdivided according to different stages of digitization. The findings of the study enrich the exploration of dynamic capabilities within the field of digital transformation and have implications for the digital transformation of dairy enterprises and other industries.*

Keywords: *Digital Transformation; Dynamic Capability; Whole Industrial Chain*

1. Introduction

Today, cloud computing, big data and artificial intelligence have completely changed the business models of traditional enterprises. The complex and ever-changing market environment has prompted enterprises to enhance their dynamic capabilities and accelerate the pace of digital transformation, thereby strengthening their competitiveness. The government report of the first session of the 14th National People's Congress pointed out that in 2023, we should vigorously develop the digital economy, accelerate the digital transformation of traditional industries and small and medium-sized enterprises, focus on enhancing high-end, intelligent and green levels, improve the level of regular regulation and support the development of the platform economy. The widespread use of digital technology has led to a continuously changing market environment. Digital transformation is one of the strategic initiatives that business executives should think about.[1] In addition, the dynamic capability theory derived from the resource-based view enables companies to be equipped to respond to different periods of the environment. Dairy enterprises are closely related to people's lives, and the degree of competition in the industry is also increasing. In order to maintain and expand market share and provide consumers with better products and services, enterprises should carry out digital transformation and apply digital technology to the whole industrial chain to make enterprises more competitive in the dynamic development process. The dairy industry spans the upper, middle and lower reaches of the industry chain, which is long and complex. How to achieve high-quality development through emerging technologies, digital transformation and cultivating dynamic capabilities is an inevitable choice for dairy enterprises to seize the opportunities of a new round of scientific and technological revolution and industrial change. Yili Group ranks among the top five dairy companies in the world and the first dairy company in Asia for nine consecutive years. It is the earliest enterprise in China's dairy industry to lay out digital transformation, and its digital transformation results have been reflected in the level of business growth. This study focuses on analyzing how dairy enterprises cope with the digital age, how to build dynamic capabilities, and the types of dynamic capabilities built, so as to realize the digital transformation of the whole industrial chain. In addition, the subdivision dimension of dynamic capabilities in digital transformation is supplemented, and the logic is sorted out to enrich the relevant theories.

ISSN 2616-5902 Vol. 5, Issue 16: 126-132, DOI: 10.25236/AJBM.2023.051617

2. Literature Review

2.1. Digital Transformation

The digital economy is changing the world economic map and becoming a new driving force for China's economic innovation and development.[2] The dairy industry is an important industry for the country's livelihood, involving the first, second and third industries, and the digital transformation of dairy companies is also an important driver of China's economic development. Digital technology not only optimizes enterprise production, but also connects markets, anticipates consumer demand and provides quality services. Therefore, digital transformation is an important strategy for dairy companies. According to Wu Jiang, enterprise digital transformation refers to the integration of information data, computing analysis, communication and connection technologies to change, reshape and optimize products and services, organizational structure, business process and business operation mode, so as to increase the value created by enterprises.[3] Scholars have explored digital transformation from the perspectives of technology innovation theory, relationship theory and strategy theory.[4] Digital transformation is a complex and multidimensional process. Current research focuses on product digital transformation, service digital transformation, process digital transformation, model digital transformation and organization digital transformation. The digital transformation of the whole industrial chain involves the above five aspects, which is holistic and systematic, and the research results are complementary and expanded to the digital transformation.

2.2. Dynamic Capability

In the digital economy, the market environment in which companies operate is constantly changing and companies should have the corresponding capabilities to adapt to these dynamic changes. Dynamic capability refers to the important ability of an enterprise to integrate, utilize and reconfigure internal and external resources in order to cope with changes in the external environment and achieve sustainable competitive advantage[5] and the ability to adapt solutions to problems or operational processes to better cope with dynamic changes.[6] For companies, dynamic capabilities are better than conventional capabilities for them to gain and maintain a competitive advantage and are the basis for orchestrating heterogeneous resources to adapt quickly to a continuously changing business environment.[7] Scholars have explored the dimensions of what constitutes dynamic capabilities, such as organizational flexibility, organizational learning,[8] the ability to gain insight into the environment, the ability to change and renew,[9] the ability to capture, adapt and guide consumer change, the ability to co-evolve with the firm and the consumer,[10] the ability to sense, acquire and transform.[6] When exploring the digital transformation of enterprises, Shao Yunfei et al divided dynamic capabilities into digital recognition, digital integration and digital reconstruction capabilities.[11] In addition, when using resources, enterprises adapt to market changes through integration, reconstruction, acquisition and release of resources,[12] which can also be regarded as the embodiment of dynamic capabilities. Acquisition capability refers to the ability to capture resources, data and information that are beneficial to the enterprise; identification capability refers to the ability to detect current market opportunities, technological developments or industry crises; integration capability is reflected in the enterprise's ability to combine various resource capabilities to seize opportunities with operational models, investment decisions and strategic layouts; and reconfiguration capability refers to the ability to recombine, match and layout the tangible and intangible assets at its disposal. Therefore, in the context of digital transformation, this study divides dynamic capabilities into digital acquisition, digital recognition, digital integration, and digital reconfiguration capabilities.

