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Analysis of the Financial Performance of Zhenhua Heavy Industries' Digital Transformation

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Abstract: Digital transformation has become a key pathway for heavy equipment manufacturers to break through development bottlenecks, improve quality and efficiency, and reshape value. This paper takes Zhenhua Heavy Industries (ZPMC) as its research subject and, based on financial data from 2021 to 2025, systematically analyzes the value-creation effects of digital transformation on the company's financial performance across four dimensions: profitability, solvency, operating capability, and development capability. The study found that Zhenhua Heavy Industries' digital transformation significantly improved operational efficiency and profitability; return on equity rose from 3.02% in 2021 to 4.52% in 2025, the operating profit margin rose from 2.26% to 3.06%, the inventory turnover ratio increased from 1.06 times to 1.29 times, and operating revenue grew from 25.978 billion yuan to 36.260 billion yuan. In 2025, net profit attributable to shareholders reached 732 million yuan, a year-over-year increase of 37.17%. The study indicates that digital transformation has effectively boosted the company's financial performance through cost reduction, efficiency gains, process optimization, and improved resource allocation, providing a practical reference for the high-quality development of the heavy equipment manufacturing industry.

Keywords: Digital Transformation; Financial Performance; Value Creation; Heavy Equipment Manufacturing Industry

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1. Introduction

Currently, the global economy is accelerating its transition into the digital economy era, and the deep penetration of digital and intelligent technologies is driving a wave of industrial transformation in the manufacturing sector. As a pillar industry of the national economy, the heavy equipment manufacturing sector shoulders the critical mission of infrastructure development and the supply of high-end equipment; the quality of its development is directly linked to the nation's industrial competitiveness. Global market competition is becoming increasingly fierce, customer demand for personalized solutions is growing, and industrial chain coordination is becoming more and more complex. In the face of these changes, the traditional heavy equipment manufacturing model has begun to expose some problems : low production efficiency, low resource allocation efficiency, R & D and innovation cycle is too long, and service response is not timely and so on. To solve these problems, enterprises urgently need to achieve high-quality development through digital transformation. The empirical research of Tan Yafei et al. [1] provides evidence. Their research shows that digital transformation can simultaneously improve the total factor productivity and ESG performance of manufacturing enterprises, and enhance the high-quality development of manufacturing enterprises through innovation channels and efficiency channels.

Digital transformation is a core strategy for enterprises to seek survival and development in the digital era. The scope of digital transformation is far more than technology application, but also involves all-round changes in organization, process and culture. Vial [2] defined digital transformation as a combination of information, computing, communication and connectivity technologies. Enterprises use the next generation of digital technology to reshape their own way of creating value, reorganize business processes, and transform business models. In recent years, China has attached great importance to the digital transformation of manufacturing industry. The 'Made in China 2025' and the '14th Five-Year Plan' have provided continuous impetus for industrial upgrading.

Zhenhua Heavy Industry is a global leader in the manufacturing of port machinery and heavy equipment. Zhenhua Heavy Industries operates in more than 100 countries and regions around the world. In the industry, Zhenhua Heavy Industry has an important influence and status. Facing the new pattern of global industrial competition and development opportunities, Zhenhua Heavy Industry is actively promoting the digital transformation strategy and carrying out a series of industry-leading initiatives. This paper takes Zhenhua Heavy Industries as its subject of study and, based on financial data from 2021 to 2025, systematically analyzes the value creation effects of its digital transformation on financial performance, with the aim of providing theoretical support and practical insights for the digital transformation of similar enterprises.

2. Theoretical Foundation of Digital Transformation

Theoretical research on digital transformation has undergone a systematic evolution from a perspective focused on technology application to one centered on strategic transformation. Early research mainly focused on one thing : whether the adoption and application of information technology can improve the operational efficiency of enterprises. In the later period, digital technology developed rapidly, and industrial transformation was also deepening. Scholars have gradually realized that the core of digital transformation is not a single technical problem.Digital transformation is a systematic effort involving strategic reshaping, organizational change, process redesign, and cultural transformation. In terms of theoretical support, resource orchestration theory provides a key perspective for understanding the micro-mechanism of digital transformation. Sirmon et al. [3] proposed the theory of resource orchestration. They believe that enterprises can not only have resources, but also must participate in a series of dynamic management activities. Resource orchestration theory emphasizes the key role of resource management capabilities in digital transformation. This theoretical framework reveals the internal logic and evolutionary model of digital transformation. At the same time, This theoretical framework also provides a solid theoretical basis and analytical perspective for this paper to deeply analyze the practical path and performance results of Zhenhua Heavy Industry in digital transformation.

Digital transformation and enterprise management reform belong to the field of interdisciplinary research. In this field, scholars have revealed from multiple perspectives how digital transformation profoundly affects the basic mechanism of enterprise operations. Zhu Jigao et al. [4] based on the exploratory case study of the State Grid pointed out that the digital transformation promotes the innovation of corporate financial control through three stages. Liu Dunhu et al. [5] carried out empirical research based on the data of A-share listed manufacturing enterprises. Their research shows that digital transformation has a significant positive impact on the new quality productive forces of manufacturing enterprises. Digital transformation has an empowering role in transforming workers' technical level, labor objects and means of production. The above theoretical findings provide a rich theoretical basis and analytical framework for this paper to systematically evaluate the value creation results of Zhenhua Heavy Industry's digital transformation from the perspective of financial performance.

