▪ Journal of Competitiveness

Does the competitive advantage of digital transformation influence comparability of accounting information?

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Abstract

At present, with the increasing digital competition among enterprises, it is of great importance for enterprises to promote digital transformation and achieve sustainable development. Taking China's A-share listed companies from 2007 to 2021 as samples, this paper performs empirical tests in order to explore the impact of enterprise digital transformation on the comparability of accounting information and its mechanism. The results show that digital transformation has significantly enhanced accounting information comparability, which is still significant after a series of robustness tests. The mechanism test shows that the improvement of the comparability of accounting information by the digital transformation is mainly achieved by alleviating earnings management and agency problem. Further research shows that when the degree of market competition or transparency is high, the role of enterprise digital transformation in enhancing the comparability is more significant. This paper enriches the literature on the economic consequences of digital transformation and the factors affecting the comparability of accounting information. At the same time, the conclusions of this paper confirm the governance effect of enterprise digital transformation, provide evidential support for investors to improve decision-making efficiency, and urge enterprises to accelerate digital transformation.

Keywords: digital transformation, comparability of accounting information, earnings management, agency problem

JEL Classification: G30, M00, M41

Article history: Received: February 2023; Accepted: February 2024; Published: March 2024

1 INTRODUCTION

In recent years, the depth of the technological and industrial revolution has been increasing. Many of the latest information technologies, including artificial intelligence, are also gradually expanding the scope of application. In the new era, China's digital economy has turned to the stage of deepening application, standardized development and inclusive sharing. Under the impact of the digital wave at home and abroad, enterprises, as the main part of the micro-economy and the key carrier of the realization of the digital economy, are increasingly competitive. According to existing research, there are many ways for enterprises to carry out digital transformation. Among them, many enterprises choose to make tangible investments and invest in infrastructure related to the digital economy. Successful investments often bring high returns, which also improves their competitiveness (Balcerzak & Pietrzak, 2017). Digital transformation is not only the mainstream trend for enterprises to adapt to the development of the times, but also an important strategy to help them cope with the changes of the times. Digital technology continues to shape and change the business landscape, and it is becoming a way to achieve and maintain the competitiveness of enterprises (Nwaiwu, 2018). To sum up, whether in academic circles or in industry, the discussion of the consequences of the digital transformation economy is worthy of attention. Today, the economic consequences that have received attention include enterprise performance, debt financing costs, enterprise stock price

collapse risk, mergers and acquisitions, international strategies, etc. (Chen & Hao, 2022; Wu et al., 2022; Sun et al., 2022; Zhai et al., 2022), but less attention has been shown to the influence of digital transformation on the accounting information comparability.

FASB (2010)[1] recognizes comparability as a qualitative feature of accounting information, which requires different enterprise accounting systems to produce similar and comparable financial accounting information for the same or similar business. As for accounting information characteristics, unlike the requirements of robustness, relevance and truthfulness that reflect the quality characteristics, comparability reflects the comparison of financial information among enterprises in the same industry. The existing research mainly explores the factors that may affect the accounting information comparability from the following two points. First, it is the impact of the adoption of International Financial Reporting Standards (IFRS) on the accounting information comparability (Barth et al., 2012; Wang, 2014; Cascino & Gassen, 2015; Schipper, 2022). Second, it explores the interfering factors of accounting information comparability from the medium and micro levels. Francis et al. (2014) found that audit style raises the accounting information comparability, and started the research on the influencing factors of comparability at medium and micro levels. At present, no scholar has studied digital transformation's impact on the comparability of accounting information.

As an emerging market and the largest developing country in the world, China's development path is of great reference value. At the same time, in recent years, the digital transformation of Chinese enterprises has developed rapidly and made considerable progress. Therefore, this paper chooses to use China's sample. China's development experience has more reference value for other developing countries in the world. Given the above background, taking China's A-share listed companies during 2007-2021 as the research object, this paper studies the effect of digital transformation on the comparability of accounting information. It is found that the digital transformation raises the comparability. This conclusion is still significant after a series of robustness tests. Then, this paper studies the internal mechanism of the relationship. It shows that the digital transformation of enterprises raises the comparability by reducing the level of earnings management and alleviating agency problems. It improves the comparability by alleviating accrual-based earnings management and real earnings management. The digital transformation raises the quantity of media reports, improves the comparability, and takes a more important part in enhancing the comparability of accounting information in the case of non-dual functions. In further research, this effect is greater in the group with higher market competition and transparency of listed companies. It reminds us that the improvement of digital transformation on comparability is influenced by market competition and the transparency of listed companies.

