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Research on the Impact of Enterprise Digital Transformation on Investment Efficiency

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Abstract

With the development of technologies such as AI, blockchain, cloud computing, and big data, digitalization is driving a new round of technological and industrial revolutions, becoming an important trend in China's economic transformation. Investment efficiency is crucial for the high-quality development of enterprises, affecting profitability and corporate value. Digital technologies have revolutionized traditional enterprise operation models and optimized both internal and external management environments. Therefore, enhancing enterprise investment efficiency through digital technologies has become an important topic. This paper aims to analyze the intrinsic relationship between enterprise digital transformation and investment efficiency, and empirically explore the promotional effect of digital transformation. The study finds that digital transformation can improve investment efficiency, with dual agency costs and accounting information quality being important mechanisms.

Keywords

Digital Empowerment on Enterprises; Investment Efficiency; Dual Agency Costs; Accounting Information Quality.

1. Introduction

With the continuous evolution of science and technology, digitalization has become the core force driving transformation, playing a vital role in promoting supply-side structural reform and promoting the economic development of enterprises. Driven by the wave of digitalization, the deep integration of the real economy and the digital economy is of great significance for promoting industrial structure adjustment, accelerating regional transformation and upgrading, and even realizing the comprehensive construction of Digital China. Therefore, promoting the digital development of my country's real economy has always been a top priority of the country. As a systematic project, digital empowerment relies on cutting-edge digital technology to enhance the efficiency of data flow, and helps enterprises gain competitive advantages and enhance their core competitiveness by optimizing the allocation efficiency of various capital elements of enterprises. So, how does digital empowerment help enterprises strengthen their core competitiveness? Clarifying this issue is crucial to give full play to the effectiveness of digital empowerment. Based on this, this article aims to deeply explore the impact mechanism of digital empowerment on enterprises from the dimension of investment efficiency.

2. Concept Introduction

2.1. Digital Empowerment

Digital empowerment refers to the comprehensive concept of equipping organizations and individuals with enhanced capabilities and opportunities through digital technologies and

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means, aiming to achieve more efficient, innovative, and intelligent ways of working and living. The core elements of digital empowerment encompass data-driven decision-making, intelligent applications leveraging artificial intelligence and machine learning, and an internet-centric mindset emphasizing user-centricity, openness, sharing, and collaboration. Its application scenarios span the construction of industrial internet of things, enhancement of internal control management and risk mitigation, as well as the establishment of integrated management platforms. These enable seamless business process integration, enterprise-wide information aggregation, and efficient collaboration, ultimately boosting overall efficiency and competitiveness. Furthermore, digital empowerment fosters optimal resource allocation, promotes sustainable economic development, and aligns with efforts to achieve carbon neutrality targets. However, it also presents challenges such as data security, rapid technological evolution, and talent shortages, which require attention and resolution during the digital transformation process.

2.2. Investment Efficiency

Enterprise investment efficiency refers to the ability of enterprises to accurately identify and select projects that can bring the greatest economic benefits when facing numerous investment opportunities, while effectively managing and controlling investment risks, so as to achieve the optimal allocation and maximum utilization of resources. It not only reflects the ability of enterprises to allocate resources, but also reflects the wisdom of enterprises in making wise decisions in a complex and changing market environment.

The level of enterprise investment efficiency is directly related to the economic benefits and long-term development capabilities of enterprises. An efficient investment decision-making mechanism can ensure that enterprises invest in projects with high growth potential and profitability, thereby bringing stable cash flow and sustained profit growth to enterprises. At the same time, efficient investment management can also reduce the financial and operating risks of enterprises, and enhance the market competitiveness and risk resistance of enterprises.

In order to achieve efficient investment, enterprises need to have keen market insight, scientific investment decision-making processes and strong risk management capabilities. These capabilities can help enterprises capture market opportunities in a timely manner, accurately assess the risks and benefits of projects, and make wise investment decisions. In addition, enterprises also need to focus on the optimization of internal governance structures, ensure the transparency and fairness of investment decisions, and prevent problems such as insider control and information asymmetry from having a negative impact on investment efficiency.

