Proceedings of the 2nd International Conference on Financial Technology and Business Analysis
DOI: 10.54254/2754-1169/101/20231656

Analysis of the Digital Transformation Route and Impact on Avary Holding (Shenzhen) Co.

Yixin Liu[1,a,*]

[1]*Faculty of Management, Shijiazhuang Tiedao University, Shijiazhuang 050000, China*
a. 2569777277@qq.com
**corresponding author*

Abstract: The digital transformation of the global economy is an inevitable trend, and Industry 4.0, based on digital transformation, has profound impacts on the global manufacturing sector. Although the manufacturing industry, as the mainstay of our country's real economy, boasts a vast scale, its infrastructure and transformation foundation are relatively weak. An effective data chain has not been fully established, facing numerous challenges in the digital transformation process. This paper selects Avary Holding (Shenzhen) Co., a leading company in the PCB manufacturing industry, as the research subject. We first outline the theoretical foundation of digital transformation, then provides a detailed introduction to the company, analyzing the motivations, pathways, and economic effects of its digital transformation. Based on this, several insights into the digital transformation of the manufacturing industry are proposed. The aim is to provide guidance for the digital transformation of manufacturing enterprises and supporting the enhancement of their competitiveness.

Keywords: Avary Holding (Shenzhen) Co., digital transformation, manufacturing industry, real economy

1. Introduction

The digital transformation of the global economy has become an irreversible trend. According to the "China Digital Economy Industry Development Report (2023)", the total volume of the digital economy in 2022 has exceeded 50 trillion yuan, accounting for 41.5% of GDP. This data clearly demonstrates the significant role of the digital economy in our country's economy. The manufacturing industry, as the pillar of our country's economy, plays a particularly crucial role in digital transformation. However, its pace in digital transformation is relatively lagging. Manufacturing enterprises currently are facing significant challenges like the construction of a complete data chain, the perfection of digital infrastructure, and the selection of transformation strategies. In the current global political and economic environment, especially considering the high inflation environment of major economies such as Europe and the United States, the importance of enterprise digital transformation is self-evident. Digitalization can not only improve the decision-making efficiency of enterprises but also help enterprises better cope with the uncertainty of the external environment. However, many Chinese enterprises are still in the initial stage of digital transformation, facing many challenges, such as insufficient understanding of digital transformation, lower digital awareness, and the possible occurrence of uneconomical behavior "automating for the sake of automation".

DOI: 10.54254/2754-1169/101/20231656

In recent years, academic research on digital transformation has become increasingly rich, covering a wide range of areas, from early explorations of the digital transformation of traditional manufacturing industries [1] to more mature theoretical research in recent years, such as analyzing the digital transformation paths of manufacturing enterprises from the perspective of dynamic capabilities [2], etc. The paper mainly explores digital transformation from three aspects: the driving forces of enterprise digital transformation, digital transformation paths, and the effects of digital transformation. The enterprises studied in this article are specifically manufacturing enterprises. There have been some existing works related to these topics. For the driving factors of enterprise digital transformation, many papers [3,4] have shown that there are many internal driving forces for enterprises to promote digital transformation, such as enhancing market competitiveness and reducing operating costs; external environmental factors cannot be ignored, as pointed out in [5], the perception of changes in the external environment, the stimulation of random events, etc., have become the main reasons driving enterprise transformation. For the paths of enterprise digital transformation, some papers [6] point out from a longitudinal time perspective that enterprise digital transformation has four development stages: empowerment, optimization, transformation, and reconstruction, while others [7] start from the perspective of triggering mechanisms, analyzing three digital transformation paths for enterprises: capability-based transformation path, dependency-based transformation path, and autonomous transformation path. This article, based on theoretical research and combined with actual cases, lands on what specific measures the enterprise has taken and divides them into three development stages. For the effect study of enterprise digital transformation, from a financial perspective, [8] points out that digital transformation improves financial performance by reducing the production costs of enterprises, and some literature [9] concludes from the perspective of capital allocation that digital transformation is conducive to improving the efficiency of enterprise capital allocation, and this result is more significant in enterprises with better digital economic development environment and higher asset specificity, technology-intensive enterprises. However, although these studies provide us with valuable theoretical knowledge, most of them describe and analyze from macro and theoretical perspectives. In practical applications, we need more in-depth research on the digital transformation of specific industries or enterprises.

