



Exploration and Analysis of the Digital Transformation Path of Garment Manufacturing Enterprises-take Bosideng Co., Ltd

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Abstract. With the development of technologies such as cloud computing and big data, China is accelerating into the digital economy era, and the integration of the real economy and the digital economy is deepening. Enterprises are reshaping their production and operation models through digital means to improve efficiency and competitiveness. As a representative of China's apparel manufacturing industry, Bosideng started its digital transformation in 2014 and entered the accelerated integration stage in 2019, with significantly improved operational efficiency. Based on the case study and literature study, this paper takes Bosideng, a leading down jacket enterprise in China, as a case study to explore the transformation motivation of Bosideng, and combined with value creation theory, Bosideng's digital transformation path of the production chain, supply chain and service chain is disassembled, and financial indicators are used for analysis. It is found that Bosideng has enhanced its profitability, operational ability, solvency and development ability by enabling the production chain, supply chain and service chain through digital technology, and increasing the value of enterprises. As a leader in the industry, Bosideng's digital transformation practice has benchmarking significance, which provides an effective reference for the transformation and upgrading of peer enterprises and traditional manufacturing enterprises.

Keywords: Digital Economy, Digital Transformation, Bosideng.

1 Introduction

With the rapid development of the digital economy, China's economy is in a critical period of transformation and upgrading. Traditional industries are facing the realistic pressure of improving efficiency and reducing costs, consumer demand is increasingly diversified, and market competition is becoming increasingly fierce. In this context, digital transformation has become an inevitable choice for enterprises to enhance their core competitiveness.

Digital transformation is a high-level transformation based on digitalization and digitalization, which further touches on the company's core business and aims at building

a new business model. Digital transformation is to develop digital technology and support capabilities to create a new dynamic digital business model [1, 2]. Digital transformation refers to the systematic remodeling of business models, processes, structure and value creation mechanisms by enterprises and other subjects using digital technologies such as cloud computing and big data [3][4]. At the enterprise level, digital technology is used to transform production, operation, management, marketing and other links to promote the development of digitalization, networking and intellectualization [5].

Under the digital economy, the connotation of value creation theory has been extended, a value creation mechanism driven by data elements and oriented by customer demand has been formed, and a new value model has been constructed relying on platform ecology [6]. Through data driven resource allocation, precise demand matching and cross subject collaboration, the reconstruction of traditional value logic has become the core foundation of traditional industrial transformation and enterprise competitiveness [6].

Relevant studies show that digital transformation promotes TFP growth through four paths: enhancing innovation ability, optimizing human capital structure, promoting the integration of the two industries and reducing costs [7, 8]. Through digital transformation, enterprises directly affect the optimization of resource allocation, cost reduction and enhancement of innovation ability to improve enterprise performance, and indirectly affect supply chain integration to improve performance [8, 9, 10].

Bosideng, a leading enterprise in China's down jacket industry, was founded in 1976, headquartered in Shanghai, founded in 1992 and listed in Hong Kong in 2007 (Stock Code: hk03998). Its main business covers down jacket design, R&D, production and sales, and constructs a whole industry chain system from raw material procurement to marketing. Its products are sold in 72 countries, and it is one of the world's largest down jacket manufacturers.

Taking Bosideng as a research case, this paper systematically explores the implementation path and internal mechanism of digital transformation, aiming to provide a theoretical basis and methodological reference for the practice of enterprise transformation. Based on the latest financial data of Bosideng in the fiscal year 2024 (as of 2023) and the three chain coordination framework of "production chain-supply chain-service chain", this paper systematically disassembles the transformation path of Bosideng, and analyzes its transformation effect through financial indicators. This study helps to enrich the empirical research in the field of digital transformation and provides practical reference for manufacturing companies to build replicable and scalable transformation models.

2 Motivation Analysis of Bosideng's DigitalTransformation

Bosideng's digital transformation is mainly affected by three factors: national policy driven, economic situation change and intensified industry competition. The national "14th five year plan" for the development of the digital economy clearly proposes to "accelerate the digital transformation of manufacturing enterprises", and the digital

transformation and digital reform of various industries have become an important strategy for the current development. The party and the government attach great importance to the development of the digital economy, encourage enterprises to carry out digital transformation and transformation, and issue relevant preferential policies to support. Digital transformation has become the direction of all walks of life.

