



Analysis of the Process, Difficulties and Challenges of Digital Transformation in China's Dairy Industry

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Abstract. With the global wave of digital transformation in recent years, the dairy industry, one of the most important traditional manufacturing industries in China, is also gradually carrying out digital transformation. In this process, most companies have faced problems and challenges in terms of lack of technological innovation, high costs, and consumers' lack of easy acceptance of new technologies. This paper analyzes the digital transformation of the Chinese dairy industry by collecting data from three stages: infrastructure, application expansion, and innovation drive. Based on the analysis, it can be known that the lack of technological innovation is due to limited digital solution applications and lack of new products and technologies, the high cost is mainly due to high talent training cost and equipment purchase cost, and the low consumer acceptance is due to the lack of easy access to new technologies. Then, based on the conclusions drawn from the analysis, corresponding recommendations are made regarding the above problems and challenges, such as strengthening cooperation has been companies and institutions and universities, supporting and encouraging innovation, and providing personalized services to consumers. In order to provide opinions and references for the digital transformation of the dairy industry.

Keywords: Dairy Industry, Digital Transformation, Technological Innovation

1 Introduction

Andrew McAfee and Erik Brynjolfsson of Massachusetts Institute of Technology(MIT) first introduced the concept of Digital transformation in their book *Winning in the Post-Digital Revolution Era* in 2014. And explored the profound impact of digital technology on the economy, industry, and society. Subsequently, Digital transformation has become a widely discussed and studied field, involving the strategies and practices of enterprises, organizations and governments in responding to digital technology changes.

In the 14th Five-Year Plan of the Communist Party of China, it has been repeatedly emphasized that the construction of digital infrastructure should be strengthened, the application and innovation of digital technology should be promoted, and talent cultivation and innovative enterprise support should be emphasized. This shows that

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the Chinese government is very supportive of enterprises' Digital transformation, so the scale of the domestic digital economy market is growing gradually. According to the Research Report on the Development of China's Digital Economy (2023) released by the China Institute of Information and Communications, it can be seen that in 2022, the scale of China's digital economy reached 50.2 trillion yuan, with a year-on-year nominal growth rate of 10.3%. It has been significantly higher than the nominal growth rate of Gross Domestic Product(GDP) for 11 consecutive years, and its proportion in GDP has increased to 41.5%.

However, the process of Digital transformation gradually carried out, it was not easy, and various organizations and enterprises encountered various problems and challenges. This paper intends to analyze the current situation of China's dairy industry, the process of Digital transformation, the challenges and difficulties encountered, etc. It is hoped that the analysis will provide specific suggestions to provide a reference for the Digital transformation of the domestic dairy industry.

2 Analysis of the Current Situation of China's Dairy Industry and the Process of Digital Transformation

China is one of the most populous countries in the world, so the huge population base provides a huge market demand for the dairy industry. According to statistics, the market size of China's dairy products industry reached Renminbi(RMB) 427 billion in 2019, and because of consumption upgrading and state support, the market size of the dairy products industry will still develop steadily in the future [1]. It is expected that by 2025, China's dairy products production will reach 41 million tons and the market size will reach RMB 810 billion, at which time China may become the world's dairy products China may become the largest potential market for global dairy consumption [2]. At the same time, with the development of the economy and the improvement of the income level of the residents, consumers' demand for high-quality and diversified dairy products is growing, and the market scale of fresh milk, yogurt, milk powder, cheese and other products are expanding, among which yogurt has become the dominant category in the domestic dairy industry. According to statistics, in 2018 China's yogurt market sales reached 31.22 billion yuan, with a year-on-year growth rate of 11.1%. It is expected that by 2024, yogurt sales may reach 45.27 billion yuan [3].

