

Enterprise Digital Transformation and Earnings Management: A Review and Outlook

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Abstract

Against the backdrop of the deep integration of the digital economy and the real economy, the impact of corporate digital transformation on earnings management has become a cutting-edge issue of academic concern, but existing research conclusions show significant discrepancies. This paper employs a systematic literature review method, tracing the cross-disciplinary research on corporate digital transformation and earnings management from three dimensions: conceptual connotation, measurement methods, and theoretical mechanisms. It summarizes a “four-effect” mechanism framework encompassing information effect, governance effect, resource effect, and pressure effect, and analyzes the root causes of research controversies from the perspectives of measurement standards, mechanism depth, type heterogeneity, and theoretical integration. The study finds that the impact of digital transformation on earnings management is not a simple linear relationship, but rather the result of a dynamic game involving multiple mechanisms. Future research should focus on promoting measurement standardization, deepening the analysis of mechanism interactions, and constructing an integrated theoretical framework.

Keywords

enterprise digital transformation, earnings management, mechanism of action, information asymmetry

1. Introduction

The digital economy has become the core engine driving global economic growth. The report of the 20th National Congress of the Communist Party of China clearly proposed to “accelerate the development of the digital economy and promote the deep integration of the digital economy and the real economy”, elevating digital transformation to the level of national strategy. Against this background, enterprises regard digital transformation as the only way to gain a competitive advantage, and related research has accumulated rapidly. From the perspective of conceptual connotation, digital transformation is defined as the strategic change behavior of enterprises to change the value creation path and improve their ability to respond to the external environment through digital technology [1]; from the perspective of economic consequences, existing research has carried out extensive discussions from the dimensions of enterprise performance, total factor productivity innovation capability and capital market performance [2, 3, 4]. However, although the impact of digital transformation on corporate earnings management behavior has attracted academic attention in recent years, related research is still in its early stages and presents thought-provoking divergent conclusions.

Earnings management refers to the behavior of corporate management in adjusting earnings information by means of accounting policy selection, accounting estimate change or real transaction arrangement, under the premise of complying with accounting standards [5]. In terms of theoretical logic, digital transformation may suppress earnings management by increasing information transparency and strengthening internal and external supervision [6, 7], but it may also induce earnings management due to increased performance pressure and a shift in the space for manipulation [8, 9]. Empirically, most studies have found that digital transformation has a significant inhibitory effect on earnings management [10, 11, 12], but some studies have revealed its promoting effect on real earnings management [8]. The divergence in research conclusions indicates that the relationship between digital transformation and earnings management is not a simple linear causal relationship, but is subject to complex influences from multiple mechanisms and boundary conditions. However, there is still a lack of systematic research on this interdisciplinary field in academia. Existing empirical studies are mostly briefly mentioned in the literature review section, and there is a lack of review papers that specifically focus on this topic.

This paper aims to systematically review domestic and international research findings in the interdisciplinary field of “enterprise digital transformation and earnings management,” clarifying core concepts, summarizing mechanisms of action, analyzing the root causes of research controversies, and identifying potential future research directions. Compared with existing research, this paper's marginal contributions are: it is the first time that research findings in this interdisciplinary field have been integrated in the form of a review paper, filling a gap in review literature; it refines the “four-effect” mechanism framework, breaking through the limitations of a single theoretical perspective; and it systematically analyzes the root causes of research disagreements, providing theoretical clues and topic selection references for subsequent empirical research.

2. Definition of Core Concepts and Literature Review

2.1 Enterprise Digital Transformation: Concept, Measurement Methods, and Economic Consequences

Digital transformation refers to the process by which enterprises use new-generation digital technologies such as artificial intelligence, blockchain, cloud computing, and big data to systematically reshape their organizational structure, business processes, management models, and value creation methods [1, 13].

The measurement of digital transformation is a fundamental challenge in empirical research. Based on the existing literature, measurement methods can be summarized into four types. The first is the dummy variable and assignment method [2]. The second is the substitution indicator method [6, 14], which uses the proportion of digital-related intangible assets or the scale of digital assets as proxy variables. The data is readily available. The third is the text analysis method, which uses Python to crawl the frequency of digital transformation keywords in the annual reports of listed companies for measurement [4], which can characterize the breadth and depth of transformation in multiple dimensions, but the construction of the thesaurus has a certain degree of subjectivity. Fourth is the comprehensive index method [15, 16], which constructs a multidimensional index system and is mainly used for macro-level measurement, with limited application at the enterprise level.