During the covid-19 epidemic, online consumption behavior accelerated, and this trend is still deepening; With the outbreak of consumer personalized demand, the traditional production model can no longer adapt to the current consumer demand; The garment industry has been facing a pain point of "high inventory and low net profit" for a long time, and transformation and upgrading has become inevitable.

Domestic competitors such as Anta and Li Ning have accelerated their digital layout, and international brands represented by Canadian Goose and Moncler have occupied the market through high-end positioning. Industry competition upgrades iteratively, Bosideng must upgrade and optimize to enhance its market competitiveness.

3 Path Analysis of Bosideng's Digital Transformation

3.1 Building an Intelligent and Efficient Production Chain

Digital Design. Bosideng takes "quality comes from design" as the concept, integrates digital quality management in the early stage of commodity design, and uses big data and AI technology to analyze commodity life cycles and customer portraits. Through 3D design, printing technology and product data system, combined with consumer data driven research and development, the full link closed-loop of "AI planning development 3D printing virtual delivery" is constructed to realize the seamless connection between human body data acquisition, virtual fitting and flexible production.

Intelligent Production. Bosideng has developed advanced production equipment such as intelligent cashmere filling systems, automatic packaging equipment and modular formwork devices. For example, GiMS Intelligent production management system, as shown in Figure 1, Through the deep integration of intelligent scheduling and a flexible manufacturing system, the order driven production mode is realized to effectively balance market demand and inventory dynamics.

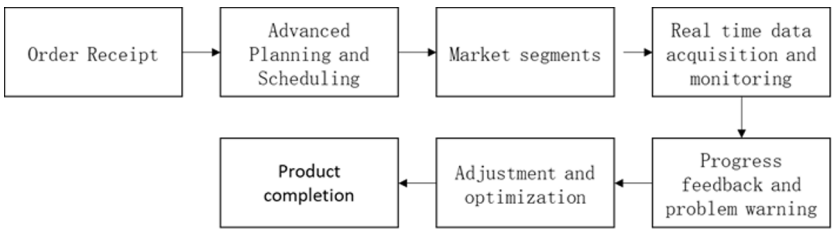


Fig. 1. GiMS Intelligent production management system (Picture credit: Original).

3.2 Promote Efficient Full Link Collaboration

Warehousing Intelligence. In 2014, Bosideng introduced the three warehouse information management systems of terminal POS, sub warehouse ERP and general warehouse WMS, which initially realized the real-time sharing of inventory data. In 2018, Bosideng integrated the national warehouses into one, and realized inventory cloud storage through virtualization and commodity informatization. In 2020, Bosideng independently developed three major systems, namely, industrial control WCs, logistics WMS and intelligent pull ISCM, to intelligently collect data and realize the automation of replenishment and transfer. In 2022, Bosideng adopted an ACR box robot system to efficiently sort order goods through an AI algorithm, and realized a threefold increase in storage per unit area of warehouse by virtue of mechanical advantages.

The transformation of warehousing wisdom has made Bosideng warehousing management turn to digitalization, intellectualization and integration, effectively reduced operating costs, and enhanced the flexibility and agility of the supply chain.

Logistics Intelligence. In 2016, Bosideng and Aliyun jointly built a "retail cloud platform" to integrate Omni channel inventory data and build an advanced intelligent distribution center in the garment industry; In 2020, retail warehouses will be cancelled, nine intelligent distribution centers and 12 dealer warehouses will be set up, and Jingdong Logistics and Shunfeng will be united to achieve "sales sinking"; In addition to human computer cooperation in the zero picking link, Changshu East China intelligent warehousing center has unmanned the whole process of warehousing, storage and delivery. In October of the same year, it acquired 100% equity in logistics companies, integrated resources to build its own smart central distribution center, and realized the full link data exchange from factory to store and express delivery.

Replenishment Intelligence. In 2016, Bosideng and Aliyun jointly built a "retail cloud platform" to integrate Omni channel inventory data to achieve connectivity; In 2018, AI driven demand forecasting was launched to analyze historical sales and weather data, so that the accuracy of demand forecasting reached 91%, and the backlog rate of unsalable inventory dropped from 15% to less than 5%. At the same time, Bosideng integrated the national warehouse into a central warehouse, established a "commercial bank" mechanism to achieve cloud inventory sharing, and helped retailers replenish on demand; In 2020, Bosideng independently developed ISCM, WMS and WCs systems to collect sales data and match recent inventory to achieve 100% automatic and efficient self replenishment. Bosideng relies on the data drive and technology empowerment to realize real-time sharing of inventory production data and improve prediction accuracy and response speed.