From the theoretical point of view of value creation, digital transformation will mainly affect the company's financial performance through three interrelated ways. The first way is to reduce costs and improve efficiency. The company introduces intelligent manufacturing systems, automation equipment and digital management tools to optimize production and operation processes, reduce labor costs and operating costs, and improve resource utilization efficiency. In this way, the company's cost structure and profitability are directly improved. The second way is to enhance the ability. The company builds data centers, deploys business intelligence systems, and establishes a digital decision support platform. In this way, the company Zhenhua Heavy Industry can gradually transition from experience-based decision-making to data-driven decision-making. Strategic decisions will become more scientific and rigorous, and business operations will be more accurate. In turn, the

overall management efficiency of the organization will also be improved. The third way is innovation-driven. Enterprises use the enabling effect of digital technology to develop intelligent products and services, explore platform-based business models, and expand digital value-added services. This will open up new sources of income and growth opportunities, and promote the strategic transition of enterprises from traditional manufacturing to intelligent manufacturing and service-oriented manufacturing. These three approaches support and collaborate with each other. They together constitute the theoretical mechanism of value creation in digital transformation. Based on this theoretical analysis framework, this paper will systematically review and evaluate the value creation results of Zhenhua Heavy Industry's digital transformation strategy from four classic financial performance dimensions. These four dimensions are profitability, solvency, operating capability and development capacity. The goal of this paper is to provide theoretical reference and practical insights for the digital transformation of heavy equipment manufacturing industry and wider manufacturing industry.

3. Overview of Zhenhua Heavy Industries and Its Digital Transformation Journey

3.1 Basic Information on Zhenhua Heavy Industries

Founded in 1992, Zhenhua Heavy Industry is headquartered in Shanghai. After more than 30 years of development, Zhenhua Heavy Industry has become the world's largest port machinery manufacturer, and is one of the leading enterprises in the field of heavy equipment manufacturing. Zhenhua Heavy Industry's core business covers many fields. In terms of port machinery, Zhenhua Heavy Industry is an important plate. For offshore engineering equipment, Zhenhua Heavy Industry also has a layout. In addition, there are large and heavy steel structures, electrical products and service solutions. Among them, port machinery products include core categories such as container cranes, bulk cargo handling machinery, and port automation systems. These products are among the world's top in terms of technological progress and market competitiveness. Zhenhua Heavy Industry's products are exported to more than 100 countries and regions around the world to provide services for major port operators and shipping companies around the world. Zhenhua Heavy Industry has ranked first globally in market share for many consecutive years, and is a benchmark enterprise with important industry representativeness and international influence. As of the end of 2025, the company's total assets reached 83.035 billion yuan, annual income was 36.26 billion yuan, and the number of employees exceeded 7,000. Zhenhua Heavy Industry has established a comprehensive industrial chain integrating R & D design, intelligent manufacturing, global marketing and after-sales service. As a pioneer and model of the digital transformation of heavy equipment manufacturing industry, Zhenhua Heavy Industry's transformation practice and performance provide valuable insights and benchmarks for other companies in the industry.

3.2 Journey of Digital Transformation

The digital transformation of Zhenhua Heavy Industry is a systematic and gradual process. Zhenhua Heavy Industry started from specific measures and then expanded to a wider range. On the whole, Zhenhua Heavy Industry has experienced three different stages of development. The first stage is from 2015 to 2018, which is the stage of IT infrastructure development. The core task of this stage is to consolidate the technical basis of digital transformation. Key achievements include several things. First, a comprehensive upgrade of the enterprise resource planning (ERP) system. Second, build a production management information platform. Thirdly, the office automation system is widely used. This stage realizes the digitization of business processes and allows basic data to be used online. Zhenhua Heavy Industry laid the IT foundation for the subsequent in-depth digital transformation. The second stage is from 2019 to 2021, which belongs to the stage of deepening digital application. The focus of this stage is to promote the deep integration of digital technology and core business operations. Zhenhua Heavy Industry has increased its investment in intelligent manufacturing. Zhenhua Heavy Industry Co., Ltd.deploys digital twin technology in key product lines to realize virtual debugging and remote operation and maintenance. Zhenhua Heavy Industry also promotes advanced digital collaboration and intelligent management within the supply chain. Therefore, digital capabilities accelerate the penetration from support functions to core business areas. The third stage is from 2022 to the present, marking the stage of comprehensive digital transformation. This stage is centered on the construction and operation of the industrial Internet platform.Zhenhua Heavy Industry has established an integrated digital system covering the entire process. In terms of R & D and design, Zhenhua Heavy Industry was included. In terms of production, operations and services, as well as supply chain management, they are also covered. This system realizes data connection and business

collaboration across departments, regions and industries. At this stage, the company has established a number of automated terminal demonstration areas, upgraded and modernized intelligent manufacturing plants, and created the first digital supply chain collaboration platform in the port machinery industry. The platform enables Zhenhua Heavy Industry to provide global customers with one-stop intelligent solutions from planning and design to operation and maintenance. Digital transformation has evolved from a tool for improving internal efficiency to a platform for creating external value.

