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# Impact of Digital Transformation on Financial Performance of Pharmaceutical Enterprises: A Case Study of Harbin Pharmaceutical Group

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**Abstract.** In recent years, Chinese pharmaceutical enterprises have faced various pressures to reduce costs and increase efficiency from within and outside the company. Digital transformation has become a popular response for many companies, and the attention to the value of digital transformation has also increased. Harbin Pharmaceutical Group, as an industry representative, has used digital technology to improve its business level and operational performance through digital transformation under such circumstances. Its successful experience has certain reference significance for understanding the value of digital transformation in pharmaceutical enterprises. Research shows that Harbin Pharmaceutical Group has made efforts to complete digital platform integration, strengthen online and offline coordination, and carry out business innovation transformation in terms of driving, empowering, and supporting dimensions through the preparation stage before digital transformation, digital transformation exploration stage, and digital transformation upgrade stage. To verify the impact of digital transformation on the financial performance of the enterprise, this section analyzed the changes in financial indicators such as operational capability, profitability, and debt repayment ability of Harbin Pharmaceutical Group before and after transformation and in different transformation stages through longitudinal comparison. To control other factors that may affect the financial performance of the enterprise, this article takes another enterprise (Health Element Company), which is similar in size, business, and market but has not undergone digital transformation, as the control group. Through comparative analysis, the relationship between digital transformation and financial performance of the enterprise was further examined. The results showed that digital transformation improved the relevant indicators of operational capability, profitability, and debt repayment ability of Harbin Pharmaceutical Group and had a positive impact on the financial performance of the enterprise.

**Keywords.** Digital Transformation, Financial Performance, Comparative Analysis, Case Study.

## 1. Introduction

The pharmaceutical industry plays a significant role in China's economy and has a notable impact on the overall economic market. As the market expands, pharmaceutical

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companies in China face challenges such as high costs, low operational efficiency, and suboptimal financial performance. Starting from 2015, China's healthcare reform entered a critical stage with the introduction of policies such as the two-invoice system, consistency evaluation of generic drugs, and the "4+7" centralized procurement. Cost control and price reduction became the focus of healthcare reform, driving pharmaceutical enterprises to continuously improve efficiency and reduce costs. The impact of the COVID-19 pandemic has also changed traditional production and consumption patterns, highlighting the importance of digital tools in production and consumption. The combination of these factors has prompted pharmaceutical companies to explore digital transformation as a means to reduce costs, improve efficiency, and enhance financial performance.

As digital transformation progresses, more scholars are exploring the impact of digital transformation on the financial performance of companies. However, there is no consensus among scholars regarding their findings. Some scholars argue that digital transformation can lower costs and improve financial performance (Liu et al., 2022)[1]; Warren et al., 2022[2]). On the other hand, some scholars propose different perspectives. Yu et al. (2017) [3] argue that the learning costs associated with digital transformation may offset its advantages. Li and Jia (2018) [4] further discovered that the application of information technology alone does not directly impact firm performance; it requires synergy among different resources. Research by Qi and Cai (2020) [5] reveals that digital transformation in companies can generate significant derivative management costs, which can severely weaken its impact on driving firm performance.

The controversies in the research findings may stem from the fact that digital transformation is a complex process. Studies that focus on single resources and adopt a static perspective often overlook the influence of industry characteristics, firm-specific resources, and path dependence during the firm's development. Consequently, the research conclusions may be biased. Case studies offer certain advantages in addressing these issues.

Therefore, this study adopts an exploratory case study approach, taking Ha Pharmaceutical Group as a representative company in the pharmaceutical industry. The study aims to investigate the unique relationship between digital transformation and financial performance in the pharmaceutical industry from the perspectives of dynamic paths of digital transformation and comprehensive factors. The findings aim to provide insights and guidance for digital transformation in pharmaceutical industry enterprises.

## 2. Literature Review

### *2.1. Digital Transformation and Its Influencing Factors*

#### *2.1.1. Definition of Digital Transformation*

Digital transformation is the innovative process by which companies utilize digital technologies. It encompasses not only technological aspects but also strategic elements such as reshaping the company's vision, strategy, organizational structure, adapting processes, and cultural adjustments (Gurbaxani V, Dunkle D, 2019) [6].Zhang Qinglong (2020) [7] proposes that digital transformation refers to the use of modern technologies and communication means to redefine the way companies create value for customers, thus achieving comprehensive improvement in corporate value. Zeng Delin et al. (2021)

[8] point out that modern digital transformation is an infrastructure that utilizes digital information, goods, and platforms. It has profound impacts on individuals, organizations, industries, etc., and it can bring positive or negative outcomes to organizations depending on the specific circumstances. Digital industrialization and industrial digitalization together constitute the digital transformation of enterprises, and their combination can facilitate the transformation of traditional enterprises and promote industrial digitalization (Wang Chunying and Chen Hongmin, 2021) [9]. For organizations prior to digitalization, digital transformation is a business transformation driven by information systems. It involves structural and organizational transformation, the use of information technology, and the creation of product and service value, which can lead to entirely new business models (Chanias et al., 2019) [10].