Therefore, this article aims to conduct an in-depth analysis of the digital transformation case of Avary Holding (Shenzhen) Co., Limited, aiming to enrich research on digital transformation combined with actual enterprise cases, provide suggestions for the digital transformation of manufacturing enterprises, and offer practical references for enhancing enterprise competitiveness. The structure of the article is as follows: Firstly, we provide a brief introduction to the research background, significance, and related literature, laying the foundation for subsequent analysis. Subsequently, the theoretical basis of digital transformation is explored, offering a theoretical framework for empirical research. Following this, a detailed analysis of Avary Holding's motivations, pathways, and effects of digital transformation is conducted. Finally, based on the practical experience of Avary Holding, conclusions and recommendations are provided for the digital transformation of the manufacturing industry.

2. Company Profile

Since its establishment in 1999, Avary Holding (Shenzhen) Co., Limited has developed into one of the few large professional manufacturers globally capable of providing a full range of PCB product development, design, manufacturing, and sales services. The company possesses a rich and diverse PCB product line, with main products including FPC, SMA, etc. This enables Avary Holding to offer comprehensive PCB electronic interconnect products and services to various customers, thereby constructing a one-stop PCB product service platform. The company adheres to the mission of "Developing Technology to Benefit Mankind, Advancing Environmental Protection to Beautify the

DOI: 10.54254/2754-1169/101/20231656

Earth." Notably, according to statistics from Prismark, Avary Holding was rated as the world's largest PCB production enterprise for four consecutive years from 2017 to 2020.

3. Motivations for Digital Transformation

3.1. Internal Motivations

3.1.1. Enhancing Production Efficiency and Reducing Costs

Facing increasingly fierce competition in the PCB industry, enterprises have stricter requirements for cost control. Digital transformation enables enterprises to achieve lean manufacturing, optimize production processes, and reduce unnecessary waste, thereby improving production benefits and profitability.

3.1.2. Improving Product Quality and Achieving Personalized Production

Digital transformation helps in forming standardized operational processes, allowing companies to monitor every stage of production more strictly, ensuring the stability and consistency of product quality. Additionally, facing the diversified demand for PCBs in the market, companies need to quickly adjust production strategies to meet the personalized needs of various customers.

3.2. External Motivations

3.2.1. Global Economic Risks

The current global inflation risk brings significant "systemic risk" to various industries, increasing the uncertainty of enterprise operations. Avary Holding is well aware of the importance of business risk management and aims to improve decision-making efficiency and more accurately respond to various uncertainties through digital transformation.

3.2.2. Technological Advancements

Emerging technologies, such as the Internet of Things, Artificial Intelligence, and Big Data, bring unprecedented opportunities for the digital transformation of enterprises. Avary Holding actively utilizes these technologies to further enhance production efficiency and product quality.

4. The Path of Digital Transformation

4.1. Phase Ⅰ: Advancement of Industry 4.0 and Establishment of Smart Factories

4.1.1. Construction of IT-Based Management System

In early 2020, Avary Holding fully implemented the SAP system and further refined the capital forecasting system. Additionally, the company initiated industrial internet and digital management projects, establishing a comprehensive IT management system. This system not only ensures product traceability but also optimizes quality control.

4.1.2. Introduction of Big Data Analysis

To further enhance production efficiency, the company introduced the Engineering Data Analysis system. By establishing a large production database, the company can conduct comprehensive analysis of equipment data across the factory, achieving interconnectivity of production-related data.

DOI: 10.54254/2754-1169/101/20231656

This strategy strengthens the core control of Industry 4.0 smart manufacturing, aiming to improve product quality and optimize production processes.

4.1.3. Integration of Production Processes

Avary Holding successfully established the MES production management system and integrated it with automated handling and warehousing systems, achieving full automation of production processes. Through the adoption of EAD software, the company has fully digitized all equipment parameters, established information capture and management systems, and achieved integration of production parameters.

4.1.4. Digitalization of Internal Management

In 2018, Avary Holding established a matrix-style business management system to ensure efficient linkage of various processes. This system implemented refined management, ensuring close cooperation between departments. By 2019, the company further advanced the digitalization of HR management, establishing a shared human resources service center.