The composition of the rest of the paper is as follows: the second part is the theoretical background; the third part is the research objective, methodology and data; the fourth part reports the results and discussion; the fifth part is the conclusion.

2 THEORETICAL BACKGROUND

2.1 The Economic Consequences of Digital Transformation

With the development of the Internet, the latest generation of digital technologies have made rapid progress. Through extensive integration and application of these new technologies, enterprises can improve business, improve efficiency, reshape value creation methods, and achieve digital transformation (Vial, 2019). Verhoef (2021) proposes that the digital transformation is to first transform the information in the production and operation process into

[1] Information source: the website of FASB (Financial Accounting Standard Board): https://www.fasb.org/

digital information, then change the original business process with digital technology, and finally change the business model to make value creation come true. Digital transformation brings a far-reaching impact, which has aroused widespread concern in the academic community.

Early studies on digital transformation are mostly theoretical (Troilo et al., 2017; Foss & Saebi, 2017). Nowadays, a growing number of scholars have focused on empirical research on enterprise digital transformation. Sun et al. (2022) found that digital transformation cut the debt capital cost, and key channels are information asymmetry and the agency problem. Wu et al. (2022) determined that digital transformation lowers share price collapse risk, and the reduction effect is more obvious in high-tech companies and developed areas. In addition, other researchers have considered the economic consequences of digital transformation on enterprise performance, debt financing costs, risk of collapse of enterprise stock prices, mergers and acquisitions, etc. (Chen & Hao, 2022; Zhai et al., 2022; Sun et al., 2022), but few have paid attention to comparability.

2.2 The Influential Factors of the Comparability of Accounting Information

The United States Securities and Exchange Commission (SEC) proposes that the comparability of accounting information requires different enterprises to adopt prescribed accounting policies when the same or similar transactions or events occur, to ensure the accounting information provided is comparable with each other, thus facilitating the users to compare and evaluate the financial status and operating results of different enterprises. After the improvement of the comparability, investors evaluate and compare the financial situation and operating results of companies in the same industry without personal subjective judgment and evaluation, and obtain more fair and objective information (Kim et al., 2016). Therefore, many scholars have studied the antecedents of accounting information comparability. More studies pay attention to the impact of convergence of accounting standards on comparability (Barth et al., 2012; Cascino & Gassen, 2015). It is found that unified accounting standards are conducive to enterprises adopting the same accounting methods for the same or similar economic businesses, and enhancing the comparability (Wang, 2014). However, accounting information comparability is not only affected by macro factors, but also by the behavior of the management of enterprise authorities. The improvement of comparability lies not only in the unification of accounting treatment methods, but also in managers' understanding and implementation of accounting methods and policies (DeFond et al., 2011). Therefore, since the research of Francis et al. (2014), scholars have begun to explore the firm-level factors that influence accounting information comparability. Francis et al. (2014) studied the impact of heterogeneity on the comparability at the company level based on a sample of the U.S. capital market, and they found that audit style raises the accounting information comparability, and this effect is more obvious in the four major international accounting firms. They also laid a foundation for research in this field and pointed out future research directions for accounting information comparability.

2.3 Digital Transformation and the Comparability of Accounting Information

Previous studies have shown that choosing and using accounting policies is one of the significant antecedents affecting the comparability of accounting information. Meanwhile, management may adjust the accounting policies used for earnings management. Previously, scholars found that for influencing the stock market's understanding of the company, improving the managers' revenue, reducing the potential chance of loan default and avoiding the control of supervision departments, operators often use accrual items and construct real transactions (Cohen & Zarowin, 2010), which will inevitably reduce the comparability. Digital transformation reduces the motivation and ability of the management to conduct earnings management, and thus improves the comparability. In terms of motivation, nowadays, the

digital economy grows fast, and traditional enterprises are facing a fierce market competition environment and thus generate strong surplus pressure (Hou & Robinson, 2006). However, after the digital transformation, the resource operation efficiency of the enterprise has been greatly improved, and the enterprise performance has been improved. The motivation of the management to improve the performance and meet the demand of the capital market through earnings manipulation has been weakened, and the comparability has been improved (Bartov et al., 2002). In terms of ability, after the digital transformation, the original accounting information system has been improved, and the ability of enterprises to gather information, work with data, and apply digital technology to assist policymaking has been enhanced. This process reduces the subjective judgment of the management and improves the comparability.