When evaluating the investment efficiency of an enterprise, in addition to traditional financial indicators, a series of non-financial indicators and comprehensive indicators can also be considered to more comprehensively reflect the investment effect of the enterprise.

2.2.1. Financial Indicators

Net present value (NPV): The net income after measuring the present value of the future cash flow of the investment project minus the initial investment cost. Projects with NPV greater than zero are generally considered feasible.

Internal rate of return (IRR): The discount rate that makes the net present value of the project equal to zero. The higher the IRR, the stronger the profitability of the project.

Accounting rate of return: The ratio of the average annual net income of the investment project to the original investment amount. It reflects the accounting profitability of the project.

Present value index (P/V): The present value of a project's future cash flows divided by its initial investment cost. Projects with a P/V greater than 1 are generally considered worthwhile investments.

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2.2.2. Non-financial Indicators

Degree of achievement of strategic goals: evaluate whether the investment project helps the company achieve its long-term strategic goals, such as market share growth, brand awareness enhancement, etc.

Long-term development capability forecast: Analyze the impact of investment projects on the company's future growth potential, including technological innovation, market expansion, etc.

Industry influence: Evaluate whether the investment project helps to enhance the company's position and influence in the industry, such as enhancing the company's competitiveness through cooperative research and development, and jointly building an industrial chain.

Comprehensive indicators:

Economic Value Added (EVA): Net profit after taking into account capital costs, used to measure the value created by a company for its shareholders. The higher the EVA, the greater the value created by the company for its shareholders.

Tobin's Q: The ratio of a company's market value to its replacement cost, used to measure a company's growth potential and market value. A Tobin's Q greater than 1 is generally considered to indicate that the company has a high investment value.

3. Analysis of Impact Mechanism and Hypothesis

3.1. Enterprise Digital Transformation Can Improve Investment Efficiency

Enterprises can significantly reduce the cost of information collection by using advanced digital technologies during digital transformation. Enterprises can obtain key information such as market trends and customer preferences more efficiently and accurately, thus avoiding the tediousness and delays in traditional information collection methods. Guided by accurate information, enterprises can make more informed investment decisions and optimize resource allocation, thereby improving the investment efficiency of enterprises[1]. Through digital means, companies can track managers' decision-making process and execution results in real time to ensure that management behavior is in line with corporate development strategies and the principle of maximizing benefits. With the help of advanced digital technology, shareholders can implement more efficient and comprehensive supervision of management, which significantly reduces the irrational tendencies that managers may have in the decision-making process, thereby improving the overall decision-making quality[2]. The digital transformation of enterprises provides strong support for external investors, enabling them to quickly obtain comprehensive information about those in need of funds, reduce information asymmetry, and quickly evaluate the feasibility and risks of investment projects, thereby making more agile investment decisions[3] .Based on the above analysis, the following hypothesis is proposed:

H1: Enterprise digital transformation has a positive effect on investment efficiency.

3.2. The Mechanism of Dual Agency Costs

First, digital transformation improves the transparency of business processes by integrating advanced technologies. It enables companies to capture and analyze operational data in real time, promotes cross-departmental communication and cooperation, reduces information asymmetry, and reduces the space for opportunistic behavior by management. Miao Wang (2023)[4] found through empirical research that enterprise digital transformation can effectively reduce the first-type agency costs between shareholders and management.