The aforementioned methods capture substantial differences in the dimensions of digital transformation: the dummy variable method focuses on “presence or absence,” the substitute indicator method focuses on digital investment or asset accumulation, and the text analysis method focuses on the breadth of strategic intent and technological application. This difference in measurement methods is a significant reason for the discrepancies in research conclusions — the “digital transformation” measured by different methods may not be different facets of the same concept, but rather point to different dimensions or even different stages of digital transformation. This makes it difficult to directly compare research conclusions based on different measurement methods, and it is a methodological issue that requires key attention in interdisciplinary research.

Research on the economic consequences of digital transformation presents a pattern of “overall positive, local cautious”, but the effects are multifaceted and conditionally dependent [2, 5]. In summary, the economic consequences of digital transformation are multifaceted and conditionally dependent, and its effects are moderated by corporate characteristics, transformation stage and external environment.

2.2 Earnings Management: Core Definition, Measurement Methods, and Influencing Factors

Earnings management refers to the behavior of corporate management in adjusting earnings information through accounting policy selection, accounting estimate changes or real transactions in accordance with accounting standards to achieve specific purposes [1, 5]. According to the different manipulation methods, earnings management can be divided into three types: accrual earnings management (adjusting book earnings through accounting choices), real earnings management (manipulating operating activities) and classification transfer earnings management (misclassifying income statement items) [17, 18].

The measurement of earnings management varies depending on the type. Accrual earnings management generally adopts the modified Jones model [1]; real earnings management mostly adopts the Roychowdhury model [17]; classification transfer earnings management is based on the McVay model [18]. The choice of measurement model will affect the comparability of research results. It is also found through comparative testing that the modified Jones model is more suitable for the Chinese capital market context [1]. Existing research has identified various internal and external factors influencing earnings management.

2.3 Literature Review on the Intersection of Digital Transformation and Earnings Management

The interdisciplinary research on enterprise digital transformation and earnings management is a new field that has emerged in recent years. Based on the differences in research conclusions, existing literature can be summarized into two major camps.

The “inhibition effect theory” is the mainstream view. Most studies have found that digital transformation has a significant inhibitory effect on earnings management: this inhibitory effect has been documented for accrual, real, and classification transfer earnings management, with mechanisms including improved information transparency, internal control, and reduced financing constraints [10, 12].

The “promotion effect theory” offers a different perspective. Liu Chang used A-share listed companies from 2013 to 2019 as a sample and found that digital transformation improved the level of real earnings management [8]. The logic is that the high investment and high risk of digital transformation have intensified the pressure on performance, while compressing the operational space of accrual earnings management, forcing management to turn to more covert real earnings management as an alternative. There is also indirect evidence from the perspective of the tone of annual reports, which found that the optimistic tone caused by digital transformation is negatively correlated with the future performance of enterprises [9].

In summary, the “inhibition effect theory” in accrual-based earnings management research is relatively robust, while research on real earnings management shows significant disagreements, and research on categorized transfer earnings management is relatively insufficient. The root causes of these disagreements warrant careful consideration and may involve multiple factors, including differences in digital transformation measurement methods, sample range selection, heterogeneity in earnings management types, and variations in the relative strengths of multiple mechanisms under different conditions. These disagreements reflect both the complexity and cutting-edge nature of this interdisciplinary field and provide important clues for subsequent mechanistic analysis.

3. Theoretical Mechanisms and Research Controversies Regarding the Impact of Digital Transformation on Earnings Management

3.1 The “Four Effects” Mechanism of Digital Transformation on Earnings Management

Research on the relationship between digital transformation and earnings management is based on several classic theories, which provide an analytical framework and deductive basis for understanding the logical connection between the two.

Based on existing research, the mechanisms by which digital transformation affects earnings management can be summarized into four main pathways. The first three tend to suppress earnings management, while the latter may induce earnings management behavior.