In summary, the digital transformation studied in this paper refers to the process in which companies optimize, upgrade, and transform various aspects and departments of their business management using digital knowledge and digital technologies.

### *2.1.2. Factors affecting digital transformation of enterprises*

Researchers both domestically and internationally have found that factors driving the digital transformation of enterprises can be roughly divided into two categories: external and internal factors.

External factors include market demand, policies, technology, and economy. Lin Yan and Zhang Xinjing (2022) [11] believe that digital transformation can be divided into two stages: the incubation stage and the implementation stage. During the digital incubation stage, driven by three factors including market, innovation, and policy, government-driven force is an important driving force for enterprises to start digital transformation, and the innovation environment provides strong development opportunities for enterprises to carry out digital transformation. Shuili et al. (2021) [12] believe that among the many factors affecting digital transformation, the rapid changes in market demand are the most important external factor, followed by the continuous introduction of policies. Alba et al. (2022) [13] found through in-depth analysis and investigation of listed companies that two external factors mainly affect the digital transformation of enterprises. The fluctuation of the macro economy will increase the cost of digital transformation, while the lack of infrastructure will hinder the progress of digital transformation. Liu et al. (2022) [14] believe that the uncertainty of China's economic policy is an important external factor that reduces the driving force of enterprise digital transformation. Tong Yu (2022) [15]believes that new technology, high-end digital talent reserves, intelligent reserves of data elements, etc. are the most important factors driving enterprise digital transformation. Bai Fuping et al. (2022) [16] found that the transformation of management philosophy is also one of the driving forces for digital transformation. Taking customer demand as the core of business decision-making and applying digital technology and means to improve the customer's whole life cycle experience is one of the important goals of digital transformation.

Domestic and foreign scholars have also conducted research on the internal factors affecting the digital transformation of enterprises. Feng Yuan (2022) [17] believes that the pursuit of cost reduction and efficiency enhancement goals by various types of enterprises is the most important factor driving their digital transformation. The adoption of advanced digital technology can accelerate the operation of various departments and processes, effectively reduce time costs and trial-and-error costs, and improve the overall operation efficiency of enterprises. Chen et al. (2022) [18] found through interviews with

executives of multiple listed companies that high-end management personnel with innovative thinking and digital-related technologies can help promote the digital transformation of enterprises. Yang Chao et al. (2022) [19] conducted research from the organizational level and found that organizational resources, organizational structure, and organizational capability play important roles in promoting the digital transformation process. Jin Xing et al. (2022) [20] also found that organizational change and transformation are important internal reasons for promoting digital transformation. Li Wenxuan and Li Xiao (2022) [21] believe that in addition to the above factors, digital transformation will also be greatly influenced by personal factors such as the values, dynamic cognition, and digital leadership of management leaders.

### *2.2. Research on the Relationship between Digital Transformation and Corporate Financial Performance*

With the continuous deepening of digital transformation, more and more scholars have begun to explore the impact of digital transformation on corporate financial performance. Some scholars believe that digital transformation can reduce costs and improve a company's financial performance. Shi Lijuan et al. (2020) [22] believe that digital transformation can effectively reduce production costs, but the reduction of management costs may require a longer time. Liu Donghui et al. (2022) [23]conducted a study on listed companies in China's manufacturing industry from 2015 to 2020 and found that digital transformation is positively correlated with financial performance. Wan Xiangyu and He Tiantian (2022) [24] believe that digitizing manufacturing processes and business models can significantly improve a company's financial performance. Organizational structure and technology are moderating variables in the relationship between digital transformation and financial performance. Tian Gaoliang and Zhang Xiaotao (2022) [25] found through analysis of the performance of listed companies after digital transformation that digital transformation has a positive effect on the efficiency improvement of various departments of a company, and these effects are reflected through indicators such as net profit and economic value added. Pronchakov (2022) [26] found through a comparison of companies with different levels of digitalization that the higher the level of digital technology, the better the overall economic benefits of the company. Zhai et al. (2022) [27] found through research that information technology can greatly improve the work efficiency of financial personnel; digitalization of data can improve the refinement level of finance and the traceability of strategic goals; and artificial intelligence can improve the speed and degree of problem-solving, thereby improving the overall processing efficiency of a company's finance. Warren et al. (2022) [28] believe that digital transformation can significantly promote corporate development and improve a company's financial performance on the one hand, and on the other hand, digital transformation can effectively alleviate financing constraints and reduce business risks.

### *2.3. Summarize*

Through the literature review, it is also found that digital transformation is a highly personalized strategic choice, and different companies in different industries, with different conditions and competitive environments, have huge differences in the path and specific implementation effects of digital transformation.