The improvement of comparability lies in the convergence of accounting standards, and more importantly, in the truthful and accurate implementation of accounting standards by managers (DeFond et al., 2011). Because of agency costs, the management or major shareholders choose accounting treatment policies and accounting information disclosure methods that are beneficial to themselves in order to increase on-the-job consumption, avoid dismissal and other personal interests, which will reduce the comparability among corporations. The digital transformation helps to mitigate agency problems and improve the comparability of accounting information (Sun et al., 2022). First, it conforms to the policy orientation trend and the vigorous growth of the digital economy, which will not only attract the attention of capital market investors and media, but also increase external supervision (Gilliland et al., 2010; Orlitzky et al., 2017). After the management or major shareholders are subject to more supervision, the possibility of hiding self-interested information is reduced, which inhibits their discretionary choice of accounting methods and policies, and improves the comparability of accounting information. Secondly, after the digital transformation, the resource operation efficiency of enterprises has been greatly improved, the enterprise performance has been improved, the motivation of management to manipulate means to beautify performance and meet the demand of capital market has been weakened, and the comparability has been improved (Bartov et al., 2002).

Above all, this paper contends that the digital transformation plays an extremely important part in enhancing the accounting information comparability by alleviating the earnings management and agency conflicts.

3 RESEARCH OBJECTIVE, METHODOLOGY AND DATA

3.1 Research Objective

This paper explores the consequences of digital transformation on the comparability of accounting information. Enterprises with stronger digital transformation achieve a high level of comparability. Therefore, hypothesis H1 is as follows:

H1: An enterprise's digital transformation improves the accounting information comparability.

3.2 Methodology

For the sake of testing the hypothesis, this paper poses a multiple linear regression model:

$$AVE_{i,t}(MED_{i,t}) = \beta_0 + \beta_1 DEGREE_{i,t-1} + \sum CONTROLS_{i,t-1} + +INDUSTRY + YEAR + \varepsilon_{i,t-1} \quad (1)$$

Among them, AVE and MED represent the accounting information comparability, DEGREE is the digital transformation, and CONTROLS represents other variables that may affect dependent variables. Table 1 shows the specific and detailed definitions. When β_1 is

significantly greater than 0, this means that the comparability is positively correlated with the digital transformation. In other words, the stronger the digital transformation, the higher the accounting information comparability, which supports hypothesis H1.

As for the digital transformation, here is the measurement. Referring to Loughran and McDonald (2011), Loughran and McDonald (2020), Caserio et al. (2019), Cho and Muslu (2021), and Ertugrul et al. (2017), textual analysis has been widely implemented in top journals of finance, accounting and management. This paper counts the number of keywords in the annual reports. All listed companies are from the Shanghai Stock Exchange and Shenzhen Stock Exchange. We used the indicators in the CSMAR database, which includes five dimensions: (1) artificial intelligence, (2) cloud computing, (3) blockchain, (4) big data and (5) digital application. For determining the right deviation, this study converts the word frequency to the natural logarithm. In order to prevent losing the company's annual observation without keywords, this study adds one to the actual value and then calculates the natural logarithm. The independent variable degree of digital transformation (DEGREE) = ln (Degree of digital transformation of listed companies +1).

As for the accounting information comparability, this paper uses the accounting information comparability index (every year) in the CSMAR database as the index to indicate the comparability of listed companies. The mean value (AVE) and median value (MED) are used for primary regression, mechanism research and further research. At the same time, TOP4AVE and TOP10AVE are used for the robustness test, and the details are in Table 1.

Using Francis et al. (2014) for reference, factors that may have an influence on comparability have also been controlled. The detailed definitions are listed below in Table 1.