3. Research Design

3.1. Case Selection

In this study, the case study method was chosen to dig deeper into the essential logic of the case, and then to draw out meaningful patterns through the complex phenomenon.[13] The Yili Group was selected for this study based on the principle of typicality. The Yili Group is a leading company in China's dairy industry and has made achievements in digital transformation, with the management and layout of its entire industrial chain attracting widespread attention at home and abroad. Secondly, the case is advanced. Yili's digital transformation practice was selected as an excellent case in the Report on the Integration and Development of the Digital and Real Economy (2022). The report, jointly

ISSN 2616-5902 Vol. 5, Issue 16: 126-132, DOI: 10.25236/AJBM.2023.051617

published by Xinhua and the China Electronics Information Industry Development Institute, is highly authoritative and representative. Yili, as the only dairy company selected, shows that it is a leader in digital transformation in this industry.

3.2. Data Collection

This study collects secondary data mainly through Yili Group's official website, WeChat public website, Yili's published public annual reports, media reports on Yili and academic literature about Yili on CNKI.

3.3. Case Object Profile

Founded in 1993, Inner Mongolia Yili Industrial Group Co., Ltd. is China's largest dairy enterprise with the most comprehensive product categories. From the 2008 Beijing Olympic Games to the 2019 Wuhan Military Games and the 2022 Beijing Winter Olympics, and from the 2010 Shanghai World Expo to the 2016 Hangzhou G20 Summit, Yili has made frequent appearances as the only dairy company to provide services. Yili is also a partner of top summits such as the World Economic Forum, Boao Forum for Asia and the World Internet Conference.

4. Case Studies

Through data collection and sorting, this study classifies the digital transformation process of Yili into two phases, namely the digital transformation exploration phase and the digital transformation acceleration phase.

4.1. Exploratory Phase of Digital Transformation (2008-2015): Digital Acquisition and Identification Capabilities

In 2008, the Chinese dairy industry was affected by the melamine incident and its market share was quickly taken over by foreign dairy companies. Since 2008, the dairy industry has been undergoing a major overhaul to establish "quality and safety" as a lifeline. In response to the changing external environment and to safeguard product quality and consumer health, Yili began to implement intelligent management in this year. In the boutique milk source base, the staff can query the information of various management links such as dairy cow breeding, production and milk source storage through the system, and can control and track the source and destination, so as to ensure the quality of milk source.

In the upstream of the industrial chain, in addition to traditional farming management, Yili has launched a digital pasture management system designed to more intelligently manage all aspects of cow feeding, breeding production, product inventory and unexpected situations. Instead of being as busy as they used to be with the day-to-day work on the farm, staff can now simply grab the key points and check the data to get a clear picture of each cow's status, accurately grasp the cow's breeding status, and check and deal with abnormalities in a timely manner. This has greatly improved the efficiency of the farm work and reduced labour costs.

In the middle of the chain, at the Yili base in Hohhot, Inner Mongolia, cows stood in a queue on a milk collection carousel inside the house, waiting for their milk to be picked up mechanically, then sprayed with a medicinal bath before lining up to return to their dormitories for a rest and a meal. As the cows stood on the carousel, staff brought them an automatic milk pump and the milk was collected through a blue pipe in the middle of the carousel and quickly transported and stored in a low-temperature preservation area to ensure maximum milk freshness.

In the downstream of the industrial chain, in 2008, Yili created the first "digital visit platform" for the public in the domestic food industry, featuring "Full Openness, Panoramic Live Broadcasting, and Full Transparency", which is a very distinctive way to show the dairy production process to consumers and accept their supervision.In 2014, in order to share supply chain information and data, Yili built and applied an information platform, organically connected the supply side and the client side, and practiced "Smart Logistics".

From the overall perspective of the industrial chain, Yili firmly chose to develop the "Smart Dairy Industry", vigorously promoted the intelligent and information technology of the dairy industry, was committed to the combination of the whole industrial chain and the Internet, and applied emerging

ISSN 2616-5902 Vol. 5, Issue 16: 126-132, DOI: 10.25236/AJBM.2023.051617

technologies to capture, mine and analyze relevant data, and then made practical corporate decisions. In 2015, Yili has implemented "Internet +" in all business areas such as ranch breeding, quality management, innovation and research and development, marketing, industrial tourism, and continued to promote the birth of new business formats.