4.2. Phase Ⅱ: Comprehensive Implementation of Digital Transformation and Organizational Integration

Avary Holding fully launched its digital transformation in 2021. In this year, the company not only deepened its digital strategy in production but also underwent a comprehensive digital upgrade in management, establishing digital management transformation as the company's core development strategy.

To ensure the smooth progress of the transformation, the company's general manager personally led the establishment of a specialized digital transformation center. Meanwhile, to enhance cross-departmental collaboration and communication, the company established a digital transformation committee and a smart manufacturing committee. These measures ensured that digital transformation received ample attention and implementation from the top to the grassroots level. Besides smart manufacturing in production, the company also advanced digital transformation in key departments such as human resources, finance, and business, aiming to improve management efficiency, enhance decision-making precision, and build sustained competitiveness.

In terms of organizational structure, Avary Holding adopted a flat management model, established an organizational development department and several professional committees, and promoted the construction of a "streamlined organization" to enhance organizational vitality and responsiveness. At the management level, the company established a corporate war room and built a big data platform, achieving data integration and sharing across departments. Additionally, to improve system efficiency and synergy, the company integrated existing dispersed management systems and optimized the SAP system to better support management decisions. In human resource management, the company accelerated the pace of digital transformation, optimized workflows, and provided solid human data support for corporate decision-making.

4.3. Phase Ⅲ: Integration and Optimization of Digital Platforms

In 2022, Avary Holding deepened digital transformation, especially in four key areas: systems, data, processes, and talent. The company successfully integrated some outdated systems, optimized the ERP system, and introduced PLM, SCM, and HRM systems. To ensure the smooth progress of the transformation, the company also conducted data governance, organizational process reconstruction, and digital talent training.

DOI: 10.54254/2754-1169/101/20231656

In production and operation, the company promoted digital transformation, especially in data governance, enterprise data platform construction, smart factory construction, big data, and AI applications. These efforts aimed to improve the company's operational management efficiency, transparency, and precision. Additionally, in 2022, the company introduced the Amoeba operating model and the ESP+ESG management model, combined with digital strategies, to elevate the level of factory automation and achieve green operation and "carbon neutrality". At the same time, the company enhanced its intelligent production level, promoted product cycle standardization, strengthened data governance capabilities, and perfected the company's data governance system through the construction of a unified data management platform.

5. Analysis of the Effects of Digital Transformation

5.1. Improvement on Financial Performance

5.1.1. Enhancement in Production Efficiency and Profitability

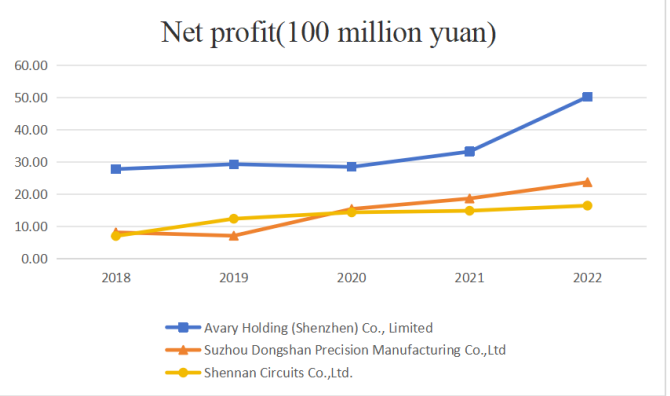

Figure 1: Net profit of three companies from 2018 to 2022

In the Printed Circuit Board (PCB) industry in China, Avary Holding, Suzhou Dongshan Precision Manufacturing Co., Ltd, and Shennan Circuits Co., Ltd. are leading enterprises. As Figure 1 shows, from 2018 to 2022, the net profits of the three companies all experienced growth, with Avary Holding showing the most significant increase, its net profit rising from 2.771 billion yuan to 5.012 billion yuan, with an average growth rate of 15.97%. This data highlights the pivotal role of digital transformation in enhancing production efficiency and profitability. Especially for Avary Holding, its profit growth significantly surpassed its industry peers, demonstrating the effectiveness of its digital transformation strategy.