Table 1 *Variable definition. Source: own research.*

	Variable	Explanation
Dependent Variable	AVE	Referring to De Franco et al. (2011), take the average of the firm's annual comparability level relative to other companies in the same industry, and multiply by 100 for the main test.
	MED	Referring to De Franco et al. (2011), take the median of the firm's annual comparability level relative to other companies in the same industry, and multiply by 100 for the main test.
	TOP4AVE	Referring to De Franco et al. (2011), take the average of the top four comparability levels of the firm relative to other companies in the same industry and multiply by 100 for robustness test.
	TOP10AVE	Referring to De Franco et al. (2011), take the average of the top ten comparability levels of the firm relative to other companies in the same industry and multiply by 100 for robustness test.
Independent Variable	DEGREE	According to Sun et al. (2022), DEGREE=ln(digital transformation+1)
	DUMMY	Company-year records with digital transformation are noted as 1, and those without records are noted as 0
Controlled variables (CV)	SIZE	According to Sun et al. (2022), SIZE=ln(Total assets).
	SOE	When the firm is state-owned, the dummy variable equals 1. When the firm is not state-owned, the dummy variable equals 0.
	BIG4	The value of enterprises audited by the big four international accounting companies is 1, and the value of others is 0.

	AUDIT	When the audit opinion is "standard unqualified opinion," the dummy variable equals 1. When the audit opinion is not "standard unqualified opinion," the dummy variable equals 0.
	LEV	The numerator is total liabilities, and the denominator is total assets.
	TURN	The numerator is operating income, and the denominator is total assets.
	ROA	The numerator is net profit, and the denominator is total assets.
	GROWTH	The numerator is the difference between the operating income of the current year and that of the last year, and the denominator is the operating income in the last year.
	TOP1	Shares held by the largest major shareholder.
	INDEP	Of all the directors, proportion of independent directors.
	DUALITY	If the positions of the general manager and the chairman are held by the same person, the value is 1, and the other is 0.
	SAL	Total management compensation divided by total assets.
	INDUSTRY	According to the industry classification of the China Securities Regulatory Commission, this variable controls the industry.
	YEAR	The data of this study covers the period from 2007 to 2021, which controls the year.
Mechanism test variables	EM	Referring to Dechow (1995), this paper uses the modified Jones model to calculate accrual-based earnings management. This paper uses Dechow (1998) and Sugata (2006) models to measure the real earnings management level of enterprises.
	AP	With reference to Bednar (2012) and others, the number of financial news content in newspapers and periodicals is used to measure media coverage. Dummy variables are used to measure the integration of two positions.
Heterogeneity research variables	HHIA	Calculate the industry market share of a single company based on its main business income.
	OPACITY	The information disclosure quality assessment level of the Shenzhen Stock Exchange is used as the proxy variable.

3.3 Data

In 2007, China implemented a new version of accounting standards for annual reports of listed companies. In order to ensure consistency, China's A-share listed companies are chosen as the initial study object. The period is from 2007 to 2021. The initial sample has been processed as follows: since the supervision requirements and reporting arrangements of financial listed companies are quite unlike other industries, this paper excludes financial listed companies; second, because the net assets of most specially treated (ST) firms are less than 0, and there are some problems in their operation continuity, this paper excludes those ST companies; third, the sample with missing data is deleted; finally, for reducing the impact of outliers on regression

analysis, the paper carries out a 1% winsorization for both ends of continuous variables. According to these standards, 18,755 annual observations were obtained for this paper. The data are from the CSMAR database.

4 RESULTS AND DISCUSSION

In this paper, the variables of samples are described and the results are shown in Table 2. Among them, the mean and median of comparability (AVE) are −1.2215 and −1.0300; the mean and median of accounting information comparability (MED) are −0.9907 and −0.7900; the mean and median of digital transformation (DEGREE) are 1.0429 and 0.6931. Other variables are not detailed. The calculation results are basically same as the existing literature.

Table 2 *Descriptive statistics of main variables. Source: own research.*

Variables	Number of Samples	Mean	Median	Standard Deviation	Minimum	Maximum
AVE	18755	−1.2215	−1.0300	0.7042	−4.4200	−0.3700
MED	18755	−0.9907	−0.7900	0.6781	−4.1700	−0.2900
DEGREE	18755	1.0429	0.6931	1.2952	0.0000	4.8675
SIZE	18755	22.3439	22.1588	1.2943	19.9525	26.2620
SOE	18755	0.4887	0.0000	0.4999	0.0000	1.0000
BIG4	18755	0.0711	0.0000	0.2570	0.0000	1.0000
AUDIT	18755	1.0642	1.0000	0.4901	1.0000	6.0000
LEV	18755	0.4580	0.4608	0.1977	0.0686	0.8682
TURN	18755	0.6445	0.5435	0.4428	0.0722	2.5193
ROA	18755	0.0390	0.0344	0.0533	−0.1709	0.2020
GROWTH	18755	0.1341	0.0946	0.3170	−0.5615	1.7143
TOP1	18755	34.8825	32.9976	14.9611	8.4484	74.0947
INDEP	18755	37.1592	33.3300	5.3150	30.0000	57.1400
DUALITY	18755	0.2127	0.0000	0.4092	0.0000	1.0000
SAL	18755	0.0013	0.0009	0.0013	0.0000	0.0070