Information effect. From the perspective of information sources, digital technology adds unstructured information such as images, videos, and audio to accounting records, enhancing the verifiability of information [19]; big data analysis has shifted from simple sampling to overall analysis, mining more visualized and multi-dimensional information [6]; digital transformation promotes the transformation of organizational structure towards flattening and decentralization, improving the efficiency of information transmission [13]. There are empirical studies that have verified the inhibitory effect of improved information transparency on earnings management [10]. However, it is also found that while digital transformation enhances internal and external supervision, it may also force management to turn to more covert impression management methods such as tone manipulation, indicating that the boundary conditions of information effects still need to be explored in depth [9].

Governance effect. In terms of internal control, the transparent information environment and efficient decision-making system built by digital technology make corporate finance and management processes more transparent and less likely to be distorted or hidden [20]; the mediating role of reduced internal control defects in digital transformation in suppressing real earnings management is verified [11]. In terms of external supervision, digital transformation improves the efficiency and quality of auditors' audits and increases the attention and supervision capabilities of analysts and the media to enterprises [21, 22]. The effect of governance depends on certain conditions: when the institutional shareholding ratio is low, the promoting effect of digital transformation on real earnings management is more significant, indicating that the supervision of institutional investors is an important prerequisite for the effect of governance [8].

Resource effect. In terms of alleviating financing constraints, the mechanism test shows that digital transformation helps to enhance the availability of corporate financing and reduce financing costs, thereby suppressing earnings management motivation [12]. In terms of improving operating efficiency, digital transformation reduces the level of earnings management by improving resource operation efficiency measured by total factor productivity [8]. In terms of risk-taking, digital operation improves the corporate risk control process, and digital technology-driven decision-making is superior to traditional experience judgment, which helps to reduce decision-making and operational risks, reduce large fluctuations in performance, and thus weaken earnings management motivation.

Pressure effect. Digital transformation is characterized by high investment, long cycle and high uncertainty. When digital technology cannot be effectively integrated with the original foundation of the enterprise, it may cause the enterprise to experience a “period of pain” [10]. At the same time, the transformation has increased investors' expectations for the enterprise's performance, further strengthening the performance pressure on management [23]. More importantly, digital transformation has compressed the operational space of accrual earnings management, and management may turn to real earnings management or manipulate the tone of the annual report and other alternative methods [8, 9].

The four paths are not independent of each other, but rather have complex interactions: the information effect may strengthen the governance effect, the resource effect may be contingent on the governance effect, and the pressure effect may become prominent when the information and governance effects are weak. The relative importance of the different path changes dynamically with the stage of digital transformation, the characteristics of the enterprise, and the external environment.

3.2 Systematic Review and Root Cause Analysis of Research Controversies

Within the aforementioned framework, existing research is controversial at multiple levels, and the root causes deserve in-depth analysis.

The divergence in the overall effect direction. The inhibitory effect theory and the facilitating effect theory each draw opposite conclusions, which may be due to the following reasons [7, 10, 11]: First, the difference in sample intervals. The inhibitory effect theory mostly uses samples after 2010, when digital transformation has entered a relatively mature stage and the governance effect is gradually emerging; the facilitating effect theory uses samples from 2013 to 2019, when some enterprises are still in the painful period of transformation, and the pressure effect dominates. Second, the difference in the type of earnings management. The inhibitory effect theory mostly focuses on accrual earnings management, while the facilitating effect theory focuses on real earnings management, and the two may not be the same research object.

The debate over the primary and secondary mechanisms of action. Even under the same effect direction, different studies have different emphases on the core mechanism. Different studies emphasize different primary mechanisms (e.g., operational risk, internal control, information transparency), and most rely on mediation models without examining interactions among mechanisms. A deeper problem is that the information effect, governance effect and resource effect may not be parallel, but rather there is a causal chain or interaction, which existing studies have not paid enough attention to.

The substitution and complementarity relationships among different types of earnings management are still unclear. The “accrual-real” substitution hypothesis is proposed, while digital transformation simultaneously inhibited the transfer of earnings management [8, 12]. The manipulation costs, concealment and economic consequences of the three types of earnings management are different, and the strategic choices of management under different constraints may have complex dynamic adjustments, which are difficult to capture in the existing static research design.