In addition, in recent years, the Chinese dairy industry is actively undergoing digital transformation and innovation, for example, by introducing advanced production equipment and technologies to improve production efficiency and product quality. The digital transformation of the domestic dairy industry so far can be roughly divided into three stages: infrastructure construction, application expansion, and innovation-driven. The three phases are 2010-2015, 2015-2020 and 2020 to the present. The measures taken and the results achieved by the dairy industry in each stage can be seen in Fig. 1

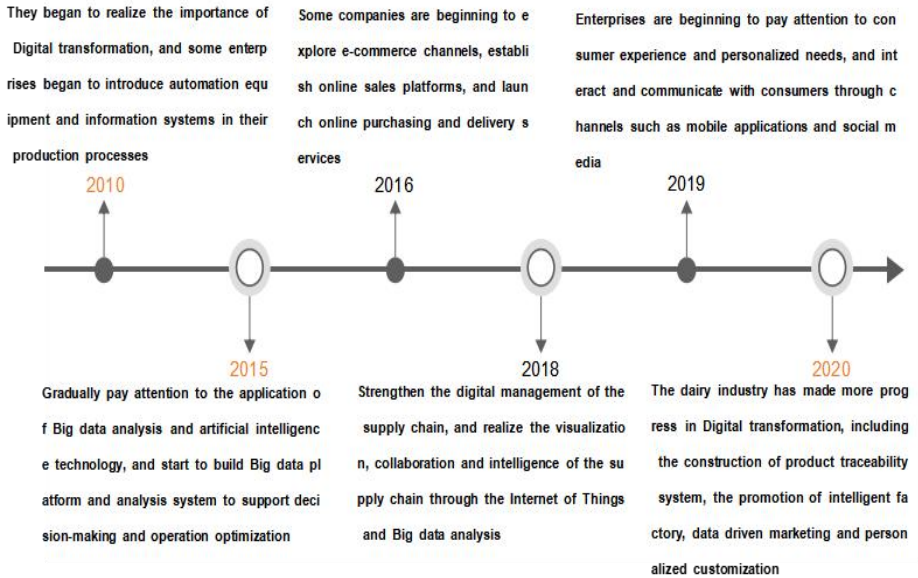


Fig. 1. Digital Transformation Process of China's Dairy Industry (Photo credit: Original)

Currently, dairy companies are paying more and more attention to data collection, management and analysis, for example, Yili Group launched the "Huntian Yi" system in 2018, through the establishment of a big data platform and analysis system, enterprises can monitor production data, sales data, consumer feedback, etc. in real time to support decision-making and optimize operations. Meanwhile, dairy companies are gradually introducing automated equipment and smart manufacturing technologies to improve production efficiency and product quality, for example, mechanical milking is now largely used on farms, and the coverage rate reached 99% as early as 2020 [4]. The introduction of Internet of Things(IoT) technology and smart devices enables real-time monitoring and management of the supply chain to improve logistics efficiency and reduce inventory and labor costs. In addition, various dairy companies have actively expanded their e-commerce channels, Mengniu reached an initial partnership with Jingdong in 2019 and formally became a strategic partner in 2020, and over the past three years, based on their deep mutual trust and cooperation, Jingdong Arrival has helped Mengniu's instant retail channel sales and business share continue to grow with high quality. In the first half of 2022, Mengniu's sales in Jingdong Arrival grew at a year-on-year rate of 30%. In the first half of 2022, Mengniu's sales in Jingdong Home grew by 30% year-on-year, ranking first in the dairy category for five months.

In the future, as digital technology becomes more widely used, dairy companies will have a broader space for development, but at the same time, they also encounter many challenges and problems in the process of digital transformation, which can be analyzed in Chapter 3.

3 Problems and Challenges in the Process of Digital Transformation of the Dairy Industry

3.1 Insufficient Technological Innovation Capability

Limited Application of Digital Solutions. At present, domestic dairy companies are relatively less likely to adopt advanced digital solutions. Many small and medium-sized dairy enterprises still rely on traditional production management systems and manual operations and do not use advanced Internet of Things, Big data analysis, artificial intelligence and other technologies to improve production efficiency and management level. According to statistics, in 2020, the core coverage rate of Enterprise Resource Planning(ERP) in China's dairy industry reached 90%, while the coverage rate of ERP with full functions was only 60%, indicating that most enterprises may still stay in the single business Digital transformation stage, that is, take local business and department information as the transformation object [4].