In terms of research on the effects of digital transformation, scholars generally use empirical methods to verify the relationship between the influencing factors of digital transformation, transformation paths, and corporate performance. Some scholars have also attempted to use case study methods to conduct in-depth research on specific companies' digital transformation issues. However, there is still a lack of research on the financial performance of pharmaceutical companies' digital transformation based on case studies.

This article takes representative companies in the pharmaceutical industry as the research object, takes case studies as the main approach, and through the analysis of changes in financial performance before and after digital transformation and at different stages of digital transformation, tests the adaptability of the digital transformation value theory in pharmaceutical companies.

## 3. Research design

### *3.1. Research methods and selection of case enterprises*

This study adopts a case study method as the core research approach. The reasons for using the case study method are as follows: Firstly, this research falls under exploratory research, making the case study method more suitable for seeking answers. Secondly, conducting research on related issues using large-sample data can easily overlook the details of the relationship between digital transformation and financial performance of pharmaceutical companies due to endogeneity-caused reverse causality and omitted variables.

The research focuses on the case of Ha Pharmaceutical Group, covering the period from 2015 to 2022. There are several reasons for selecting this company: Firstly, Ha Pharmaceutical Group became the first successfully listed company in the pharmaceutical industry on the Shanghai Stock Exchange in 1993. The cost, efficiency, market, and competition issues faced by Ha Pharmaceutical Group are common challenges for companies in the pharmaceutical industry. Conclusions drawn from studying this company have a certain industry representativeness and provide valuable insights for the digital transformation of the industry. Secondly, the digital transformation process of this company from 2015 to 2022 is relatively clear and has a certain degree of representativeness.

### *3.2. Data sources and analysis ideas*

The case materials and data in this article come from Harbin Pharmaceutical Group's annual report, announcements published on its official website, analyst research reports, brokerage reports, and relevant financial and economic reports.

Based on the case enterprise data in the study and guided by the value creation theory of enterprise digital transformation, this article first sorts out the characteristics of Harbin Pharmaceutical Group's digital transformation in different stages, the key issues it solves, and the current financial performance, and then summarizes the impact of digital transformation on corporate financial performance through vertical comparative analysis and benchmarking analysis. On this basis, the problems existing in Harbin Pharmaceutical Group's digital transformation are summarized, and targeted suggestions are proposed.

## 4.Case Study

### *4.1. Introduction to Harbin Pharmaceutical Group*

Harbin Pharmaceutical Group was successfully listed on the Shanghai Stock Exchange in 1993 and became the first pharmaceutical industry listed company in China. It is a large enterprise group that integrates "pharmaceutical manufacturing + trade + scientific research." Currently, Harbin Pharmaceutical Group owns two successfully listed companies, Harbin Pharmaceutical Group Co., Ltd. and People's Tongtai, as well as 10 industrial enterprises including Harbin Pharmaceutical Sanjing and the General Factory, two commercial circulation enterprises including Harbin Pharmaceutical Marketing, and one new drug R&D technology center. The company's products cover seven major areas, including antibiotics, chemical drug formulations, health products, and animal vaccines. The company adopts pharmaceutical retail business model mainly based on direct chain stores.

### *4.2. Analysis of Harbin Pharmaceutical Group's Digital Transformation Motivation*

#### *4.2.1. High product costs and low production efficiency of the enterprise*

One of the pressing issues that Ha Pharmaceutical Group needs to address is the high product cost. The reasons for this are as follows: Firstly, as a leading company in the industry, Ha Pharmaceutical Group invests a significant amount of funds annually in the research and development of new drugs. The lengthy duration and high failure rate of drug development are important factors contributing to the company's high costs. Secondly, the pharmaceutical business involves numerous supply, production, and distribution processes, and the widespread problem of information asymmetry increases internal management costs and reduces management efficiency. Thirdly, the company has a large proportion of production personnel, resulting in high personnel costs. Since 2012, the number of production personnel in Ha Pharmaceutical Group has remained at around 10,000, accounting for over 50 percent of the total employees of the company, which brings about significant personnel costs. Lastly, the company has a complex organizational structure, and the coordination and cooperation among different departments pose challenges, resulting in low internal management and operational efficiency. Faced with these challenges, Ha Pharmaceutical Group urgently needs to reduce costs and increase efficiency through digital transformation in order to enhance its enterprise value.

#### *4.2.2. Inability to ensure the security and efficiency of data assets*

The business management process of Harbin Pharmaceutical Group involves the connection of information in various links of supply, production, and sales, covering various activities such as information collection, storage, analysis, and sharing. The deployed information systems include multiple systems such as finance, procurement, operation, marketing, and OA, in addition to more than 2,000 units accessing the company's information platform via the public network every day. This poses a huge challenge to the data security and efficiency of the company.

The group's finance, procurement, marketing, and other systems form separate systems, lacking coordination and unified management. There are information asymmetry, untimely information acquisition, and lagging information management

between the group headquarters and subsidiaries. The existence of these problems not only increases the difficulty of management but also reduces the efficiency of business management.