4. Analysis of Zhenhua Heavy Industries' Financial Performance and Value Creation Mechanisms

This section draws on the financial data disclosed in Zhenhua Heavy Industry's annual report from 2021 to 2025. This paper uses financial ratio analysis to systematically examine the dynamic changes of the company's financial performance and the effectiveness of its value creation in the context of digital transformation. This article focuses on four classic dimensions : profitability, solvency, operational capabilities, and development capabilities. In the analysis of profitability, this paper selects five indicators. The five indicators are operating profit margin, net profit margin, gross profit margin, ROE and ROA. These indicators are used to comprehensively measure the company's value creation ability. In the solvency analysis, this paper selects five indicators. The debt-to-asset ratio, current ratio, quick ratio, interest coverage ratio and cash-to-current liability ratio are included. They are used to assess the company's financial security and debt repayment ability. For the analysis of operational capability, this paper selects four indicators. Accounts receivable turnover rate, inventory turnover rate, current asset turnover rate and total asset turnover rate are all within the scope of investigation. They are used to measure the operational efficiency and management level of the company's assets. For the analysis of development ability, this paper selects five indicators. Income growth rate, net profit growth rate, total asset growth rate, net asset growth rate and R & D investment growth rate are included in the analysis. They are used to assess a company's growth potential and sustainability. Through the systematic analysis of the above multi-dimensional index system, this paper comprehensively and objectively reveals the impact mechanism and actual effect of digital transformation on the financial performance of Zhenhua Heavy Industry.

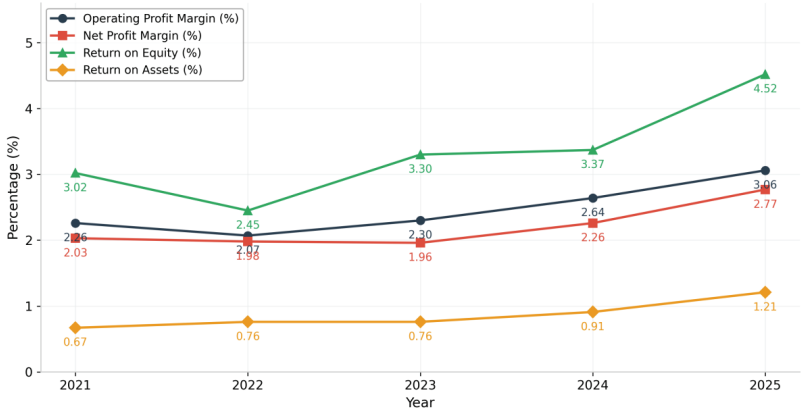
4.1 Profitability Analysis

Profitability is the core indicator to measure the company's ability to create value and the level of capital return. Profitability directly reflects the company's overall ability to create profits and realize value added in a highly competitive market. This paper selects five key indicators from multiple dimensions to construct a profit evaluation framework. These five indicators are operating profit margin, net profit margin, gross profit margin, return on equity (ROE) and return on assets (ROA). They each undertake different analytical tasks. In terms of operating profit margin, Zhenhua Heavy Industry reflects the profitability of the company's core business and its cost control capabilities. In terms of net profit margin, Zhenhua Heavy Industry measures the net profit generated by each yuan of sales revenue, reflecting the company's overall profit efficiency. In terms of gross margin, Zhenhua Heavy Industry reflects the added value of the company's products and its market pricing power. Return on equity (ROE) is the core indicator to evaluate the company's ability to create returns for shareholders. Return on Assets (ROA) measures the overall efficiency of a company's profit generation from its total assets. Through the systematic analysis of these five indicators, this paper can comprehensively evaluate the dynamic changes and structural characteristics of Zhenhua Heavy Industry's profitability in the context of digital transformation.

Table 1: Profitability Indicators of Zhenhua Heavy Industries (2021–2025)

Indicator / Year	2021	2022	2023	2024	2025
Operating Profit Margin (%)	2.26	2.07	2.30	2.64	3.06
Net Sales Profit Margin (%)	2.03	1.98	1.96	2.26	2.77
Gross Sales Profit Margin (%)	9.55	13.40	13.52	12.76	13.74
Return on Equity (%)	3.02	2.45	3.30	3.37	4.52
Return on Total Assets (%)	0.67	0.76	0.76	0.91	1.21

Figure 1: Trend of Zhenhua Heavy Industries' Profitability Indicators (2021–2025)



As shown in Table 1 and Figure 1, Zhenhua Heavy Industry's operating profit margin is generally on the rise, rising from 2.26 % in 2021 to 3.06 % in 2025, with an overall increase of 35.40 %. This shows that Zhenhua Heavy Industry has significantly improved the efficiency of cost control and income conversion during the digital transformation. The net profit margin of Zhenhua Heavy Industry also shows a steady growth trend, from 2.03 % in 2021 to 2.77 % in 2025. These changes reflect that digital transformation is conducive to Zhenhua Heavy Industry to improve its overall profitability.

It is worth noting that Zhenhua Heavy Industry's gross margin fell sharply to 9.55 % in 2021. The main reason for this change is the sharp rise in global raw material prices and the repeated outbreak of the new coronavirus pneumonia epidemic. However, by accelerating the digital transformation, Zhenhua Heavy Industry rebounded rapidly to 13.40 % in 2022, and the gross profit margin remained stable in the following years, and further increased to 13.74 % by 2025. The return on equity (ROE) has increased significantly from 3.02 % in 2021 to 4.52 % in 2025, while the return on total assets (ROTA) has increased from 0.67 % to 1.21 %, indicating that digital transformation has effectively improved the return on capital.