Since 2008, Yili has taken the first step towards digitalization, transforming its process management and making the industrial chain more standardized and intelligent. In response to the external environment, Yili identified opportunities for digital growth and implemented changes to the industry chain, thus starting a period of exploration for digital transformation. During this period, Yili's dynamic capabilities were mainly digital acquisition and identification capabilities. Digital acquisition capabilities were subdivided into building intelligent management systems and developing smart manufacturing, while digital identification capabilities were subdivided into crisis response, change and renewal, and digital direction identification. This capability helps Yili to perceive the core factors of the crisis, apply intelligent management systems, lay the foundation for digital transformation, optimize the industrial chain and gain competitive advantage. As a result, Yili has increased its turnover by 290% in the ten years since then, making it the highest growing dairy company in the world during this period. The concepts related to digital transformation of enterprise industrial chain, dynamic capability and typical evidence cited are shown in Table 1.

Table 1: Dynamic Capability and State of the Whole Industry Chain in the Exploratory Phase of Yili's Digital Transformation

Concept	Sub-concepts	Evidence (typically cited)
Dynamic Capabilities-Digital Acquisition	Intelligent Management System Construction	From digital ear tags on each cow's ear, to GPS tracking of raw milk collection vehicles, to an integrated system and a nationwide ERP network system, Yili has achieved comprehensive and timely product information traceability
	Developing Smart Manufacturing and Smart Logistics	Real-time information generated by sensors, RFID tags, brakes, GPS and other devices and systems to create a future-proof supply chain with three key features: advanced, connected and intelligent
	Data Capture	In 2015, Yili's "Mother and Baby Ecosystem", covering more than 250 data sources, with an effective data level of more than 90% of the entire network, was captured and analyzed to achieve real-time response and collaboration between different segments.
Dynamic Capabilities-Digital Identification	Responding to the Crisis	The melamine scandal has caused consumers to distrust Chinese dairy companies, the Smart System allows consumers to access information on all aspects of dairy farming and farm management
	Change and Renewal	Baoding Starlight Ranch is one of Yili's many partner farms, with nearly 300 cows on the farm. With the grazing management system in place, 13 staff can be reduced to five
	Digital Orientation Recognition	Intelligent and digitalized industry chain for resource integration and insight into consumer trends
Digital Transformation	Exploration Period of Digital Transformation	Awareness of the importance of intelligence and digitalization, initial exploration, development and use of intelligent management systems, construction of digital visitor platforms, etc.
The Whole Industry Chain	Upstream: Fine Management	Staff can simply check the data to get a clear picture of the status of each cow
	Midstream : Automated Operations	The cows lined up to be mechanically milked, received a spray bath and then returned to their dormitories to feed and rest, largely unattended.
	Downstream: Open and Transparent	In 2008, Yili launched the first "Digital Visitor Platform" for the domestic food industry.
		In 2014, Yili introduced CRM, APS, TW, QR code, GPS, e-procurement platform, EOS electronic order and other advanced information technology tools to achieve efficient, flexible and transparent control throughout the process
	Smart Dairy	Yili has implemented "Internet+" in all business areas such as farming, quality management, innovation and R&D, marketing, industrial tourism, etc.

ISSN 2616-5902 Vol. 5, Issue 16: 126-132, DOI: 10.25236/AJBM.2023.051617

4.2. Accelerated Phase of Digital Transformation (2016-Present) : Digital Integration and Reconfiguration Capabilities

With the continuous advancement of the national innovation strategy and the continuous deepening of the digital lifestyle of consumers, Yili understands the importance of digitalization to drive "consumption upgrading" and achieve refined operation control. The Digital Centre aims to fundamentally transform the company into a future-proof "digital native organisation", with its function being to "lead and empower". In collaboration with other departments, it continued to improve the level of assessment, consultation, implementation of digital transformation and cultivation of digital talent. Yili also explored smart manufacturing, and its leading project on "Smart Manufacturing Standards Research" for the dairy industry was approved by the state in 2017, filling the gap in standards for smart factory construction in China's dairy industry. In 2022, Yili proposed the "' Digital N+ Yi 'ecological creation and sharing plan", combining the strength and wisdom of various parties to explore more ways of digital transformation of the dairy industry. In 2023, Yili held the "Ecological Network Construction Tour of Digital Transformation" to continue to help ecological construction.