Secondly, digital transformation is conducive to strengthening external supervision of enterprises. In practice, due to the existence of information asymmetry, it is difficult for external media and regulatory agencies to effectively supervise companies[5]. In this case, it is impossible to effectively constrain the behavior of major shareholders. This may cause major

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shareholders to take some actions that harm the interests of small shareholders, and small shareholders lack effective checks and balances in this case, which increases agency costs, that is, the second type of agency costs. The rise of digital transformation has provided a new solution to this problem. Digital transformation has led companies to have a strong desire to increase information disclosure, which not only greatly improves the transparency and accessibility of information, but also provides external supervisory entities with more powerful supervision channels through advanced technologies such as big data and artificial intelligence, reducing information asymmetry [2]. Based on the above analysis, the following hypothesis is proposed:

H2: Digital transformation can improve enterprise investment efficiency by reducing dual agency costs.

3.3. Mechanism of Accounting Information Quality

Comparability of accounting information is an important quality feature of accounting information. In the era of digital economy, the development and application of digital technology can play a positive role in internal governance, which may constrain the discretion of enterprises in the implementation of accounting standards, thus affecting the comparability of accounting information [6]. Luo Xiying and Guo Wei (2023)[7] also found through research that enterprise digital transformation is conducive to improving the reliability, comparability and relevance of accounting information, and promoting the improvement of the quality of accounting information. In the modern economic environment, high-quality accounting information is widely recognized as an important factor in improving investment efficiency.Biddle,Hilary(2006)[8] and McNichols,Stubben(2008)[9] found that low-quality accounting information can harm investment efficiency.

First, high-quality accounting information plays a key role in project identification. Investors and managers rely on accurate and transparent financial reports to assess the quality of potential investment opportunities. By providing detailed financial data and operating performance information, high-quality accounting information helps investors more effectively identify which projects have high return potential and which may face risks. This clear project identification ability can not only promote the effective allocation of funds and reduce the possibility of blind investment, thereby improving overall investment efficiency[10].

Secondly, in terms of corporate governance, high-quality accounting information can significantly strengthen investors' supervision and control over management. Transparent financial information enables investors to have a clearer understanding of the company's operating conditions and strategic execution results. Companies with high information transparency are less likely to engage in earnings management[11]. This supervision mechanism can encourage managers to pay more attention to investment efficiency, reduce resource waste, and improve the scientificity and rationality of decision-making. Good corporate governance creates a positive image for the company, which not only enhances investor confidence, but also helps attract more capital investment, thereby further optimizing the investment environment[12].

Finally, high-quality accounting information helps reduce adverse selection and liquidity risk. High-quality accounting information reduces information asymmetry by making the financial status and operating performance of enterprises transparent, thereby reducing the adverse selection risk of investors. At the same time, transparent information disclosure also enhances market liquidity, making it easier for investors to buy or sell assets when needed. This risk reduction not only guides funds to high-return investment projects, but also effectively reduces the phenomenon of underinvestment caused by information asymmetry. Based on the above analysis, the following hypothesis is proposed:

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H3: Digital transformation can improve corporate investment efficiency by improving the quality of accounting information.

4. Empirical Analysis

For the above analysis, the correctness of the hypothesis has not been verified. This section lists the regression results.

4.1. Main Regression Results

The research results show that there is a significant positive correlation between the transformation of enterprises in the digitalization process and the return on investment, and this correlation is confirmed at the significance level of 1%, revealing that DCG has a positive and significant role in improving the investment efficiency of enterprises,see Table 1.

Table 1. Main regression results

Name	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Inv	Inv	Inv	Inv	Inv	Inv	Inv	Inv	Inv
DCG	0.001*	0.001*	0.001**	0.002***	0.002***	0.002***	0.002***	0.002***	0.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Lev		-0.003	-0.010***	-0.019***	-0.006	-0.008**	-0.016***	-0.016***	-0.017***
		(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
ROA			-0.053***	-0.057***	0.022**	0.024**	0.034***	0.034***	0.032***
			(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.011)
SOE				0.020***	0.016***	0.014***	0.012***	0.012***	0.012***
				(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Growth					-0.046***	-0.046***	-0.045***	-0.045***	-0.045***
					(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
ListAge						0.004***	0.004***	0.004***	0.004***
						(0.001)	(0.001)	(0.001)	(0.001)
TobinQ							-0.006***	-0.006***	-0.006***
							(0.000)	(0.000)	(0.001)
Top1								0.000	-0.000
								(0.005)	(0.005)
Size									0.000
									(0.001)
YEAR	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry	YES	YES	YES	YES	YES	YES	YES	YES	YES
_cons	-0.048***	-0.046***	-0.042***	-0.049***	-0.050***	-0.057***	-0.039***	-0.039***	-0.048***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)	(0.015)
N	24769	24769	24769	24769	24769	24769	24769	24769	24769
r2	0.025	0.025	0.026	0.033	0.063	0.064	0.070	0.070	0.070