The contradiction in the moderating direction of boundary conditions. Executive compensation weakened the inhibitory effect of digital development on earnings management, while the degree of diversified operation enhanced the inhibitory effect [1]. The inhibitory effect of digital transformation was more significant in non-state-owned enterprises, while the promoting effect of digital transformation was more significant in non-state-owned enterprises [8, 11]. This contradiction may stem from the fact that the same moderating variable produces different moderating effects in different types of earnings management or different stages of digital transformation.

In summary, research on the relationship between digital transformation and earnings management has initially established a “four-effect” mechanism framework. However, the relative importance, interaction, and boundary conditions of each effect still require further in-depth exploration. The existence of research controversies reflects both the complexity and cutting-edge nature of this field and points to potential breakthroughs for future research — standardization of metrics, deepening of mechanisms, differentiation of types, and integration of frameworks are four directions that future research should focus on.

4. Research Gaps and Future Prospects

4.1 Core Gaps in Existing Research

Although some progress has been made in research on the intersection of digital transformation and earnings management, there are still several bottlenecks that need to be overcome in terms of research design, mechanism revelation, and theoretical construction.

The measurement standards are not yet unified, and the comparability of conclusions is limited. As discussed in Section 2.1, the lack of standardized measurement methods for digital transformation limits the comparability of findings; the same applies to earnings management metrics.

The mechanisms underlying earnings management remain largely unexplored. While existing research has identified multiple mechanisms by which digital transformation impacts earnings management, in-depth analysis of their interactions, dynamic evolution, and micro-foundations is still lacking. Information effects, governance effects, resource effects, and pressure effects are not independent but may exhibit complementary, substitutive, or hierarchical relationships. However, current research often examines the mediating effect of a single mechanism, lacking a systematic examination of the interactions among multiple mechanisms. Furthermore, the micro-strategic choice logic of how management balances and substitutes among accrual, real, and classified transfer earnings management methods remains to be explored.

The heterogeneity of earnings management types has not received sufficient attention. Research on the three types of earnings management is unevenly distributed, with accrual earnings management being the most abundant, followed by real earnings management, and classified transfer earnings management being the least. The three methods differ significantly in terms of manipulation costs, concealment, and economic consequences. The impact mechanism of digital transformation on them may be different, but systematic comparative studies are still lacking.

An integrative theoretical framework is lacking. Existing research often adopts a single theoretical perspective, such as the information asymmetry perspective, the principal-agent perspective, or the signaling perspective. However, digital transformation possesses three attributes: information mechanisms, governance mechanisms, and resource mechanisms, while earnings management is driven by three motivations: opportunism, effective contracts, and signaling. A single theoretical perspective cannot fully explain the complex relationship between these two aspects, and there is currently a lack of an integrative analytical framework that organically combines these multiple attributes and diverse motivations.

The research methods are relatively simplistic, and causal identification needs improvement. While some studies have begun to utilize instrumental variables, multi-period difference-in-differences models, and PSM matching to address endogeneity issues, digital transformation is a long-term dynamic process, but most studies employ static panel models, lacking systematic tracking of long-term dynamic effects. Furthermore, research data primarily relies on listed companies' annual reports and financial databases, with limited use of questionnaires, case studies, and experimental methods. Cross-validation of multi-source data needs further strengthening.

4.2 Future Research Directions

Based on the identification of the aforementioned research gaps, this paper proposes the following potential research directions.

Promote the standardization of metrics to enhance research comparability. Future research could explore integrating multiple metric methods to construct a comprehensive indicator system encompassing strategic guidance, technological investment, organizational empowerment, and application of results. This system could be combined with objective indicators such as digital investment and the proportion of digital talent, and cross-validated with text analysis indicators. Regarding earnings management metrics, a systematic comparison of the applicability of different models in the Chinese context should be conducted to reach a consensus on the selection of metric methods.