Figure 2: Trends in Operating Revenue, Operating Costs, and Net Profit Attributable to the Parent Company of Zhenhua Heavy Industries (2021–2025)

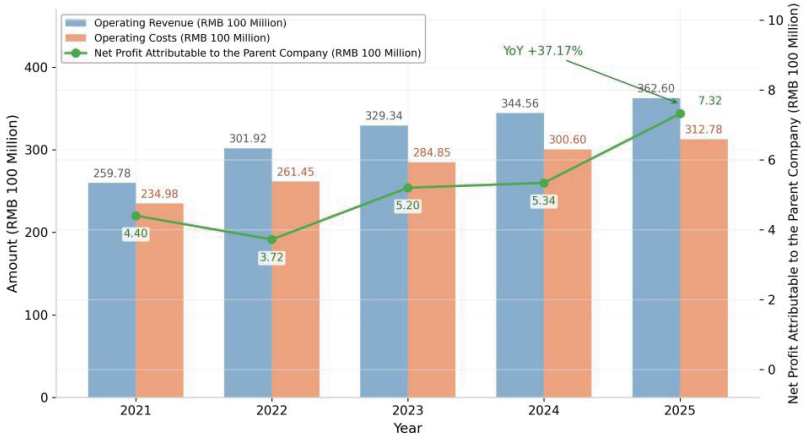


Figure 2 shows that Zhenhua Heavy Industry's revenue has continued to grow over the past five years, from 25.978 billion yuan in 2021 to 36.260 billion yuan in 2025. Net profit attributable to the parent company's shareholders rebounded rapidly after a brief decline in 2022, reaching 732 million yuan in 2025, an increase of 37.17 % year-on-year, so Zhenhua Heavy Industry achieved high-quality performance in the last year of the 14th Five-Year Plan.

Behind this systematic improvement in profitability, the basic mechanism lies in the dual reshaping of business costs and revenues by digital transformation. Look at the cost side first. The smart cash management system realizes the centralized allocation and efficient deployment of global funds. The digital upgrade of foreign exchange risk hedging tools has effectively reduced foreign exchange losses. As a result, financial expenditure fell by more than 50 % in five years. Digital office system and intelligent decision support system have been fully adopted. The digital office system and intelligent decision support system simplify the management level and improve the information flow and decision-making efficiency. As a result, the

management expense ratio decreased from 3.35 % in 2021 to 2.31 % in 2025. Look at the income side. Intensive R & D investment has spawned a number of innovative products. Taking the automatic terminal system as an example, Zhenhua Heavy Industry has led the industry's technical direction. Take the intelligent remote control platform, Zhenhua Heavy Industry is also in the forefront. Unmanned container crane is also one of them. The whole life cycle management platform of port equipment and the intelligent operation and maintenance service system promote the transformation of business model. The business model has shifted from equipment sales to a comprehensive 'product + service' solution. This effectively expands the scope of high value-added service-oriented business. In 2025, the 'ZPMC' brand was selected by the State-owned Assets Supervision and Administration Commission (SASAC) as one of the first batch of outstanding central enterprise brands. This further strengthens the market premium of its products. Cost reduction and value creation form a synergistic effect, laying the foundation for sustained profitability.