3.3 Strengthen Efficient User Service Chain

"Smart Store + Online Cloud Store" Global Retail. Since 2016, Bosideng has launched a pilot project of smart stores and promoted them nationwide in 2020: Deploy

intelligent hardware in stores, such as smart fitting mirrors, customer flow analysis systems, etc.; Simultaneously integrating over 200 systems including ERP, POS, CRM, etc., forming three shared service layers: user center, inventory center, and order center; And through scenario based experience design, it supports on-site customization and tracks production progress through the GiMS platform. The conversion rate for in store try on has increased from 15% to 35%, with a 20% increase in average order value. Bosideng integrates inventory data from eight major central warehouses, over 3000 stores, and e-commerce platforms across the country through retail cloud platforms and virtual inventory pool technology, and synchronizes them in real-time. By 2023, the omnichannel inventory sharing rate will reach 95%.

Creating a Premium Customer Experience. Bosideng upgrades consumption experience with technology in smart stores: Nanjing's first store built a minus 30 °C ice and snow scene for consumers to try on and perceive product performance on the spot; An intelligent body matching system is developed, and a three-dimensional model is generated by motion capture to realize virtual fitting, which solves the problem of size matching; A customization area is set up to support fabric version customization, and delivery is completed within 15 days relying on the GIMS platform.

In the online cloud store, the app side "my wardrobe" uses AR technology to realize virtual fitting and intelligent matching; Building a snow mountain flash store on the top of Altay Mountain, driving sales to increase by 66%; Set up sustainable zones, provide environmental science popularization and carbon footprint inquiry, and strengthen the awareness of green consumption. Through the deep integration of technological empowerment and scene innovation, the product function experience is upgraded to emotional value resonance, and an immersive consumption ecosystem with a seamless connection between online and offline has been built to create a high-quality experience atmosphere for consumers.

4 Effectiveness Analysis of Value Creation in Bosideng's Digital Transformation

4.1 Profitability

Bosideng adopts digital means to optimize supply chain management and reduce procurement and production costs; At the same time, through accurate marketing activity planning and online and offline integrated sales mode, the marketing efficiency is improved.

Table 1. Bosideng's Profitability index from 2018 to 2023.

profitability index	2018	2019	2020	2021	2022	2023
JROA (%)	6.65	7.41	9.41	10.25	10.13	13.16
Gross profit margin (%)	53.1	55.03	58.63	60.06	59.47	59.59
Operating profit margin (%)	13.43	13.13	16.58	16.48	17.18	19.56
Net profit margin on sales (%)	9.45	9.87	12.65	12.72	12.75	13.24

As can be seen from Table 1, from 2018 to 2023, Bosideng's financial data showed an upward trend, which shows that Bosideng's digital transformation has brought good benefits. Especially under the influence of the epidemic in 2020, The profit indicators do not decrease but increase, which strongly proves the correctness of Bosideng's transformation. From 2018 to 2023, the net interest rate of Bosideng's total assets increased from 6.65% to 13.16%, this shows the stability of its comprehensive profitability.

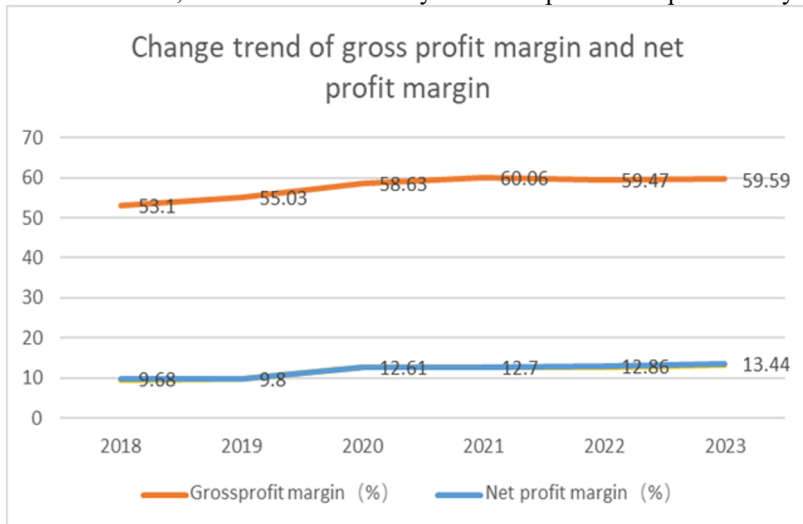


Fig. 2. Bosideng's Change trend of gross profit margin and net profit margin from 2018 to 2023 (Picture credit: Original).