#### *4.2.3. The efficiency of warehousing and distribution operations needs to be improved*

As the scale of Harbin Pharmaceutical Group continues to expand and the business volume increases year by year, the daily warehousing and distribution pressure of the group continues to increase. However, the trend of scattered customer demand and fragmented orders has further increased the difficulty of the group's warehouse distribution operations.

The traditional document-making and distribution method used by Harbin Pharmaceutical Group in the past not only lacks more in-depth and systematic data processing and analysis capabilities, but also the difficulty of manual operation has become increasingly difficult with the surge in order quantity, resulting in a high error rate. Harbin Pharmaceutical Group subsequently adopted some warehouse information technology, but with the increase of inbound and outbound operations and the increase of the number of warehouses, the information technology in use cannot simultaneously support the unified management, slicing, and docking of complex business scenarios with multiple warehouses and multiple platforms, resulting in low order execution efficiency and accuracy. In addition, due to the lack of automatic collection and processing of data on all links in the whole process of warehouse operation process, the lack of real-time interaction of data, the lack of unified scheduling and supervision, resulting in the low efficiency of the transportation management system, causing the problem of untimely delivery, increasing the cost of performance, and also reducing the satisfaction of third-party shippers and customers.

#### *4.2.4. The group faces more severe challenges in new channel competition*

With the popularization of online medical care, competition in the pharmaceutical field has become more intense. With the gradual relaxation of national policies related to online diagnosis, online prescription and other businesses, the previous status of prescription drugs not being able to buy and sell online has been broken. Some online medical brands, such as Ali Health and JD Pharmacy, have gradually occupied the majority of the online pharmaceutical retail market share, posing a huge threat to traditional pharmaceutical retail methods. The rise of Meituan, JD Daojia, and Dingdang Kuaiyao has provided new ideas for the expansion of traditional offline pharmaceutical retail channels and further intensified the competition in the offline pharmaceutical retail industry.

Harbin Pharmaceutical Group urgently needs to change its traditional medical sales methods. Only by constantly changing can it seize new opportunities and improve its market share.

### *4.3. The digital transformation process of Harbin Pharmaceutical Group*

#### *4.3.1. Preparation stage before digital transformation (before 2015)*

Before 2015, several enterprises under Harbin Pharmaceutical Group began building their own information systems. In order to better complete the digital transformation

work at the group level, the top management of the group proposed four goals for digital construction at the strategic level.

First, resource integration. By greatly integrating infrastructure platforms and existing software platforms, data redundancy can be effectively reduced, data integration can be enhanced, the liquidity of digital assets can be accelerated, and the overall operational efficiency of the group can be improved.

Second, optimizing management mode. Taking advantage of the digital transformation opportunity, small accounting units were merged, and redundant functional departments and professional departments were merged or deleted to reduce operating costs and improve operational efficiency through flat management.

Third, achieving smooth flow of processes. Through BPM management of collaborative platforms, the existing processes of enterprises were improved and simplified, and customized services were opened up on the platform to build a "major issue work order processing program".

Fourth, achieving the goal of comprehensive intelligent management. Through the collaborative mobile platform, the group's entire staff, process, and level were made mobile, intelligent, and visible.

#### *4.3.2. Digital transformation exploration stage (2015-2019)*

During this stage, Harbin Pharmaceutical Group determined the overall plan for digital transformation: based on Huawei Cloud's overall architecture, hardware resource sharing was achieved. SAP and ERP systems were used to achieve overall control over procurement, production, marketing, finance, and personnel. The collaborative operation platform (COP) of Zhiyuan Interconnection was used to connect various business systems and achieve efficient collaborative connection of integrated group management. The achievements achieved in this stage include: （1） Upgrading the traditional production and sales model；（2）Establishment of financial shared services center；（3） Building a collaborative operation integration platform；（4） Building a full-range, full-domain data information connection system.

By 2019, Harbin Pharmaceutical Group 's digital management system had covered six core business applications, including financial sharing (SSF), procurement center (SRM), human resources (HR), production management (PP), master data (MM), and image systems. In order to connect these six systems to achieve real-time, comprehensive linkage of business and data, Harbin Pharmaceutical Group relied on the collaborative operation platform (COP) to achieve effective cooperation of "collaboration + business".

#### *4.3.3. Digital transformation upgrade stage (2020-present)*

In 2020, Harbin Pharmaceutical Group increased its investment in online products and services, mainly providing customized digital services to different users, further building online and offline collaborative capabilities, increasing new retail port construction, and further improving multi-channel operation modes.

In 2021, the group mainly carried out digital transformation including work platform integration, mobile digital dashboard, master data governance, business-finance integration, data platform infrastructure construction, store intelligence, and logistics intelligence.