4.1 Main regression results

Table 3 lists the regression analysis results of model (1). Considering that the influence of digital transformation on the comparability of accounting information has a certain time lag, this paper deals with the key explanatory variables with a lag of one period. Among them, columns (3) and (6) list the regression results that control industry and yearly effects; and they include control variables. The results show that in columns (3) and (6), the coefficients of digital transformation (DEGREE) are statistically significantly positive; the coefficients of digital transformation (DEGREE) are 0.0337 and 0.0382, and the t values are 4.64 and 5.18, indicating that the higher the digital transformation, the higher the comparability of accounting information, supporting H1.

Table 3 *Digital transformation and comparability of accounting information. Source: own research.*

	(1) AVE	(2) AVE	(3) AVE	(4) MED	(5) MED	(6) MED
DEGREE	−0.0109	0.0264***	0.0352***	0.0126*	0.0295***	0.0398***
	(−1.57)	(3.73)	(5.56)	(1.88)	(4.15)	(6.22)
CV	NO	NO	YES	NO	NO	YES
INDUSTRY	NO	YES	YES	NO	YES	YES
YEAR	NO	YES	YES	NO	YES	YES
N	18755	18755	18755	18755	18755	18755

Adj-R^2	0.000	0.215	0.347	0.001	0.143	0.291

Note: The significance levels of 1%, 5% and 10% are expressed by * * *, * * and * respectively, and the values in brackets are T values. All subsequent tables are the same.

To ensure the robustness of the above results, several robustness and endogenous tests were performed. (1) Fixed effect model. To exclude the interference of individual differences of companies, this paper re-regressed model (1) after controlling the fixed effect model of companies. (2) Instrument variable. This paper uses the digital economy index of cities in the "White Paper on China's Urban Digital Economy Index" as the tool variable of the independent variable, digital transformation, and uses the two-stage least squares (2SLS) method to internally process the model. (3) Substitute independent variable. This paper measures the degree of digital transformation (DIGITAL) again and still counts the number of words, but the word list is changed. It covers four dimensions: digital technology application, internet business model, intelligent manufacture and modern information system. Given the right skewness, this paper changes the digital transformation word counts into a natural logarithm. To prevent ignoring zero-value observations, this paper adds 1 to the original values, that is, degree of digital transformation (DIGITAL) = ln (Degree of digital transformation of listed companies +1). At the same time, this paper uses the dummy variable of digital transformation degree (DUMMY) as the substitute variable of digital transformation to regress the model. (4) Substitute dependent variable. The first four average values (Top4AVE) and the first ten average values (Top10AVE) of the comparability are used as the alternative variables of the comparability to regress the model (1). (5) Quantile regression. The quantile regression method is used to regress model (1). All of the previous results further support the conclusion.

4.2 Mechanism Test

As noted, the digital transformation produces a profound influence on the comparability, and earnings management and agency issues are the main mechanisms that have an impact. Next, this paper analyzes the intrinsic mechanism of the impact of digital transformation on the comparability, that is, whether or not the digital transformation upgrades the accounting information comparability by alleviating the problems of earnings management and agency.

4.2.1 Mechanism Test：Earnings Management

First, this paper focuses on accrual earnings management. The prediction and amortization in accrual accounting are easy to use for earnings management. With the in-depth development of digital transformation and the improvement of the information environment, it is easier for external investors to find out when the management conducts accrual earnings management. After the digital transformation, the increasingly perfect accounting information system can help the enterprise authorities to judge the accounting attribution of complex matters, thus reducing the professional judgment of management executives. Therefore, the digital transformation may alleviate the accrual-based earnings management. This paper speculates that digital transformation can mitigate the accrual-based earnings management, thereby enhancing the comparability.

Table 4 (1) - (2) lists the results. They show that the coefficient of the variable DEGREE * EM is statistically significantly negative, which indicates that when the accrual-based earnings management is lower, the earnings management is lower, and the digital transformation takes a greater part in improving accounting information comparability.