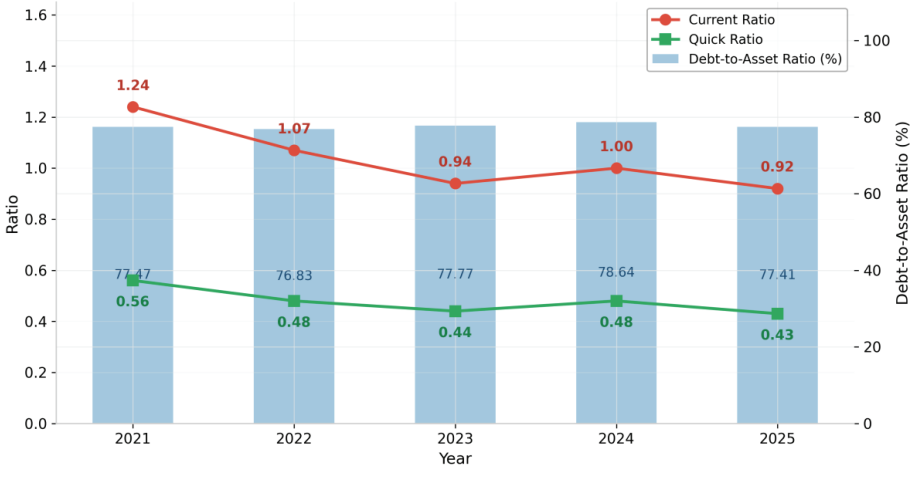
4.2 Solvency Analysis

Solvency is a core indicator for assessing the company's financial security and risk management capabilities. Zhenhua Heavy Industry reflects the company's overall ability to fulfill its principal and interest payment obligations when the debt matures. Zhenhua Heavy Industry is also a key guarantee for sustainable business operations. This paper selects five indicators to build a solvency assessment system. These five indicators are debt-to-asset ratio, current ratio, quick ratio, interest coverage ratio and cash-to-current liability ratio. They have their own uses. In terms of debt-to-asset ratio, Zhenhua Heavy Industry reflects the proportion of total assets financed by liabilities, and measures long-term debt repayment pressure and the rationality of capital structure. In terms of current ratio and quick ratio, they reflect the coverage of current assets to current liabilities respectively, and are important indicators for assessing short-term solvency. The interest coverage rate measures the degree to which the company's earnings before interest and taxes (EBIT) cover interest costs, reflecting the safety margin of the company's payment of debt interest. The ratio of cash to current liabilities directly reflects the ability of operating cash flow to pay current liabilities. Through the systematic analysis of these indicators, we can comprehensively evaluate the actual impact of digital transformation on Zhenhua Heavy Industry's capital structure optimization, debt risk control and financial security enhancement.

Table 2: Solvency Indicators of Zhenhua Heavy Industries (2021–2025)

Indicator / Year	2021	2022	2023	2024	2025
Debt-to-Asset Ratio (%)	77.47	76.83	77.77	78.64	77.41
Current Ratio	1.24	1.07	0.94	1.00	0.92
Quick Ratio	0.56	0.48	0.44	0.48	0.43
Interest Coverage Ratio	1.89	1.81	2.39	3.79	4.36
Cash-to-Current-Liabilities Ratio (%)	6.50	7.07	10.76	11.23	12.84

Figure 3: Trend in Zhenhua Heavy Industries' Solvency Indicators (2021–2025)



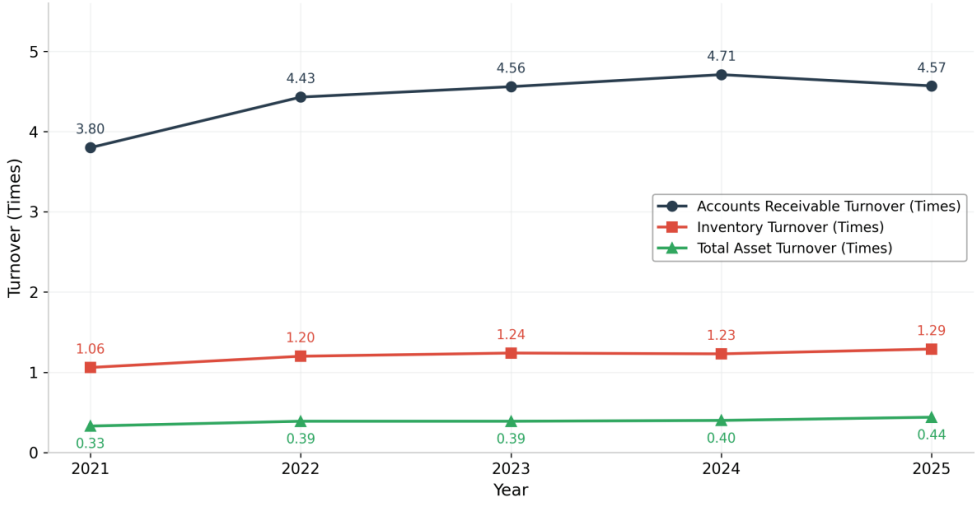
4.3 Operating Capability Analysis

Operational capability is a key indicator to measure the company's asset management efficiency and operational quality. Zhenhua Heavy Industry reflects the company's ability to convert various assets into sales revenue, and also reflects the overall level of resource allocation and process management. This paper selects four core indicators to build an operational capability evaluation system. These four indicators are accounts receivable turnover, inventory turnover, current asset turnover and total asset turnover. They have their own uses. Taking the turnover rate of accounts receivable and the number of days of unpaid sales, they reflect the rationality of the company's credit sales policy and the efficiency of accounts receivable collection management. In terms of inventory turnover and the number of days of inventory on hand, they measure the company's inventory management level and the degree of coordination between production and sales. The turnover rate of current assets reflects the overall operational efficiency and liquidity of the company's current assets. The total asset turnover rate comprehensively evaluates the management efficiency and utilization rate of the company's total assets. Through the systematic analysis of these four indicators, this paper can effectively reveal the driving role of digital transformation in optimizing business processes, improving asset utilization efficiency and accelerating capital turnover in Zhenhua Heavy Industry's operating capacity.

Table 3: Operating Capability Indicators of Zhenhua Heavy Industries (2021–2025)

Indicator / Year	2021	2022	2023	2024	2025
Accounts Receivable Turnover Ratio (times)	3.80	4.43	4.56	4.71	4.57
Inventory Turnover Ratio (times)	1.06	1.20	1.24	1.23	1.29
Current Asset Turnover Ratio (times)	0.64	0.78	0.72	0.73	0.81
Total Asset Turnover Ratio (times)	0.33	0.39	0.39	0.40	0.44
Days Sales Outstanding (days)	95	81	79	76	79
Inventory Turnover Days (days)	340	300	289	292	279

Figure 4: Trends in Operational Capability Indicators of Zhenhua Heavy Industries (2021–2025)



As shown in Table 3 and Figure 4, Zhenhua Heavy Industry's accounts receivable turnover rate has generally remained at a high level of 3.80-4.71 times, while the days sales outstanding has dropped from 95 days in 2021 to 79 days in 2025. This shows that Zhenhua Heavy Industry has effectively improved customer credit management and collection efficiency through its digital marketing system and intelligent risk control platform. In 2025, due to the payment cycle of certain overseas projects, the accounts receivable turnover rate decreased slightly to 4.57 times.