DOI: 10.54254/2754-1169/101/20231656

5.1.2. Improvement in Operational Efficiency

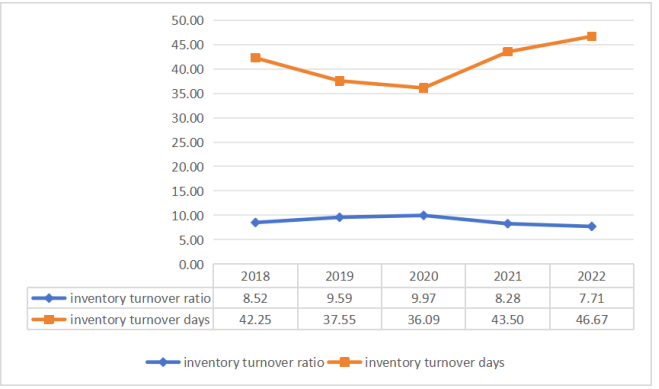

Figure 2: Inventory Turnover of Avary Holding from 2018 to 2022

As figure 2 shows, Avary Holding's inventory turnover rate continued to rise from 2018 to 2020 but started to decline annually from 2021, reaching 7.71 times in 2022. This reflects the inventory backlog issue faced by Avary Holding in its digital transformation. The balance sheet shows that its inventory increased significantly from 2021, with an increase of 36.13%, mainly for strategic stockpiling in response to Apple's spring new product releases, according to its quarterly data. From 2021, Avary Holding fully launched digital transformation projects involving data governance, smart factory construction, supply chain optimization, etc. However, due to the short implementation time of the project and recent changes in the macroeconomic environment, such as global inflation and the downturn in the consumer electronics industry, the results of its digital transformation have not yet been manifested, and the inventory turnover speed has slowed down accordingly. Nonetheless, digital transformation has still brought certain benefits to the company. By the first half of 2023, its accounts receivable turnover days were 77 days, and inventory turnover days were 59 days, both of which are relatively good performances in the industry. This indicates that through digital transformation and strengthened warehouse management, Avary Holding has improved its operational efficiency to a certain extent.

5.2. Improvement in Non-Financial Performance

5.2.1. Enhancement in Organizational Efficiency

In terms of organizational development, Avary Holding has optimized its organizational structure through digital transformation, implemented flat management, and improved efficiency. The company has built a learning organization, conducted training, and enhanced its soft power. Additionally, Avary Holding has also promoted talent echelon construction, implemented employee job rotation systems, continuously optimized the talent team structure, and accelerated the digitalization of human resources, providing data support for decision-making.

DOI: 10.54254/2754-1169/101/20231656

5.2.2. Strengthening of R&D and Innovation Capability

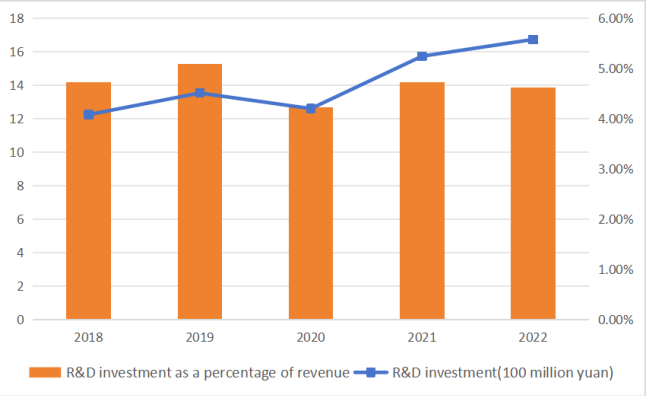

Figure 3: Changes in R&D Investment of Avary Holding from 2018 to 2022

According to Figure 3, we can observe the R&D investment of Avary Holding (Shenzhen) Co., Limited from 2018 to 2022. In 2018, the company's R&D investment was 1.223 billion yuan, accounting for 4.73% of the total operating income. By 2022, R&D investment had further increased to 1.672 billion yuan, but its proportion in operating income slightly declined to 4.62%. Overall, Avary Holding has consistently maintained a high level of investment in R&D, with its R&D investment to operating income ratio roughly stable around 4%. This demonstrates the company's high regard for technological innovation and R&D, continuously increasing funds for the development of new products and technologies, and introducing automated equipment to reduce production costs. Avary Holding has also established a big data analysis platform using digital technology and adopted AI technology to improve product quality and production efficiency, thereby comprehensively strengthening its R&D and innovation capabilities and ensuring its leading position in technology and products.