Second, this paper cares about real earnings management. Real earnings management means earnings manipulation by enterprise authorities through actual transaction activities such as manipulation of operation, production costs and discretionary expenses (Sugata, 2006). After the digital transformation, the companies' performance has increased, and the willingness of all

department members to cooperate with the management to implement real earnings management has decreased based on the consideration of occupational safety and occupational reputation. Therefore, this paper infers that real earnings management is mitigated.

Columns (3) and (4) in Table 4 list the results. They show that the coefficient of the variable (DEGREE * EM) is statistically significantly negative, indicating that when the earnings management is lower, enterprise digital transformation plays a greater role in enhancing the comparability of accounting information.

Table 4 *Mechanism Test: Earnings Management. Source: own research.*

	(1) AVE	(2) MED	(3) AVE	(4) MED
DEGREE	0.0505***	0.0571***	0.0354***	0.0396***
	(7.10)	(7.96)	(5.53)	(6.09)
EM	−0.5575***	−0.6042***	0.2762***	0.2749***
	(−5.44)	(−5.74)	(6.39)	(6.33)
DEGREE*EM	−0.2542***	−0.2842***	−0.0495**	−0.0614***
	(−4.05)	(−4.36)	(−2.10)	(−2.59)
CV	YES	YES	YES	YES
INDUSTRY	YES	YES	YES	YES
YEAR	YES	YES	YES	YES
N	18386	18386	18319	18319
Adj-R^2	0.353	0.301	0.350	0.297

4.2.2 Mechanism Test：Agency Problem

First, this paper focuses on media coverage. Studies have shown that the media will actively monitor a company's behavior for the sake of reputation and interests. The disclosure of a company's problems reported by the media will attract the attention of the regulatory authorities and the whole society, which will play a role in constraining and regulating the company's behavior (Bednar, 2012; Liu & McConnell, 2013). Digital transformation is highly considered as a social hotspot by all media, which reduces managers' discretionary choice of accounting methods and policies. The agency problem is alleviated, and the comparability is improved.

This paper divides the number of companies with financial news content in newspapers and periodicals by 1,000 and puts them into regression. Columns (1) and (2) in Table 5 list the results. They show that the coefficient of variable (DEGREE * AP) is statistically significantly positive, indicating that media coverage is indeed an important factor affecting the digital transformation and the comparability of accounting information. When the media reports are more, enterprises are more supervised and agency problems can be alleviated.

Second, this paper cares about the integration of two positions. Since Jensen and Meckling (1976) began their research, the discussion on agency has continued. It has been found that the identity of the chairman and CEO is unified, the board of directors finds it difficult to exercise its original duties, and the self-interested behavior of the general manager is easier to carry out, which hinders the reasonable flow of internal information to the capital market, which undoubtedly aggravates the agency problem (Fama & Jensen, 1983). Digital transformation has changed the original business model, current business model and internal structure (Verhoef et al., 2021). This means that the management's discretion on the daily business activities of the company has been greatly weakened, and the agency problem has been alleviated.

When the enterprises combine title of board chair and CEO, the value of the variable is 1, and if there is no combination of the two positions, the value of the variable is 0. Columns (3) and (4) in Table 5 list the results. They show that the coefficient of variable (DEGREE * AP) is statistically significant and negative, indicating that agency problem is indeed an important

channel for digital transformation to affect the comparability accounting information. Digital transformation alleviates the agency problem, thus enhancing the comparability of accounting information, supporting the conclusion.

Table 5 *Mechanism Test: Agency Problem. Source: own research.*

	(1) AVE	(2) MED	(3) AVE	(4) MED
DEGREE	0.0276***	0.0312***	0.0438***	0.0473***
	(4.25)	(4.73)	(6.16)	(6.52)
AP	−0.0704**	−0.0991***	0.0508***	0.0494***
	(−2.49)	(−3.26)	(2.66)	(2.59)
DEGREE*AP	0.0299***	0.0353***	−0.0300***	−0.0261**
	(2.70)	(2.73)	(−2.94)	(−2.53)
CV	YES	YES	YES	YES
INDUSTRY	YES	YES	YES	YES
YEAR	YES	YES	YES	YES
N	18755	18755	18755	18755
Adj-R^2	0.347	0.292	0.347	0.291