Notes: () indicates standard error; ***, **, and * indicate significant differences at the 1%, 5%, and 10% levels, respectively.

4.2. Dual Agency Costs

In order to study the mediating role of dual agency costs in enterprise digital transformation and investment efficiency, this paper conducted three verification experiments, and the empirical results are shown in Table 2. The results show that dual agency costs are the

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mediating variable that affects the investment efficiency of enterprises through digital transformation.

Table 2. Regression results of the mediation effect based on dual agency costs

Name	(1)	(2)	(3)	(4)	(5)
	Inv	AC1	Inv	AC2	Inv
DCG	0.002***	0.022***	-0.001***	-0.005***	-0.002***
	(0.000)	(0.002)	(0.001)	(0.001)	(0.001)
AC1			-0.018***		
			(0.002)		
AC2					0.039***
					(0.006)
_cons	-0.059***	0.616***	0.041***	-0.028*	0.031**
	(0.007)	(0.055)	(0.015)	(0.017)	(0.015)
N	24806	24806	24806	24790	24790
r2	0.149	0.226	0.080	0.154	0.077

Notes: () indicates standard error; ***, **, and * indicate significant differences at the 1%, 5%, and 10% levels, respectively.

4.3. Quality of Accounting Information

Table 3 shows the mediating effect of accounting information quality on enterprise digital transformation and investment efficiency. From the results of column (1), digital transformation has an inhibitory effect on earnings management, and it is significant at the 1% confidence level. From the results of column (2), the regression coefficient of the mediating variable is significant at the 1% level, indicating that improving earnings management can improve enterprise investment efficiency. Therefore, Hypothesis 3 proposed in this paper is passed, that is, digital transformation can improve enterprise investment efficiency by improving accounting information quality.

Table 3. Three Scheme comparing

Name	(1)	(2)
	AbsEM	Inv
DCG	-0.002***	-0.041***
	(0.001)	(0.007)
AbsEM		1.085***
		(0.078)
_cons	0.206***	-3.104***
	(0.016)	(0.191)
N	24230	24230
r2	0.064	0.125

Notes: () indicates standard error; ***, **, and * indicate significant differences at the 1%, 5%, and 10% levels, respectively.

5. Conclusion

(1) Digital transformation significantly improves corporate investment efficiency. On the one hand, digital transformation can strengthen the communication channels between external investors and internal managers, reducing the degree of information asymmetry between the

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internal and external parties of the enterprise. On the other hand, digital transformation can effectively supervise the behavior of managers, who may make irrational decisions that reduce investment efficiency out of self-interest.

(2)Digital transformation improves corporate investment efficiency by controlling dual agency costs. The benchmark regression results show that digital transformation has a significant inhibitory effect on the first type of agency costs (AC1) and the second type of agency costs (AC2) at the 1% level, which means that digital transformation can reduce the dual agency costs of enterprises to improve investment efficiency and achieve high-quality development.

(3) Digital transformation improves the investment efficiency of enterprises by improving the quality of accounting information. Digital transformation improves the quality of accounting information, which not only improves the efficiency and accuracy of internal management of enterprises, but also enhances the communication and trust between enterprises and external investors, ultimately promoting the improvement of investment efficiency of enterprises.

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