The inventory turnover rate of Zhenhua Heavy Industry has steadily increased from 1.06 times in 2021 to 1.29 times in 2025,

while the number of inventory turnover days has dropped from 340 days to 279 days. These changes reflect the best level in the past five years. The continuous optimization of Zhenhua Heavy Industry's digital supply chain platform and intelligent production scheduling system has significantly improved inventory management efficiency. The total asset turnover rate also increased from 0.33 times in 2021 to 0.44 times in 2025, and the continuous improvement of asset utilization efficiency directly promoted the growth of enterprise value.

The continuous improvement of operational efficiency is rooted in the intelligent restructuring of production and operation systems driven by digital transformation. Through the intelligent factory and automatic production line, Zhenhua Heavy Industry has realized the comprehensive digital control and management of the production process. Taking digital twin technology as an example, Zhenhua Heavy Industry transfers product design verification and process optimization to virtual environment, shortens the R & D cycle by more than 30 %, and significantly reduces the trial and error cost related to physical prototype. Based on big data analysis and artificial intelligence algorithm, the intelligent production scheduling system realizes the dynamic and optimal allocation of production resources, and improves the utilization rate of equipment to more than 90 %. The digital supply chain platform covers the entire life cycle management. In terms of supplier entry evaluation and performance evaluation, they are included. Risk warning is also within the scope of management. The visibility of e-procurement and supply chain not only reduces the risk of human intervention and fraud, but also greatly enhances the resilience of the supply chain and the smooth integration of production and sales. In terms of asset operation, the intelligent risk control platform uses machine learning algorithms to achieve customer credit evaluation, contract compliance monitoring, and end-to-end management of accounts receivable alerts. By providing real-time monitoring and dynamic rating of global customer reputation, Zhenhua Heavy Industry ensures the timeliness and security of sales receivable collection. Therefore, digital transformation has penetrated into the core aspects of operation management, forming a data-driven lean production model, which provides institutional guarantee for systematically improving asset utilization efficiency.

4.4 Development Capability Analysis

Development capability is a key dimension for measuring a company's growth potential and prospects for sustainable development; it reflects the company's comprehensive ability to achieve scale expansion, improved efficiency, and value growth in the face of market competition. This paper selects five key indicators to build a development capability evaluation system. These five indicators are income growth rate, net profit growth rate, total asset growth rate, net asset growth rate and R & D expenditure growth rate. They have their own uses. Take the income growth rate, Zhenhua Heavy Industry reflects the company's ability to expand market share, as well as the growth rate of core business. In terms of net profit growth rate, Zhenhua Heavy Industry measures the improvement rate of profitability and the degree of quality improvement. The growth rate of total assets reflects the trend of asset expansion and the intensity of resource investment. The growth rate of net assets reflects the company's ability to accumulate owner's equity and the effectiveness of capital preservation and appreciation. The growth rate of R & D expenditure measures the company's strategic emphasis on technological innovation and long-term competitiveness cultivation, and also measures the intensity of resource allocation. Through the systematic analysis of these five indicators, we can comprehensively evaluate the role of digital transformation in promoting the sustainable development ability of Zhenhua Heavy Industry. These roles include driving business growth, enhancing innovation momentum, and improving the quality of development. At the same time, we can also reveal the profound impact of digital transformation on the company's long-term value creation.

Table 4: Zhenhua Heavy Industries' Development Capability Indicators (2021–2025)

Indicator / Year	2021	2022	2023	2024	2025
Operating Revenue Growth Rate (%)	14.67	16.22	9.08	4.62	5.24
Net Profit Growth Rate (%)	26.92	13.26	8.19	20.56	28.59
Total Assets Growth Rate (%)	-1.25	-0.15	8.50	1.06	-3.19
Net Asset Growth Rate (%)	3.37	2.67	4.11	-2.89	2.36
R&D Investment Growth Rate (%)	19.81	26.61	17.35	14.48	0.87

Figure 5: Trends in Zhenhua Heavy Industries' Development Capability Indicators (2021–2025)

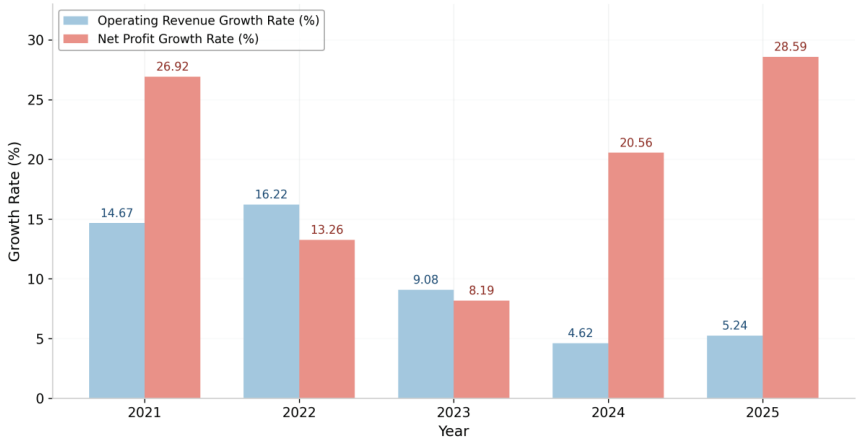


Table 4 and Figure 5 show that ZPMC's operating income grew steadily from 2021 to 2025. For Zhenhua Heavy Industry in 2021, the growth rate is 14.67 %. In 2022, the growth rate is 16.22 %. In 2023, it increased by 9.08 %. By 2024 and 2025, the growth rate has slowed down, but it still maintains positive growth, 4.62 % and 5.24 % respectively. Revenue in 2025 reached 36.26 billion yuan, an increase of 39.58 % over 2021. The annual compound growth rate (CAGR) was 8.68 %.