In 2022, in order to improve the internal informationization level of the enterprise and promote the process of internal service, Harbin Pharmaceutical Group cooperated

with Wofeng Technology GaussMind to use its AI voice robot automatic service capability to achieve fault repair and demand application services, eliminating the need for cumbersome system login and information input, and achieving full automation processing through phone calls.

In the digital transformation upgrade stage, Harbin Pharmaceutical Group 's digital transformation focus shifted from digital facility construction to digital platform integration, strengthening digital online and offline collaborative capabilities, and then developing business innovation transformation from driving, empowering, and supporting three dimensions.

### *4.4. Financial Indicators Analysis of Different Stages of Digital Transformation of Harbin Pharmaceutical Group*

This section analyzes the changes in financial indicators such as operating ability, profitability, and solvency of Harbin Pharmaceutical Group before and after digital transformation and in different stages of digital transformation through vertical comparison.

#### *4.4.1. Operating Ability Analysis*

##### *4.4.1.1 Analysis of Inventory Liquidity*

From Figure 1, it can be seen that the inventory turnover rate of Harbin Pharmaceutical Group has continued to increase after digital transformation, and the turnover days have decreased from an average of 90 days before transformation to 74 days after transformation. From 2012 to 2014, the inventory of Harbin Pharmaceutical Group has always been around 3.2 billion, and it has been increasing every year. Since 2015, the inventory of the group has been maintained at around 2 billion. In summary, the liquidity of Harbin Pharmaceutical Group's inventory has improved after digital transformation, mainly due to the implementation of the following digital transformation measures:

(1) In 2016, the group introduced the WMS system (Warehouse Management System), which was officially launched. The processing cycle of the original shipment order of 10-15 days was compressed.

(2) Through system integration, the seamless docking of the SF system and Harbin Pharmaceutical Group's Transport Management System (TMS) was realized. The implementation of this digital transformation measure not only optimized the distribution efficiency by 40 percent, but also realized the visualization of goods in transit, greatly improving the efficiency of warehouse management.


| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|
| Inventory turnover | 4.29 | 3.89 | 3.59 | 4.27 | 5.23 | 5.12 | 4.61 | 4.85 | 4.34 | 4.98 |
| Days of inventory turnover | 83.96 | 92.53 | 100.26 | 84.22 | 68.86 | 70.32 | 78.15 | 74.27 | 82.91 | 72.35 |

**Figure 1.** Inventory turnover of Harbin Pharmaceutical Group from 2012 to 2021

*4.4.1.2 Analysis of Asset Liquidity*

From Figure 2, it can be seen that the total asset turnover rate and current asset turnover rate of Harbin Pharmaceutical Group showed a significant downward trend from 2012 to 2014, rebounded in 2015, and continued to decline. The reason may be that from 2015 to 2019, it was the exploration stage of Harbin Pharmaceutical Group's digital transformation. During this stage, the group invested a lot of funds in digital facility construction, and the investment in fixed assets was greater than the increase in operating income, resulting in a continuous decline in asset turnover rate. After 2019, Harbin Pharmaceutical Group entered the stage of digital transformation and upgrading, and the focus of work shifted from construction to coordination of departments and functional work, and the comprehensive digital capabilities were improved. The investment in fixed assets decreased, and the effect of improving business management efficiency brought by digital transformation was significant. Especially during the COVID-19 pandemic, the effect of the group's early digital transformation work was more significant.

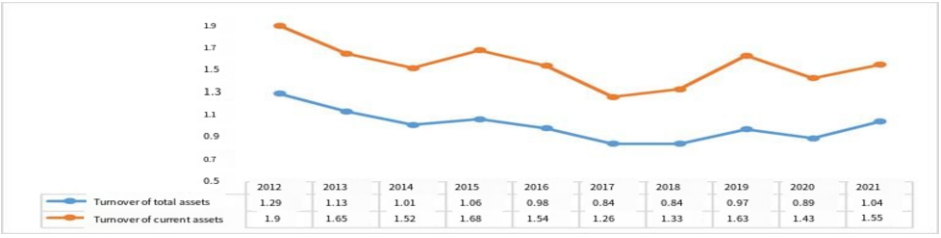



**Figure 2.** Asset turnover of Harbin Pharmaceutical Group from 2012 to 2021

*4.4.2. Profitability Analysis*

From Figure 3, it can be seen that the operating profit margin and net profit margin of Harbin Pharmaceutical Group have been in a continuous growth trend since 2013 except for the special period of the COVID-19 pandemic in 2020. The sales gross profit margin showed a slight downward trend from 2012 to 2014 and then a stable development trend since 2015. It is worth noting that the three indicators of operating profit margin, sales gross profit margin, and net profit margin showed a rapid growth trend in 2021.