In the upstream of the industrial chain, Yili creates a "Smart Ranch". It uses fully intelligent unmanned milking robots, feeding robots and pushing robots to optimize the unmanned workflow. Based on the ranch operation management system, combined with the Internet of Things technology, it monitors all aspects of the farm 24/7, without dead ends, and automatically adjusts the temperature, humidity and light levels of the cattle house. It grasps the milk production, feeding, exercise and health of the cows in real time, and accurately controls the whole life cycle of the cows.

In the midstream of the industry chain, Yili has built "Smart Factories". By improving the automation and efficiency of production lines and digitally empowering the entire chain, including design, procurement, production, logistics and sales, Yili has created the industry's famous "unmanned factories" and has implemented intelligent layouts in all of its factories nationwide.

In the downstream of the industry chain, focusing on consumer demand and experience, Yili has explored the innovative marketing model of "consumer operation" and built an end-to-end big data consumer intelligence insight platform. Covering more than 420 data sources, the effective data level reaches 95% of the volume of the entire network, while real-time attention to product feedback from different regions and different groups of people, through artificial intelligence to provide the basis for product iteration and innovation and service quality upgrade, to create more products and services to meet diversified and personalized needs. In addition, through the launch of the first dairy AI packaging, Yili Group creates a diversified "surprise experience" for consumers. In 2023, Yili creats the Metaverse Digital Twin Factory, applying digital twin technology to replicate the entire Yili liquid milk production line in a 1:1. Consumers can log on to the digital factory at any time to observe the details of the equipment in the factory line, understand the core process and visit the experience online. In the same year, Yili Yogurt launches new products alongside with Xiaobin company, the AI industry leader, creating a virtual cherry blossom world, tailoring consumers their own artificial intelligence digital human (AI Being) to enhance the empathy and connection between users and the brand.

From the perspective of the industry chain as a whole, through data sharing, standard unification and platform construction to break down digital silos, Yili has truly realized the digital intelligence of the entire industry chain from raw milk production to consumer terminals, and is actively exploring the organic integration of emerging technologies and marketing scenarios to promote the ecological construction of the dairy industry as a leader.

Since 2016, Yili has accelerated its digital transformation across the board, going through a process from partial to full industry chain. With the digitalisation wave on its doorstep, Yili is taking a pioneering stance to accelerate its digital transformation more leisurely. As a result, Yili has integrated data from upstream, midstream and downstream segments of the industry chain to optimize and improve its management system, starting a period of accelerated digital transformation. During this period, Yili's dynamic capabilities are mainly digital integration and reconfiguration capabilities. Digital integration capabilities subdivided into organizational renewal, consumer-focused operations and comprehensive layout of intelligence, while digital reconfiguration capabilities are broken down into leadership in building digital ecology and exploring digital marketing scenarios. These capabilities help Yili achieve the digital transformation of the entire industry chain, continuously optimize operational efficiency and build core competitiveness. According to the "Brand Footprint 2022" China market report released by Kantar Consumer Index, Yili topped the list of "Most Chosen Brands" with 92.4% brand penetration and nearly 1.3 billion consumer touches. The concepts related to digital transformation of enterprise industrial chain, dynamic capability and typical evidence cited are shown

ISSN 2616-5902 Vol. 5, Issue 16: 126-132, DOI: 10.25236/AJBM.2023.051617

in Table 2.

Table 2: Dynamic Capability and State of the Whole Industry Chain in the Accelerated Phase of Yili's Digital Transformation

Concept	Sub-concepts	Evidence (typically cited)
Dynamic Capabilities - Digital Integration Capabilities	Organizational Updates	In 2019, the Digital Centre was established to build a professional team that enhanced the level of technology, business and management.
	Focus on Consumer Operations	Build an end-to-end big data consumer intelligence insight platform to focus on diverse consumer needs
		First to launch the Metaverse Digital Twin Factory, offering consumers a tech-savvy "new digital experience".
	Intelligent and Comprehensive Layout	Introduction of MES, SCADA and other systems, combined with the Internet of Things, artificial intelligence and other technologies, to achieve sealed aseptic automated intelligent production of all links from production lines to sampling and inspection, and then to boxing, and a comprehensive layout
Dynamic Capabilities - Digital Reconfiguration Capabilities	Leading the Way in Building a Digital Ecosystem	Through the Digital N+I Eco-Creation Programme, partners are selected and sponsored to share digital achievements such as Digital Twin Factory and to promote the building of a digital ecosystem for the dairy industry.
	Explore the digital marketing scene	Creating an interactive field with Artificial Intelligence Content Generation (AIGC) and exploring new paths for AI in the digital marketing scene.
Digital Transformation	Accelerated Digital Transformation Period	Establishment of a separate digital department and a growing team of digital professionals to drive the creation of a digital ecosystem for the entire dairy industry
The Whole Industry Chain	Upstream: Smart Pastures	Robotic operations, 24/7 monitoring and real-time status adjustment of the pastures
	Midstream: Smart Factory	In 2020, the Jinhai factory was selected as one of the "2020 China Benchmark Smart Factories" with its outstanding level of intelligence and application of smart technology, becoming the only dairy factory on the list.
	Downstream: Consumer Operations	The effective data level of the consumer platform reached 95% of the voice of the whole network and successfully developed the Ambrosia Room Temperature Yogurt product
		Digital Twin Factory gives consumers a deeper sense of involvement and a newer experience.
	Full digital Transformation	In 2021, Yili released a 13 billion yuan pre-proposal to build a "5G+Industrial Internet Infant Formula Intelligent Manufacturing Demonstration Project" to build a digital system across all business segments and promote the digital transformation of the entire industrial chain