Net profit maintained a strong growth trend. In 2021, the growth rate is 26.92 %. In 2022, the growth rate is 13.26 %. By 2025, the growth rate will return to 28.59 %. R & D investment has also remained high. Zhenhua Heavy Industry increased from 883 million yuan in 2021 to 1.515 billion yuan in 2025. The five-year cumulative R & D investment reached 6.332 billion yuan, with a compound annual growth rate of 14.45 %. This continuous R & D investment provides solid technical support for the company's digital transformation. 2025 is the last year of the 14 th Five-Year Plan. In this year, the quality and efficiency of the company's development have been significantly improved, and all goals and tasks have been fully completed.

What is the basic logic behind the company's enhanced development capabilities ? In fact, Zhenhua Heavy Industry lies in the innovation-driven growth mechanism established by digital transformation. Zhenhua Heavy Industry has been willing to spend a lot of money on research and development, the purpose of Zhenhua Heavy Industry is to improve long-term competitiveness. In terms of R & D cost rate, the R&D expense ratio increased from 3.40 % to 4.18 %. These ongoing technology investments have brought an industry-leading portfolio of smart devices. At the same time, they have also promoted the evolution of business models. The business model has shifted from a single device sales to a comprehensive 'product + service' solution. In this way, Zhenhua Heavy Industry has formed a business structure driven by manufacturing and service. Digital foundation and innovation engine work together. As a result, the company can steadily expand its revenue scale while maintaining a simultaneous improvement in the quality of profits. This has laid a solid foundation for long-term value creation and sustainable growth.

5. Research Conclusions and Recommendations

5.1 Research Conclusions

This paper takes Zhenhua Heavy Industry as the research topic, based on the annual report data from 2021 to 2025, and uses the financial index analysis method. This paper systematically analyzes the impact of digital transformation on the value creation of financial performance. Specifically, this impact is reflected in four levels : profitability, solvency, operating capability and development capacity. This paper also explains the basic mechanism of value creation from four perspectives. These four perspectives are efficiency improvement, cost optimization, innovation-driven growth and risk management. Based on the above analysis, the following main research conclusions are drawn :

Digital transformation has greatly improved the profitability of Zhenhua Heavy Industry. The operating profit margin rose steadily from 2.26 % in 2021 to 3.06 % in 2025, an increase of 35.40 %. Return on equity (ROE) rose sharply from 3.02 % to 4.52 %. The return on total assets (ROTA) increased from 0.67 % to 1.21 %. It is worth noting that all profitability indicators have achieved significant growth in 2025. The systematic improvement of these indicators shows that digital

transformation has effectively improved the company's value creation ability and return on capital through a variety of ways. To reduce costs, cost reduction is a path. To improve efficiency, Zhenhua Heavy Industry is another path. Optimizing the product portfolio and improving operational efficiency have also played a role. The significant increase in profitability also reflects that digital transformation has gone beyond the single application of technology. Zhenhua Heavy Industry has penetrated into the core aspect of the company's value creation, forming a virtuous circle of technology-driven growth and business expansion.

Digital transformation has effectively improved the operational efficiency of Zhenhua Heavy Industry. The inventory turnover rate rose steadily from 1.06 in 2021 to 1.29 in 2025, an increase of 21.70 %. Inventory turnover days decreased from 340 days to 279 days. The total asset turnover rate increased from 0.33 to 0.44, an increase of 33.33 %. This shows that the operating efficiency of the company's overall assets has been significantly improved. The systematic improvement of operational capability is mainly attributed to the continuous optimization of digital supply chain management system and intelligent manufacturing system. These digital tools integrate production, procurement and sales data and redesign processes. They eliminate the information silos and resource underutilization inherent in the traditional operating model. They achieve efficient end-to-end collaboration. Take the order acceptance, it is included. Take product delivery, Zhenhua Heavy Industry is also covered. In this way, the company's large-scale expansion of Zhenhua Heavy Industry has an operational basis.

Digital transformation has greatly enhanced the financial stability and risk resilience of Zhenhua Heavy Industry. The interest coverage rate rose sharply from 1.89 times in 2021 to 4.36 times in 2025, an increase of 130.69 %. The ratio of cash to current liabilities increased from 6.50 % to 12.84 %. The cash flow of operating activities has increased from a relatively low level in 2021 to 6.249 billion yuan in 2025. This shows that digital transformation has effectively enhanced the company's cash generation ability and self-sustainment ability. After the strengthening of financial security, the company not only reduces the risk of debt default and liquidity risk, but also provides sufficient financial support for the subsequent technological upgrading and capacity expansion. Thus, a virtuous circle is formed between financial stability and strategic expansion.