4.3 Further Research

4.3.1 Further Research：Market competition.

It has been found that market competition has certain corporate governance effects, which can spur enterprises to disclose more information (Chhaochharia et al., 2017; Boubaker et al., 2018). Therefore, the more competitive the market, the more transparent the information environment the enterprise is in. This will help users of enterprise statements compare the financial status and operating results of different enterprises, and improve the comparability of accounting information. Moreover, market competition has a pressure effect. When the market competition is fierce, enterprises will increase their R&D efforts to improve their competitiveness (Hou & Robinson, 2006). The promotion of digital transformation depends on the promotion of enterprise creation, which is inseparable from the attention and investment of enterprises in R&D activities. Therefore, it is speculated that when the market competition is higher, digital transformation will play an increased role in improving the accounting information comparability.

The market share of a company is expressed by the proportion of the operating income of the chosen corporation to the total operating income of all corporations in the same industry. The higher the market share, the lower the market competition the enterprise faces. Table 6 lists the results. They show that the coefficient of variable (DEGREE * HHIA) is statistically significant and negative, indicating that market competition is indeed an important factor affecting the digital transformation and the accounting information comparability. When the market competition is high, corporations carry out digital transformation more actively, which can play a more important role in improving the accounting information comparability.

Table 6 *Further Test: Transparency of listed companies. Source: own research.*

	(1) AVE	(2) AVE	(3) AVE	(4) MED	(5) MED	(6) MED
DEGREE	0.0516**	0.1059***	0.0964***	0.0688***	0.1030***	0.0949***
	(2.04)	(4.83)	(4.78)	(2.86)	(4.64)	(4.62)
HHIA	−0.3989***	−0.5456***	−0.6311***	−0.2665**	−0.4999***	−0.5893***
	(−3.52)	(−3.36)	(−4.29)	(−2.40)	(−2.94)	(−3.85)
DEGREE*HHIA	−0.1772**	−0.2821***	−0.2117***	−0.1610**	−0.2610***	−0.1895***
	(−2.15)	(−3.88)	(−3.16)	(−2.10)	(−3.55)	(−2.79)
CV	NO	YES	YES	NO	YES	YES

INDUSTRY	NO	YES	YES	NO	YES	YES
YEAR	NO	YES	YES	NO	YES	YES
N	15698	15698	15698	15698	15698	15698
Adj-R^2	0.008	0.241	0.361	0.006	0.165	0.302

4.3.2 Further Research：Transparency of listed companies.

Transparency of listed companies includes two aspects: financial transparency reflects the strength and timeliness of financial disclosure, and governance transparency reflects the strength of governance disclosure used by external investors to hold executives and directors accountable (Bushman et al., 2004). The improvement in transparency of listed companies can effectively reduce the information risk in the capital market, improve corporate governance and reduce "adverse selection" behavior. According to the definition of the Basel Committee on Banking Supervision (1998),[2] high transparency means that investors can grasp the essence of things through superficial phenomena. It can be seen that when the transparency of listed companies is high, the internal and external information can be shared in a timely manner, and the information asymmetry is reduced. At the same time, investors can master more information to compare the same or similar accounting events between different companies, and the accounting information comparability can be improved. Therefore, this paper infers that when the transparency of listed companies is high, digital transformation plays a greater part in raising the accounting information comparability.

We assigned the levels A, B, C and D to 4, 3, 2 and 1. The higher the grade, the higher the score and the higher the transparency of listed companies. Table 7 shows the results. The results show that the coefficient of the variable (DEGREE * OPACITY) is positive, and it is statistically significant, indicating that the company's transparency is indeed an important factor affecting the digital transformation. When the transparency of listed companies is higher, the digital transformation takes a key part in improving the accounting information comparability.

Table 7 *Further Test: Transparency of listed companies. Source: own research.*

	(1) AVE	(2) AVE	(3) AVE	(4) MED	(5) MED	(6) MED
DEGREE	−0.1742***	−0.1222***	−0.0858***	−0.1569***	−0.1374***	−0.0977***
	(−4.35)	(−3.40)	(−2.81)	(−3.97)	(−3.72)	(−3.12)
OPACITY	0.0960***	0.0912***	0.0691***	0.0996***	0.0896***	0.0664***
	(4.19)	(4.74)	(4.21)	(4.45)	(4.57)	(3.99)
DEGREE*OPACITY	0.0505***	0.0427***	0.0355***	0.0520***	0.0485***	0.0407***
	(4.12)	(3.97)	(3.84)	(4.34)	(4.42)	(4.30)
CV	NO	YES	YES	NO	YES	YES
INDUSTRY	NO	YES	YES	NO	YES	YES
YEAR	NO	YES	YES	NO	YES	YES
N	12477	12477	12477	12477	12477	12477
Adj-R^2	0.022	0.283	0.403	0.025	0.210	0.346