Lack of Launch of New Products and Technologies. In recent years, because of Corona Virus Disease 2019(COVID-19) in 2019, it has led to a substantial increase in national health awareness and therefore more attention to the balance and diversity of dairy products nutrition. However, due to the lack of core strength of product development and slow upgrading of most small and medium-sized dairy products enterprises. Therefore, it has caused the phenomenon of homogenization of domestic dairy products to be more serious [5]. At the same time if a few large dairy enterprises all occupy a large market share in the dairy products market, i.e., if the market share is highly concentrated. Due to fierce competition, in order to pursue cost efficiency and market share, these companies may tend to launch similar products, leading to the homogenization phenomenon. As shown in Fig. 2, two companies, Yili and Mengniu, account for nearly half of the market share, which illustrates the relatively serious homogenization of domestic dairy products and better illustrates the lack of technological and product innovation in the dairy industry.

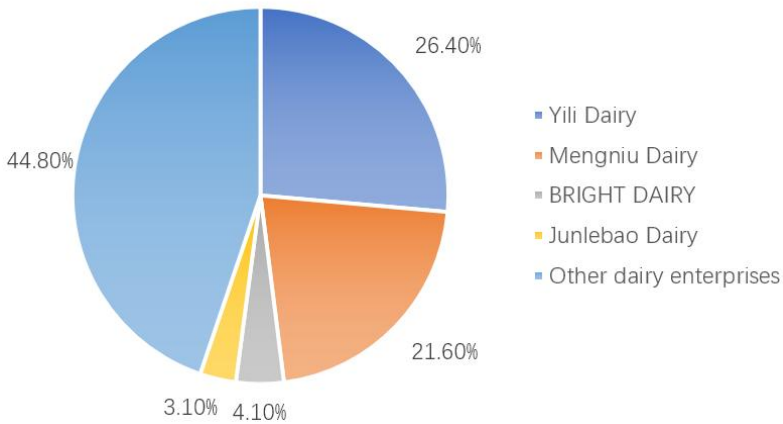


Fig. 2. Market share data of China's dairy industry in 2020 (Photo credit: Original)

3.2 Huge Economic Investment

Technological Innovation and Research and Development Costs. In the process of digital transformation, technological innovation and Research and Development (R&D) are very important. By introducing new digital technologies and tools, companies can improve production processes, increase productivity and optimize product quality, while increasing product diversity to meet consumer demand for personalized and diverse products. But in order to drive innovation and research and development in technology, it means investing a lot of money. According to statistics, Yili Group's R&D investment from 2015 to 2020 is shown in Fig. 3, which shows that Yili Group's R&D investment in the process of digital transformation is increasing year by year, indicating that companies need a lot of financial support for technological innovation and R&D.

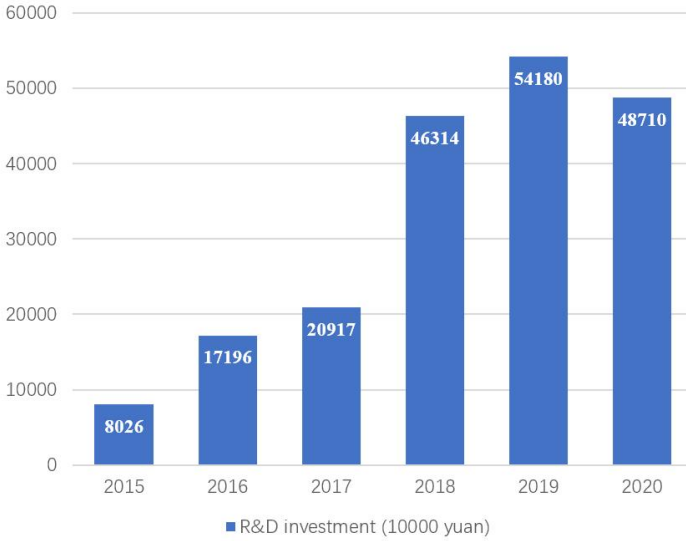


Fig. 3. Yili Group's R&D costs from 2015 to 2020 (Photo credit: Original)

Employee Development and Talent Employment Costs. Digital transformation often involves the application of new technologies and tools, as all as the possible introduction of new workflows and business processes, and therefore requires employees to have the appropriate skills and knowledge to cope with the new technologies and workflows. For this reason, Yili established a separate digital transformation department, the Digital Center, in 2019 and has invested heavily in training to support employees and suppliers to keep their knowledge systems and skills up to date [6,7]. In addition, Mengniu will continue to invest in its talent pipeline in 2019, setting up the "Blue Ocean Plan" and "Overmatch Plan" to bring in a number of marketing, R&D and new retail talents from outside to meet the needs of rapid business development [8]. According to statistics, Mengniu will spend RMB 8.66 billion on staffing in 2022, an increase of 15.4% compared to 2021 [9]. It can be seen that staff training and talent introduction also need to spend a lot of money.