Further research should delve into the mechanisms and reveal the underlying logic. Future studies should focus on exploring the interactions among information effects, governance effects, resource effects, and pressure effects. For example, does increased information transparency indirectly suppress earnings management by strengthening governance effects? Are pressure effects more pronounced in companies with weaker governance effects? Dynamic panel models or phased regression studies should be used to examine the changes in the relative importance of each mechanism at different stages of digital transformation, revealing the dynamic evolution of their relationship. Furthermore, experimental studies, case studies, or field investigations should be used to explore the micro-decision-making logic of management's trade-offs and substitutions among the three earnings management methods.

Focusing on type heterogeneity, systematic comparisons should be conducted. Future research should simultaneously examine the impact of digital transformation on three types of earnings management within the same framework, systematically comparing the differences in the direction and mechanism of effects. Simultaneous equation models or seemingly unrelated regression methods systematically examine the substitution or complementarity relationships among the three types of earnings management in the context of digital transformation, and to examine the moderating effects of corporate characteristics and the external environment on this relationship, revealing the boundary conditions for the transformation of earnings management methods.

Constructing an integrated theoretical framework to broaden research perspectives is crucial. Future research could explore building an integrated framework of “attributes-motivations-mechanisms-effects,” organically combining the multiple attributes of digital transformation with the diverse motivations of earnings management. The theoretical explanation of the mechanisms by which contextual factors play a role should be deepened, rather than merely focusing on the significance reports of heterogeneity tests. Furthermore, cross-national comparative studies could be expanded, utilizing data from multiple countries to examine the similarities and differences in the relationship between the two under different institutional environments, levels of digital economic development, and accounting standards systems, thereby enhancing the external validity of research conclusions.

Innovative research methods should be employed to strengthen causal identification. Future research can further explore exogenous policy impacts such as the integration of informatization and industrialization pilot projects, smart city pilot projects, and digital economy demonstration zones to construct a more credible causal identification framework. Longitudinal tracking studies should be conducted, tracking specific enterprise samples over a long period to examine the dynamic changes in earnings management behavior throughout the entire process of digital transformation from initiation to maturity. Multi-source data fusion and multi-method cross-validation can be promoted, combining questionnaire surveys, case studies, and machine learning methods to overcome the limitations of single methods and enhance the robustness and richness of research conclusions.

5. Conclusion

This paper, focusing on “Enterprise Digital Transformation and Earnings Management,” systematically reviews relevant research findings both domestically and internationally. The study finds that the relationship between digital transformation and earnings management has evolved into an academic dialogue with both “inhibitionist” and “promoting” theories. Discrepancies in research conclusions can be attributed to differences in measurement methods, heterogeneity in earnings management types, sample range selection, and variations in the relative strengths of multiple mechanisms in different contexts. At the mechanistic level, this paper proposes a “four-effect” analytical framework—information effect, governance effect, resource effect, and pressure effect- that tend to inhibit earnings management, while the pressure effect may induce earnings management behavior. These four paths are not independent but rather involve complex interactions, and their relative importance dynamically changes with the stage of digital transformation and the characteristics of the enterprise.

Based on a systematic review, this paper identifies five research gaps concerning measurement standardization, mechanism interaction, type heterogeneity, theoretical integration, and methodological diversification. To address these gaps, this paper proposes that future research should advance in five directions: standardization of measurement, deepening of mechanisms, differentiation of types, integration of frameworks, and diversification of methods.

This paper's theoretical contribution lies in its first systematic integration of research findings in this interdisciplinary field in a review format. It extracts a “four-effect” mechanism framework, analyzes the deep-seated roots of research disagreements, and identifies forward-looking research directions. In practice, enterprises should dialectically understand the dual impact of digital transformation on earnings management, strengthen governance mechanisms during the transformation process, and prevent the covert transfer of earnings management methods. Regulatory agencies should pay attention to the new characteristics of earnings management in the digital age and leverage digital technology to improve regulatory effectiveness. Investors need to comprehensively assess corporate earnings quality in conjunction with the transformation stage and governance environment, avoiding simplistic judgments. This paper also has certain limitations: the literature reviewed mainly focuses on the Chinese context, and cross-border comparative studies need further development.

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Funding

This research received no external funding.

Conflicts of Interest

The authors declare no conflict of interest.

Acknowledgment

This paper is an output of the science project.

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