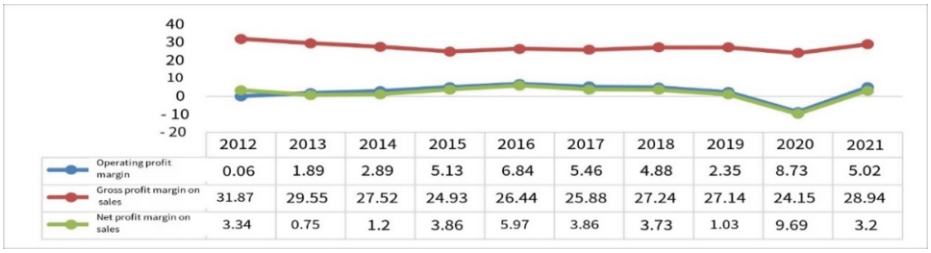



**Figure 3.** Changes in operating profit margin, gross profit margin, and net profit margin of Harbin Pharmaceutical Group from 2012 to 2021

The difference between the sales gross profit margin and the net profit margin is mainly caused by period expenses. From 2012 to 2014, the period expense ratio (financial expenses, sales expenses, and administrative expenses) of Harbin Pharmaceutical Group was relatively high, and it has been maintained at around 24 percent. With the implementation of a series of digital transformation measures such as building a financial

shared service center to improve financial management efficiency, and implementing the "collaboration + business" joint strategy to support data and information flow sharing between departments, the control of period expenses has had a positive effect. From 2015 to 2021, the period expense ratio (except in 2022) decreased and has been maintained at around 20 percent.

Digital transformation has played a positive role in reducing period expenses of Harbin Pharmaceutical Group, which is reflected in the influence on financial expenses, sales expenses, and administrative expenses.

Figure 4 shows the comparison of the number of financial accounting personnel, document processing days, and payment and settlement time before and after the operation of the financial shared service center. Digital transformation has significantly reduced personnel costs and improved financial processing efficiency.

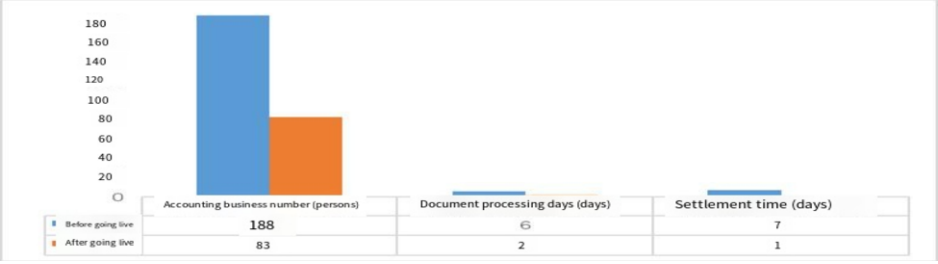
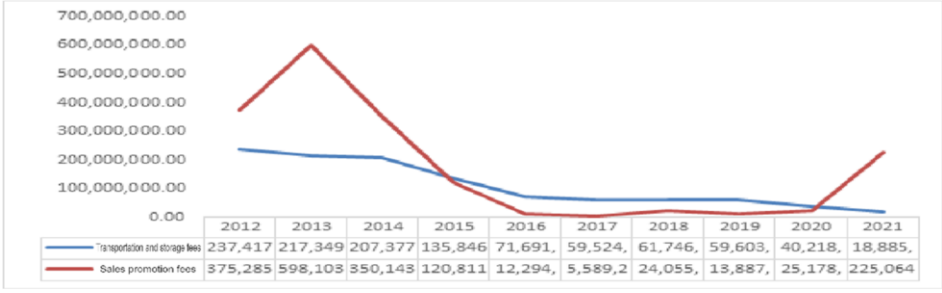



**Figure 4.** Comparison of data before and after the operation of the financial shared service center

Changes in transportation and warehousing fees and sales promotion expenses of Harbin Pharmaceutical Group from 2012 to 2021 are shown in Figure 5. Harbin Pharmaceutical Group has upgraded the traditional production and sales model with digital technology. By using SAP and ERP systems, the group has realized overall control over finance, supply, and personnel. Using the collaborative operation platform COP, it connects various business systems to achieve efficient collaborative connection of integrated group management. These digital transformation measures have comprehensively reduced sales expenses and administrative expenses while ensuring service quality. In 2020, facing the impact of the COVID-19 pandemic, physical pharmacies were hit unprecedentedly. Harbin Pharmaceutical Group actively developed new fields and channels, expanded online sales, which led to an increase in promotion expenses, and thus an increase in sales expenses.




| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|
| Transportation and storage fees | 237,417 | 217,349 | 207,377 | 135,846 | 71,691, | 59,524, | 61,746, | 59,603, | 40,218, | 18,885, |
| Sales promotion fees | 375,285 | 598,103 | 350,143 | 120,811 | 12,294, | 5,589,2 | 24,055, | 13,887, | 25,178, | 225,064 |

**Figure 5.** Changes in transportation and warehousing fees and sales promotion expenses of Harbin Pharmaceutical Group from 2012 to 2021

### 4.4.3. Solvency Analysis

From Figure 6, it can be seen that the current ratio and quick ratio of Harbin Pharmaceutical Group before and after digital transformation are within a relatively normal range, indicating that the company's ability to realize its assets is strong. However, the quick ratio has decreased significantly in the five years after digital transformation, indicating that the company has achieved initial results with a brand-new sales model, which shows that digital transformation can bring benefits to the company.