3.3 Consumer Acceptance and Experience

This is because digital transformation means that consumers need to be familiar with and master certain digital technologies. However, the Internet penetration rate in China is shown in Figure 4. As can be seen from Fig. 4: China's Internet penetration rate is 75.6% as of 2022. This means that there is still a certain percentage of the population that has no access to or is not familiar with the Internet and digital technology. At the same time, these consumers may find digital products and services too complex and difficult to operate. This may leave them with the challenge of learning and adapting to new technologies, making them skeptical of digital solutions.

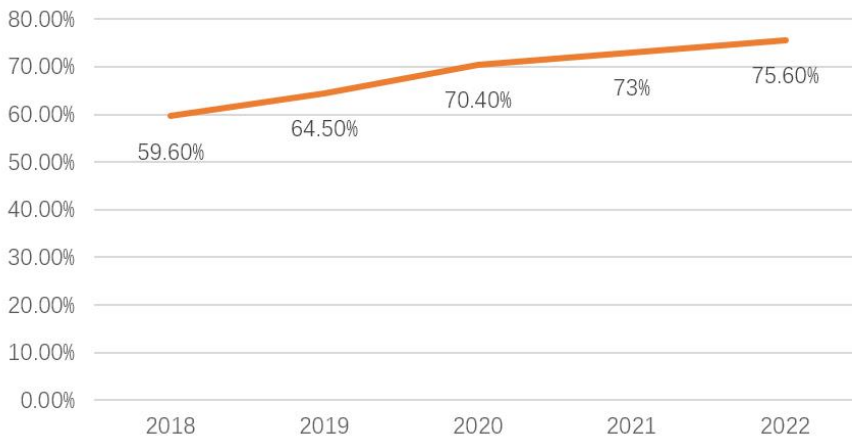


Fig. 4. Internet Penetration Rate Data in China from 2018 to 2022 (Photo credit: Original)

4 Suggestions

4.1 Encourage Research and Development and Strengthen Collaborative Innovation

In order to change this lack of technological innovation, dairy companies can establish an innovative corporate culture and encourage employees to be bold and innovative, which can be achieved through innovation competitions. In 2022, Yili launched the "Digital N + Y" eco-creation program and co-organized the "Digital Transformation Eco-Innovation Competition" with Microsoft Accelerator. By the registration deadline, more than 100 companies had registered for the competition. Some of them are China's leading digital intelligence platform and service providers, leading domestic industrial Internet technology companies, as ll as leading companies focusing on human-computer interaction, technology companies with meta-universe platforms, and industry newcomers, etc. [10]. Through this competition, Yili hopes to work with these outstanding companies on the combination of digital achievements and enterprises to promote digital transformation. The six final winning companies will also receive a total of no less than 1.2 million yuan in pilot project start-up funds from Yili Group, and the remaining finalists may become Yili digital transformation partners; Mengniu Corporation, in order to promote digital intelligence innovation in the dairy industry and drive digital reform in the industry, held the second "Niu Kesong Innovation Technology Competition". Participants not only have the opportunity to co-creation and reach business cooperation with Mengniu, but also have the chance to enter the Digital Intelligence Innovation Ecological Alliance initiated by Mengniu and dock to the industrial resources of the alliance's large enterprises. And the holding of these innovation knowledge competitions not only

encourages enterprises and participants to actively carry out technological innovation, but also promotes the process of digital transformation of the industry.

In addition, dairy companies can also establish partnerships with universities, research institutions and technology enterprises to share resources and knowledge and carry out joint R&D projects as a way to promote technological innovation. In recent years, Mengniu has cooperated with the China Nutrition Research Institute, the Dairy Research Institute, and universities such as Nankai University and China Agricultural University in order to improve its independent research and development capabilities [11]. Yili has also launched collaborative R&D projects with universities: since 2016. Yili has been working with Peking University to study the nutritional composition of dairy products [12]. To further strengthen dairy breeding and accelerate the development of new technologies, Yili has joined forces with China Agricultural University and the China Dairy Association to develop biological breeding technology for new strains of enriched dairy cows, relying on the basic data of 500,000 cows [13]. Cooperation and R&D with universities and research institutes have also led to an increase in the number of patents issued by Yili each year.