5.2.3. Enhancement in Risk Resistance Capability

Digital transformation has also enhanced Avary Holding's ability to resist risks. The company has strengthened supply chain management *and* established a business continuity system to cope with market risks. At the same time, it has improved decision-making efficiency and precision through digital upgrades, enhancing the company's ability to deal with uncertainties in the macroeconomic environment. These measures have enhanced the stability of Avary Holding's operations.

6. Conclusion

This paper analyzes the motives, paths, and effects of Avary Holding's digital transformation. From the three phases of the path, it can be seen that its transformation path is also a process of continuous exploration. Before fully starting digital transformation, the company had very foresightedly introduced new systems and actively stepped into Industry 4.0. By 2021, under the irresistible trend of the macro environment, the company began a comprehensive digital transformation. In 2022, the company carried out digital-related work from several aspects such as systems, data, processes, and talent, and further clarified the five aspects of digital infrastructure, process innovation, digital platforms, digital operations, and digital ecology in 2023. Through the analysis of the effects of Avary Holding's digital transformation, we can find that its effects are very obvious, helping the company maintain profit growth in a severe market and successfully improving the company's decision-making precision, risk response capability, and market competitiveness.

DOI: 10.54254/2754-1169/101/20231656

From the case analyzed in this article, it can be seen that manufacturing enterprises in China are actively keeping up with the global pace of digitalization, and digitalization also brings more opportunities to enterprises themselves. The digital transformation path of the company in this article provides a good reference for the transformation of manufacturing enterprises and also points out how enterprises can be more economical and effective in digitalization. In the future, it is still necessary to strengthen exploration in this area to promote the development of digital transformation in the manufacturing industry.

References

[1] *Chen Liping, Liu Liang. A Brief Analysis of Problems and Countermeasures in the Digital Transformation of Traditional Manufacturing Industries[J]. Modernization of Shopping Malls, 2018(23):183-184. DOI:10.14013/j.cnki.scxdh.2018.23.109.*

[2] *Mao Sufang, Yu Weixin, Niu Lanlan. Research on Opportunity Development Process in Digital Transformation of Traditional Manufacturing Enterprises from the Perspective of Dynamic Capabilities[J]. Technology Economy, 2023, 42(07):126-140.*

[3] *Tao Lin, Li Yan. Analysis and Suggestions on the Motives of Enterprise Digital Transformation[J]. Cooperative Economy & Science, 2022(04):124-125. DOI:10.13665/j.cnki.hzjjykj.2022.04.050.*

[4] *Yao Hui. Research on the Motives of Digital Transformation of Manufacturing Enterprises in Zhejiang[J]. Rural Economy and Technology, 2021, 32(20):166-168.*

[5] *Liu Xiangdong, Tang Peiqing. Practices and Experiences in the Digital Transformation Process of Physical Retailers—Based on the Case Analysis of Rainbow Department Store[J]. Journal of Beijing Technology and Business University (Social Sciences), 2018, 33(04):12-21.*

[6] *Li Jianfeng. The Essential Connotation and Practical Path of Enterprise Digital Transformation[J]. Forum on Petroleum Technology, 2020, 39(05):1-8.*

[7] *Zhang Miaomiao. Research on the Trigger Mechanism and Transformation Path of Manufacturing Enterprise Digitalization[D]. Hebei University of Technology, 2023. DOI:10.27105/d.cnki.ghbgu.2021.001159.*

[8] *Yin Xianan, Zhan Ximing, Tang Shaoqing. The Impact Mechanism of Manufacturing Enterprise Digital Transformation on Financial Performance[J]. China Circulation Economy, 2022, 36(07):96-106. DOI:10.14089/j.cnki.cn11-3664/f.2022.07.009.*

[9] *Guo Jitao, Wang Zijin. The Impact of Digital Transformation on Enterprise Capital Allocation Efficiency—Empirical Evidence from Listed Manufacturing Enterprises[J]. Journal of Nanjing University of Finance and Economics, 2023(03):67-76.*