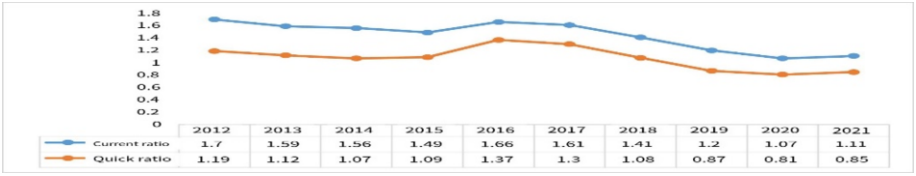



**Figure 6.** Changes in current ratio and quick ratio of Harbin Pharmaceutical Group from 2012 to 2021

### 4.5. Benchmark Analysis

In the process of researching the relationship between digital transformation of Harbin Pharmaceutical Group and its financial performance, in order to control other factors that may affect financial performance, this article selects another enterprise (Jiankangyuan Company) with similar scale, business, and market but has not undergone digital transformation as a control group. Through comparative analysis, the relationship between digital transformation and financial performance of the enterprise is further tested.

### 4.5.1. Introduction of Jiankangyuan Company

Jiankangyuan Company (hereinafter referred to as "Jiankangyuan") is a Sino-foreign joint venture established in 1992. In 2001, it was successfully listed on the Shanghai Stock Exchange. In 2003, the company was officially renamed "Jiankangyuan Pharmaceutical Group Co., Ltd." Currently, Jiankangyuan has developed into a comprehensive pharmaceutical manufacturing enterprise with business covering prescription drugs, health products, raw materials, and OTC in four major areas.

As shown in Table 1, both Jiankangyuan and Harbin Pharmaceutical Group are listed on the Shanghai Stock Exchange, mainly producing health products and vaccines, and have similarities in product production and market aspects with Harbin Pharmaceutical Group. With a registered capital of about 3 billion yuan, Jiankangyuan has a similar scale to Harbin Pharmaceutical Group. Therefore, considering the above factors, Jiankangyuan is suitable as a benchmark company for benchmark analysis.

**Table 1.** Comparison between the situation of HaPharma Group and HealthYuan

| | **Ha Pharmaceutical Group** | **Health Dollar** |
|---|---|---|
| Establishment time | 1991 | 1992 |
| Time to market | 1993 | 2001 |
| Product production | Antibiotics, chemical drug preparations, health products, vaccines, oral solutions | Prescription drugs, health care products, raw materials, oral liquid |
| Listing Location | SSE | SSE |

### *4.5.2. Comparison of Financial Performance between Two Companies*

#### *4.5.2.1. Analysis of Operational Capability*

Figure 7 shows that during the period of 2012-2021, the inventory turnover rate of Harbin Pharmaceutical Group has always been higher than that of Health Element, and the gap between the two has gradually increased during the exploration and upgrade of digital transformation of Harbin Pharmaceutical Group from 2015 to 2021. From 2012 to 2014, the gap between the two companies was not obvious, and Harbin Pharmaceutical Group had not yet introduced advanced WMS system, so the inventory turnover rate of the two companies remained at a relatively similar level. However, since 2015, Harbin Pharmaceutical Group has started digital transformation and upgraded traditional production and sales model, and with the use of advanced warehousing facilities and equipment, it can be found that the inventory turnover rate of Harbin Pharmaceutical Group can reach nearly twice that of Health Element in some years, and this trend has continued until now.

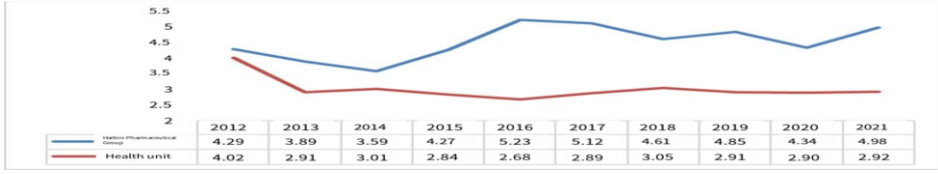
This shows that the use of digital technology can accelerate the inventory turnover of enterprises, effectively shorten the process from procurement to production and manufacturing to sales, and increase the number of profits; on the contrary, companies that do not use digital technology may have inventory backlog, product unsalable, and affect the profitability of the enterprise.


| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|
| Harbin Pharmaceutical Group | 1.19 | 1.12 | 1.07 | 1.09 | 1.37 | 1.3 | 1.08 | 0.87 | 0.81 | 0.85 |
| Health unit | 1.29 | 1.22 | 1.1 | 0.98 | 1.42 | 1.87 | 1.99 | 2.04 | 2.12 | 1.84 |

**Figure 7.** Comparison of Inventory Turnover Rate Changes between Harbin Pharmaceutical Group and Health Element in 2012-2021

#### *4.5.2.2.Analysis of Debt Repayment Capability*

Figure 8 shows that before 2016, Harbin Pharmaceutical Group and Health Element had roughly the same quick ratio, but with the further deepening of digital process of Harbin Pharmaceutical Group, the enterprise has adopted a brand new sales and operation model, which has reduced the quick ratio to around 1, while the quick ratio of Health Element has been on the rise in recent years, indicating that there is a large amount of cash or cash equivalents within the company, and the company has not effectively utilized all resources.




| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|
| Harbin Pharmaceutical Group | 4.29 | 3.89 | 3.59 | 4.27 | 5.23 | 5.12 | 4.61 | 4.85 | 4.34 | 4.98 |
| Health unit | 4.02 | 2.91 | 3.01 | 2.84 | 2.68 | 2.89 | 3.05 | 2.91 | 2.90 | 2.92 |

**Figure 8.** Comparison of Changes in Quick Ratio between Harbin Pharmaceutical Group and Health Element in 2012-2021

*4.5.2.3. Analysis of Profitability*

Figure 9 shows that during the period of 2012-2021, the period expense ratio of Harbin Pharmaceutical Group has always been lower than that of Health Element, especially after Harbin Pharmaceutical Group officially started digital transformation from 2015 to 2021, the period expense ratio, especially the sales expense ratio, has dropped significantly, while Health Element has always maintained its original operation mode without adopting digital technology, so the period expense ratio has been high.

In summary, the sales expense ratio accounts for the highest proportion of the period expense ratio of pharmaceutical companies, and the adoption of digital technology can effectively reduce costs and create greater value for the enterprise.


**Figure 9.** Comparison of Changes in Period Expense Ratio between Harbin Pharmaceutical Group and Health Element in 2012-2021

## 5. Conclusion and Enlightenment

### *5.1. Research Conclusion*

The research findings reveal that the digital transformation of Ha Pharmaceutical Group is the result of the combined effects of internal cost reduction and efficiency improvement, as well as external market competition. During different stages of digital transformation in Ha Pharmaceutical Group, the impact on the financial performance of the company exhibits different characteristics due to the differences in transformation goals.

In order to examine the impact of digital transformation on the financial performance of the company, this study used both vertical and horizontal comparison analysis methods. The research conclusions are as follows:

(1) Operational capability: The study mainly analyzed liquidity indicators related to inventory and asset turnover. The research shows that digital transformation has significantly improved the liquidity indicators of inventory, such as inventory levels, turnover days, and turnover rate, for Ha Pharmaceutical Group. It has also had a positive impact on the total asset turnover rate and current asset turnover rate.

(2) Profitability: After analyzing indicators reflecting profitability such as operating profit margin, gross profit margin, and net profit margin, it was found that digital transformation had a positive effect on reducing expenses during the period, specifically in terms of financial expenses, sales expenses, and management expenses.

(3) Solvency: Ha Pharmaceutical Group maintained a relatively normal range of current ratio and quick ratio before and after the transformation, indicating strong liquidity. However, the quick ratio noticeably decreased in the five years after digital transformation, indicating the initial results of adopting a new sales model, suggesting that digital transformation can bring benefits to the company.

### *5.2. Research Enlightenment*

(1) Digital transformation is an inevitable choice for the development of pharmaceutical companies. Chinese pharmaceutical companies are facing challenges such as weak independent innovation capabilities, high cost pressures, and weak market competitiveness. Digital transformation of pharmaceutical companies is imperative. Digital transformation uses digital technology as a means, involving digital strategic design, software and hardware digital updates and transformations, business process digital transformation, and organizational structure digital adjustment. It is a complex system engineering.
(2) The impact of digital transformation on the financial performance of enterprises presents different characteristics at different stages of digital transformation. In the early stage of digital transformation, enterprises need to invest a lot in digital-related software and hardware, coupled with the factor of cultivating digital talents, and the output efficiency of enterprise digital transformation has not yet fully demonstrated, and enterprise financial performance is often not satisfactory. With the deepening of digital transformation, the synergistic effect of digital transformation gradually emerges and is reflected in various financial indicators of enterprise financial performance.
(3) Different enterprises have different reasons for transformation, different conditions and preparations for transformation, and different ways and paths of digital transformation, so the specific performance of cost reduction and efficiency improvement may vary.
(4) Digital transformation needs support from the government. The success of digital transformation not only requires the efforts of enterprises themselves, but also requires support from the government in terms of encouraging policies and guarantee measures to help enterprises promote the process of digital transformation.

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