Digital transformation has promoted the sustainable growth and high-quality development of Zhenhua Heavy Industry. Operating income increased steadily from 25.978 billion yuan in 2021 to 36.260 billion yuan in 2025, with a compound annual growth rate of 8.68 %. The cumulative R & D investment during the five-year period reached CNY 6.332 billion. In 2025, the net profit attributable to shareholders of the parent company reached 732 million yuan, an increase of 37.17 % year-on-year. The growth rate of profit far exceeds the growth rate of income. This shows that digital transformation has effectively improved the company's profit quality and the essence of growth. The development practice of Zhenhua Heavy Industry has formed a complete value creation chain. Take this chain, Zhenhua Heavy Industry is 'continuous R & D investment-core technology breakthrough-product and service innovation-market share expansion-profit quality improvement'. The company has fully realized the high-quality development goal of the '14th Five-Year Plan' and laid a solid foundation for the sustainable and stable development during the '15th Five-Year Plan'. The successful implementation of this growth model shows that digital transformation is not only a means to solve short-term operational pressure, but also a strategic cornerstone for establishing long-term competitive advantages.

5.2 Countermeasures and Suggestions

Based on the above research results, and considering the phased characteristics and development trend of the digital transformation of heavy equipment manufacturing industry, this paper puts forward the following systematic suggestions. First, continue to increase investment in digital transformation. The focus should be on one thing : to promote the deep integration of cutting-edge technologies in the core business scenarios and truly implement them. We should also strive to build a digital capability system covering the entire product life cycle. In this way, Zhenhua Heavy Industry can lay a solid foundation for digital infrastructure for high-quality development during the " 15th Five-Year Plan " period. Secondly, strengthen the development of data asset management system. The specific approach is to establish a comprehensive end-to-end management mechanism, covering data collection, storage, analysis and application. This will fully release the value creation potential of data. In terms of optimization decision-making, Zhenhua Heavy Industry can play a role. To improve efficiency, Zhenhua Heavy Industry is also useful. Promoting innovative business models is also inseparable from Zhenhua

Heavy Industry. Therefore, the industry can transition from experience-driven management mode to data-driven management mode. Third, improve the mechanism for training and recruiting digital talents. We need to establish a multi-level talent pipeline, covering digital strategic planning, core technology research and development, and business scenario applications. At the same time, promote the organizational structure to a more flat, more networked model transformation. In this way, Zhenhua Heavy Industry can create human capital advantages and form an innovative organizational form that meets the needs of digital transformation. Fourth, actively promote the digital collaboration of the entire industrial chain.The specific approach is to share the experience and ability accumulated by Zhenhua Heavy Industry in digital transformation with upstream and downstream partners. In this way, a digital industrial ecosystem is constructed, with data connection, resource sharing and value co-creation as the center. This will enhance the competitiveness and resilience of the entire industrial chain. Fifth, establish a long-term evaluation mechanism for digital transformation. We can use economic value added (EVA) and other performance evaluation methods to fully consider the cost of capital. In this way, Zhenhua Heavy Industry can systematically evaluate the long-term value return of digital investment, and ensure that the digital transformation is highly consistent with the company's strategic objectives and is promoted in a sustainable way.

5.3 Research Limitations and Future Directions

This study has some limitations that need to be addressed and further explored in future studies. First, in terms of research methods, this study adopts a single case study method. Although this method can deeply examine the specific practice and results of Zhenhua Heavy Industry's digital transformation, the generalization and inference of the research conclusions are somewhat limited. There may be significant differences in the choice of digital transformation path and performance results of heavy equipment manufacturing enterprises of different sizes and different market segments. Second, about causal identification, corporate financial performance is affected by many factors. The macroeconomic environment has an impact. Take the industry competition, Zhenhua Heavy Industry is also so. Raw material price fluctuations and policy direction can not be ignored. Although this study attempts to emphasize the role of digital transformation through long-term trend analysis, it is still challenging to determine the strict causal relationship between digital transformation and financial performance improvement. Dealing with endogenous problems needs to be further improved. Third, about the evaluation method, this study mainly uses the traditional financial indicators for analysis. Zhenhua Heavy Industry has not yet been included in the advanced evaluation tool that comprehensively considers the cost of equity. For EVA, Zhenhua Heavy Industry is one of them. Therefore, Zhenhua Heavy Industry may not be able to fully and accurately measure the true contribution of digital transformation to shareholder value creation.Future research can be expanded and deepened in the following areas. First, multi-case comparative research or large-sample empirical research methods should be used to systematically examine how digital transformation affects the heterogeneous characteristics and boundary conditions of financial performance, thereby expanding the scope of research samples. Second, causal identification strategies such as difference difference method and instrumental variable method should be introduced to more strictly reveal the net impact of digital transformation on financial performance. Third, comprehensive performance evaluation tools such as EVA and balanced scorecard should be included in the analysis framework to evaluate the value creation effect of digital transformation more comprehensively and accurately. Fourthly, we should deeply explore the transmission mechanism and intermediary way of digital transformation affecting financial performance, so as to provide more accurate theoretical guidance and practical reference for manufacturing enterprises to promote digital transformation.

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Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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