4.4 Discussion

This study makes three contributions to the existing literature. To begin with, it is one of the first empirical studies to test the influence of digital transformation. Previous studies focus on its influence on corporate performance (Peng & Tao, 2022; Chen & Hao, 2022), corporate social responsibility (Meng et al, 2022), risk taking (Tian et al., 2022), etc. Sun et al. (2021) pay attention to the relationship of digital transformation and the cost of debt capital. But, there is no discussion on the comparability of accounting information. This study proves that digital

[2] From the report, "Enhancing Bank Transparency," issued by the Basel Committee on Banking Supervision in 1998.

transformation improves the comparability of accounting information, which is innovative and meaningful.

Second, it enhances the understanding of the interfering factors of the comparability of accounting information by detecting the influence of firm-level digital transformation on it and studying the intrinsic mechanisms from the aspects of earnings management and the agency problem. Previous studies have mainly cared about the impact of convergence of accounting standards on comparability (Barth et al., 2012; Cascino & Gassen, 2015). Francis et al. (2014) focused on the impact of heterogeneity on the accounting information comparability at firm level based on a sample of the U.S. capital market, and they found that audit style enhances the comparability, and this style effect is more obvious in the four major international accounting firms. The findings in this paper emphasize that digital transformation improves a company's comparability of accounting information, which is vital for future accounting information quality research.

Third, this paper provides evidence on the impact of digital transformation. The mechanism research results show that the comparability of enterprises with strong digital transformation is mainly caused by alleviating the earnings management and agency problems. Previous studies have shown that digital transformation exerts its influence through alleviating the information asymmetry and agency problems (Sun et al., 2021). This paper further consolidates the explanatory power of these two mechanisms.

What this paper and the previous literature have in common is that both focus on the positive impact of digital transformation of enterprises on corporate finance, and explore the new influencing factor of comparability of accounting information digital transformation. Similar to existing studies, this paper reviews the literature on the economic consequences of digital transformation and the factors affecting the comparability of accounting information. The research in this article follows the logic and context of existing research, but due to different specific entry points and objectives, the conclusions drawn in this article are unique.

5 CONCLUSION

This paper studies the influence of digital transformation on the comparability of accounting information. The study finds that digital transformation can effectively improve the accounting information comparability. The stronger the digital transformation of enterprises, the lower the comparability. The above conclusions are still significant under some robustness tests. Mechanism research shows that digital transformation improves the accounting information comparability by alleviating earnings management and agency problems. Among them, accrual-based earnings management and real earnings management are two ways for digital transformation to affect the comparability by influencing the level of earnings management. Media reports and the integration of two positions are two ways for digital transformation to affect the comparability of accounting information. Further research suggests that the relationship between digital transformation and comparability of accounting information is influenced by the degree of market competition and the transparency of listed companies. Specifically, when enterprises face fiercer competition and a higher level of transparency, digital transformation will play a stronger role in enhancing the accounting information comparability.

The importance of this study is two-fold: theoretical contribution and practical inspiration. As for theoretical contributions, first, this paper enriches the literature on the economic outcomes of digital transformation and the factors affecting the comparability of accounting information. At the same time, this paper explores the mechanism and provides a reference for the development and conduct of subsequent related research. In terms of practical inspiration, this

paper confirms the governance effect and provides evidential support for investors to improve decision-making efficiency. In addition, the conclusion also urges enterprises to accelerate digital transformation.

This paper has certain limitations. Although text mining using digital keywords to describe digital transformation is a specific and feasible method, it may not be accurate enough to measure the degree of digital transformation of enterprises. In the future, we can further explore indicators that can accurately measure the implementation effect of digital transformation. At the same time, the heterogeneity of this study focuses on market competition, company transparency, and growth. In the future, other influencing factors such as industry and region can also be considered.

Acknowledgement

This study was supported by the "Fundamental Research Funds for the Central Universities" in China (2022NTSS02).

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