As shown in Figure 2, Bosideng's gross profit margin and net profit margin showed a steady growth trend from 2018 to 2023, this shows that Bosideng's positive performance in profitability reflects the correctness of Bosideng's transformation strategic direction.

4.2 Operating Capacity

Bosideng has improved the turnover speed of inventory by building a flexible supply chain system to reduce inventory backlog and shortage. The digital customer relationship management and sales system tracks the recovery of accounts receivable in a timely manner, which strengthens the management of accounts receivable, reduces the occupation of funds, and improves the efficiency of the use of funds. Production,

sales and other links are efficiently coordinated to improve the efficiency of capital operations.

Table 2. Bosideng’s Operating capacity indicators from 2018 to 2023.

Operating capacity indicators	2018	2019	2020	2021	2022	2023
Accounts receivable turnover(second)	10.3	10.92	13.04	15.35	15.53	19.18
Inventory turnover(second)	2.88	2.35	2.08	2.43	2.53	3.19
Current asset turnover(second)	0.94	1.03	1.07	1.17	1.14	1.38
Total asset turnover(second)	0.7	0.75	0.74	0.81	0.79	0.99

There is a significant two-way driving relationship between Bosideng's operating capacity and digital transformation. As shown in Table 2, In recent years, Bosideng's inventory turnover rate has remained above 2 times, showing a growth trend. This shows that its inventory liquidity is better. This is deeply related to Bosideng's intelligent and efficient supply chain. The reconstruction of the digital supply chain has greatly improved the efficient turnover of inventory. Before Bosideng's transformation in 2014, the wholesale model led to the concentration of inventory risk and a low inventory turnover rate. After the transformation, through AI forecast demand and small order quick return to achieve "production based on sales", the inventory turnover rate in 2023 increased by about 30% compared with 2018. Bosideng's accounts receivable turnover rate increased from 10.3 times in 2018 to 19.18 times in 2023, and the turnover rate of accounts receivable shows a steady growth trend. It can be seen that Bosideng's collection speed is faster and its account age is shorter, which indirectly reflects the increasingly active positioning of enterprises in the industrial chain. The turnover rate of current assets and the turnover rate of total assets also maintained a good growth trend. The decline in the two indicators in 2020 was due to the impact of the epidemic and the decline in the utilization frequency of plant and fixed equipment.

4.3 Solvency

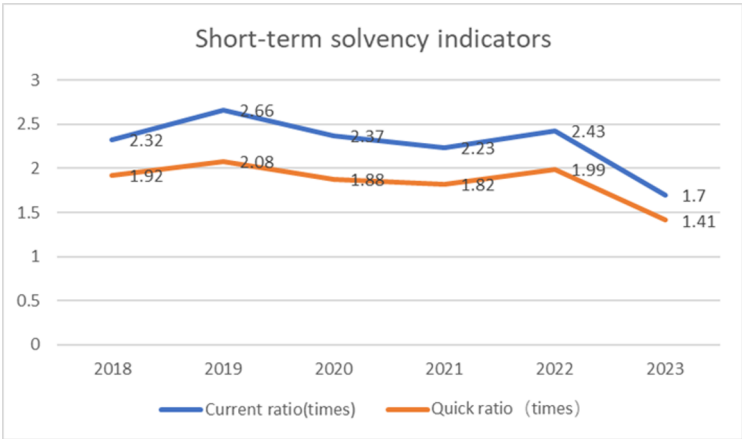


Fig. 3. Bosideng’s Short-term solvency indicators from 2018 to 2023(Picture credit: Original).