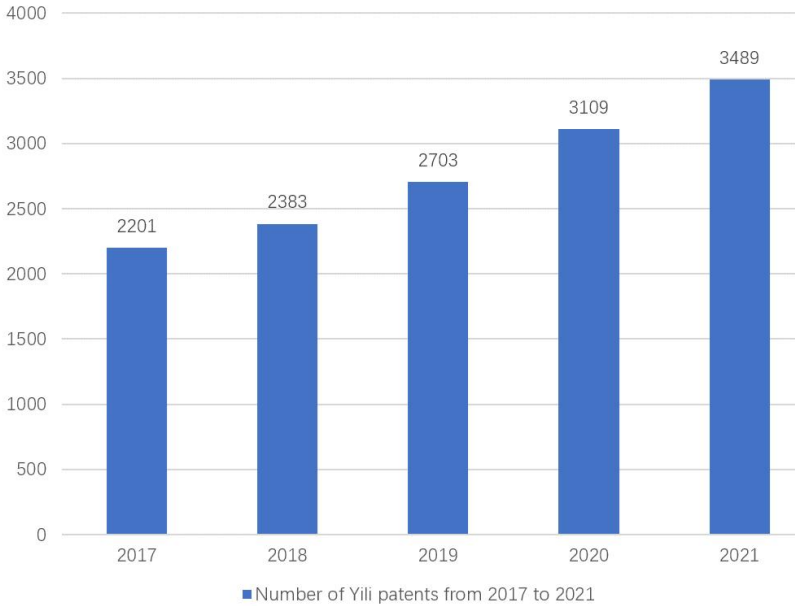


Fig. 5. Internet Penetration Rate Data in China from 2018 to 2022 (Photo credit: Original)

As shown in Fig. 5, the number of patents of Yili Group from 2017-2021 is increasing year by year. Therefore, cooperation between companies and research institutions and universities can effectively promote technology development and innovation, and because major institutions and universities have a large number of professionals and tools and equipment, they can effectively reduce the costs in terms of training talents and purchasing a large amount of specialized equipment.

4.2 Provide Personalized Digital Products and Services

Through data analysis and personalized recommendation algorithms, dairy companies can understand consumer preferences and needs, and provide customized products and services. In 2020, Mengniu launched the construction of the digital project of "dual middle platforms" for businesses and data centers [14]. Mengniu relies on the "double platform" to collect information, analyze consumers' consumption habits, and based on this, launch dairy products of different categories and functions to meet consumers' diverse and personalized needs [15]. For example, the "Youyi C" series is committed to emphasizing the benefits of vitamin C, suitable for consumers who need additional vitamin C supplementation; The "Yogurt" series focuses on moderate acidity and balanced taste, including different flavors and variants of Yogurt products, aiming to meet the pursuit of taste and yogurt benefits. Therefore, by providing personalized digital products and services, dairy companies can better meet the personalized needs and preferences of consumers, and improve the attractiveness and satisfaction of their products.

5 Conclusion

The study reveals that dairy companies generally face difficulties in digital transformation in terms of high costs, insufficient technological innovation and low consumer acceptance. An analysis of the digital transformation initiatives and the number of patents taken by Mengniu and Yili in recent years shows that holding technology innovation competitions and collaborating with universities and institutions can effectively promote innovation, while strengthening cooperation with institutions and universities can also reduce talent training and facility costs. Dairy companies can also rely on big data analysis to launch different types of dairy product lines to meet the individual needs of consumers by targeting different consumer habits.

This study analyzes some of the problems that dairy companies commonly encounter in the process of digital transformation and gives some corresponding recommendations. The study analyzes the measures taken by Yili and Mengniu, the two leading companies in the dairy industry in China, which have achieved rich results in the digital transformation process. Most of the dairy companies in China are still in the stage of partial business digitization, and I hope to provide some reference suggestions for these companies through this study.

Finally, there are some shortcomings in this study, as only the more general issues of cost, innovation and consumer experience are considered in the analysis of possible difficulties and challenges. Therefore, future studies can consider a more comprehensive and deeper analysis in order to provide more accurate and targeted reference information for the digital transformation of the domestic dairy industry.

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