5. Conclusions

Through literature review and case study analysis, this study draws the following conclusions.

First of all, the dimensions of dynamic capability can be subdivided according to specific contexts, and the type of dynamic capability that a company should have varies according to the external environment in which it operates.

Secondly, companies should be clear about whether or not to undertake digital transformation and divide their digital transformation strategy tasks into different phases. Emphasis should be placed on cultivating the dynamic capability required at the different stages of digitalisation and driving the convergence of emerging technologies with the market to enable companies to better respond to the dynamic environment.

Finally, enterprises should actively explore the application scenarios of digital technology, join

ISSN 2616-5902 Vol. 5, Issue 16: 126-132, DOI: 10.25236/AJBM.2023.051617

forces with multiple parties to build a digital ecology, promote the high-quality development of their industries, and inject new momentum into China's economy.

References

[1] WARNER K S R, WAGER M. (2019). Building Dynamic Capabilities for Digital Transformation: An Ongoing Process of Strategic Renewal. Long Range Planning, (3), 326-349.
[2] Qi I.D., Xiao X. (2020). Enterprise Management Change in the Digital Economy Era. Management World, (6), 135-152+250.
[3] Wu Jiang, Chen Ting, Gong Yiwei, et al. (2021). Theoretical Framework and Research Perspectives on Digital Transformation of Enterprises. Journal of Management, (12), 1871-1880.
[4] Zhu Xiumei, Lin Xiaoyue. (2022). Digital Transformation of Enterprises: Research Pulse Combing and Integration Framework Construction. Research and Development Management, (04), 141-155.
[5] Teece D J, Pisan G. (1994) The Dynamic Capabilities of Firms: An Introduction. Industrial & Corporate Change, (3), 537 -556.
[6] Li B, Wang F B, Qin Y. (2013). How Do Dynamic Capabilities Affect Organizational Operating Routines? -- a Two-Case Comparative Study. Management World, (8), 136-153.
[7] Teece D I. (2014). The Foundations of Enterprise Performance: Dynamic and Ordinary Capabilities in An (Economic) Theory of Firms. Academy of Management Perspectives, (4), 328-352.
[8] He Xiaogang, Li Xinchun, Fang Haiying. (2006). Measurement and Efficacy of Dynamic Capabilities: An Empirical Study Based on Chinese Experience. Management World, (03), 94-103+113+171.
[9] Jiao Hao, Wei Jiang, Cui Yu. (2008). Analysis of Dynamic Capability Building Paths of Enterprises: Based on the Perspectives of Entrepreneurial Orientation and Organizational Learning. Management World, (04), 91-106.
[10] Xiao, Jing-Hua, Xie, Kang, Wu, Yao et al. (2014). Dynamic Capability Building for Firm-Consumer Co-Evolution: A Case Study of B2C E-Commerce Company Monbasa. Management World, (08), 134-151+179.
[11] Shao Yunfei, Jiang Rui, Yang Xuecheng. (2023). Going With the Flow: How Dynamic Capabilities Drive The Evolution of Corporate Innovation Strategies? --A Longitudinal Case Study Based on Siemens (China). Technology Economics, (03), 90-101.
[12] EISENHARDT K M, MARTIN J A. (2000). Dynamic Capabilities: What Are They? Strategic Management Journal, (21), 1105-1121.
[13] Dai Nan, Qian Cheng, Zhao Xuan et al. (2020). Analysis of the Transformation Process of Platform-Based Strategy of Manufacturing Enterprises-Based on Dynamic Capability Perspective. Management Modernization, (01), 29-31.