Bosideng's digital transformation improves the inventory turnover rate by optimizing the supply chain, reduces the occupation of liquidity by inventory backlog, and indirectly improves the current ratio and quick ratio. As shown in Figure 3, the changes in Bosideng's current ratio and quick ratio show a consistent trend. From 2020 to 2021, affected by the epidemic, enterprises closed some retail stores, resulting in a decline in the number of retail outlets. In addition, the reduction of human flow and the reduction of consumers' purchasing power has led to the decline of inventory circulation efficiency, resulting in a slight decline in the current ratio and quick ratio. In 2022, Bosideng continued to improve its digital management. Bosideng actively cooperates with Alibaba Cloud and Dingding to strengthen the application of digital technology. In addition, the epidemic has been controlled, society has gradually returned to normal operation, and the consumption capacity of consumers has been improved. Bosideng's inventory flow rate has been increased and its short-term solvency has been enhanced.

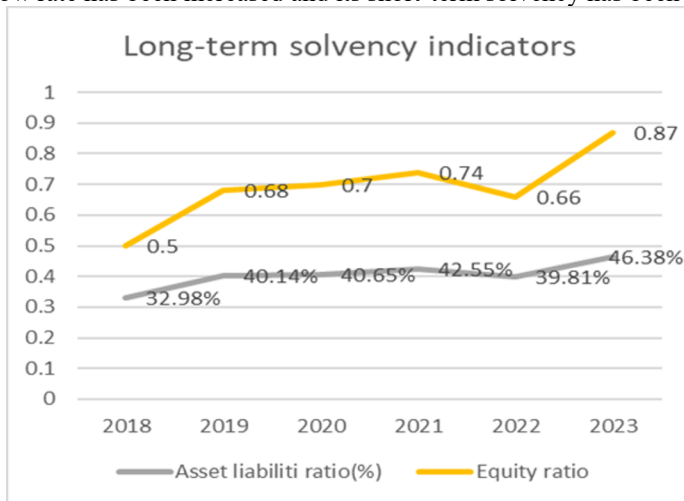


Fig. 4. Bosideng's Long-term solvency indicators from 2018 to 2023. (Picture credit: Original)

Digital transformation has improved Bosideng's operational efficiency, enhanced profitability and reduced its dependence on external debt funds. As shown in Figure 4, in 2019, Bosideng entered the third stage of digital transformation, and bank loans increased to raise funds for digital construction, so the property rights ratio and asset liability ratio fluctuated greatly. In 2023, the property rights ratio and asset liability ratio increased significantly, which was due to Bosideng's business expansion and increased financing demand. At the same time, some bondholders have converted convertible bonds issued by Bosideng into shares, which has increased the equity ratio.

4.4 Developmental Capacity

Digital transformation helps Bosideng better grasp market demand and trends. Through online and offline integration, personalized customization and other methods, the sales

channels are broadened, the market share is increased, and the steady growth of business income is realized. As can be seen from Table 3, there are fluctuations in many development capacity indicators of Bosideng. Especially in 2022, all indicators have declined significantly. This is mainly due to the significant adjustment of the enterprise sales structure in 2022. In the two core businesses, the gross profit margin of the Bosideng brand down jacket and OEM processing has increased to varying degrees. However, in contrast, the growth rate of OEM processing business revenue is higher than that of the brand down jacket sector, and its gross profit contribution is more significant. As the gross profit margin of the OEM processing business is lower than that of the brand down jacket, the rapid expansion of the business scale has a downward effect on the overall gross profit margin to a certain extent.

Table 3. Bosideng’s Developmental capacity indicators from 2018 to 2023.

Developmental capacity indicators	2018	2019	2020	2021	2022	2023
Net profit growth rate (%)	57.24	18.87	42.64	20.75	4.74	44.69
Gross profit margin growth rate (%)	33.85	21.68	18.12	22.88	2.45	38.67
Sales growth rate (%)	16.92	17.4	10.88	19.95	3.46	38.39

5 Conclusion

This paper selects Bosideng as a case study. This paper first introduces the motivation of Bosideng's digital transformation, and then explains the process of Bosideng's digital transformation from production chain, supply chain to service chain. Bosideng has used digital technology to promote the digital upgrading of enterprises, realized the intelligent automation of production, and created a perfect supply chain system and high-quality customer service chain. Thus, the production cost is reduced and the operation efficiency is improved. Finally, based on financial indicators, the article analyzes the value creation effect of Bosideng's digital transformation, and finds that the overall operation situation of Bosideng's digital transformation is better. Bosideng actively explores advanced technology and digital modes in the industry and plays a leading role. Its remarkable achievements and successful experience in digital transformation are worth learning and exploring in the industry.

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