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Examining the Effect of Earnings Management, Performance Management, and Corporate Social Performance on Artificial Intelligence of Things System Construction

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In an increasingly complex and uncertain business environment, enterprises must integrate internal governance mechanisms with external sustainability considerations to enhance organizational performance and strategic effectiveness. As natural resource depletion, climate change, and environmental awareness intensify, corporate evaluation has extended beyond financial outcomes to include corporate governance, green management practices, and social responsibility. Concurrently, rapid advances in IoT and AI have accelerated intelligent operations and fintech development, positioning digital transformation as a key source of competitive advantage. Within this context, the integration of Artificial Intelligence of Things (AIoT) technologies into organizational management systems represents a critical pathway toward smart governance and sustainable development. Accordingly, in this study, we investigated the relationships among earnings management, performance management, corporate social performance (CSP), and the construction of AIoT information systems, with particular attention to the mediating role of organizational fit. The empirical results indicate that earnings management, performance management, and CSP exert significant positive effects on organizational fit with AIoT systems. Moreover, organizational fit mediates the relationship between these managerial mechanisms and effective AIoT system construction, facilitating the application of information security, AI, and big data technologies. Overall, the findings enrich the literature on smart governance and sustainable management while offering practical insights for enterprises seeking to leverage AIoT and fintech to enhance sustainability and sustain long-term competitive advantage.

1. Introduction

In an increasingly complex and uncertain business environment, investors and stakeholders rely heavily on corporate performance as a primary indicator when evaluating investment decisions and collaborative relationships. Traditionally, enterprises have formulated strategies on the basis of profit maximization and internally oriented governance mechanisms. However,

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amid natural resource depletion, intensifying climate change, growing environmental awareness, and ongoing globalization, such conventional management approaches have become insufficient to support long-term organizational performance and strategic effectiveness. As a result, enterprises are increasingly required to integrate internal governance mechanisms with external sustainability considerations to respond to environmental uncertainty and competitive pressures.

Since the Brundtland Report,[1] environmental, social, and governance (ESG) considerations have emerged as essential criteria for assessing corporate responsibility and sustainability performance. Enterprises are no longer evaluated solely on financial performance but are also expected to strengthen corporate governance, adopt green management practices, and fulfill social responsibilities. Previous studies suggest that proactive ESG and corporate social performance (CSP) initiatives can enhance long-term competitiveness; however, excessive emphasis on ESG may create trade-offs between economic outcomes and social objectives, particularly in the short term. Moreover, CSP investments may exhibit heterogeneous and time-lagged effects on firm performance, underscoring the need for balanced managerial decision-making.

At the same time, rapid advancements in IoT and AI have accelerated the adoption of intelligent operations and fintech, which have become key drivers of digital transformation and competitive advantage. In this context, the integration of AIoT technologies with organizational management systems represents an important pathway toward smart governance and sustainable development. Despite the widespread implementation of IoT-based technologies in the manufacturing and retail sectors, the development of AIoT applications in fintech remains relatively limited, constrained by challenges related to technological complexity, data integration, and information security. Accordingly, in this study, we examined the relationships among earnings management, performance management, CSP, and the construction of AIoT information systems, with a particular focus on the mediating role of organizational fit. By empirically analyzing these relationships, we sought to provide both theoretical contributions to the literature on smart governance and sustainable management and practical implications for enterprises pursuing intelligent operations and sustainable competitive advantage.

2. Theoretical Background

2.1 Impact of AIoT on earnings management

Earnings management refers to managerial discretion in financial reporting or operating decisions to affect reported earnings within regulatory boundaries. [2,3] Prior studies indicate that managers may opportunistically adjust accounting policies or real activities to affect earnings informativeness and investors' perceptions of firm value. [4] In response to increased regulatory scrutiny, real earnings management has attracted growing academic attention, given its relatively concealed nature.

Empirical evidence suggests that real earnings management is negatively associated with earnings quality, although enhanced information environments can mitigate information asymmetry and constrain opportunistic behavior. Corporate governance mechanisms—

including board independence, ownership structure, risk management, and disclosure transparency—are shown to effectively limit earnings manipulation. Firms with stronger governance structures generally exhibit lower levels of earnings management.

Recent studies have increasingly emphasized the role of digital technologies in enhancing accounting information quality and constraining earnings management. Warren *et al.*[5] argued that big data analytics can strengthen management control systems and reduce information asymmetry, thereby improving firms' financial information environments. Extending this line of research, Wang *et al.*[6] provided empirical evidence that the adoption of IoT technologies significantly suppresses both accrual-based and real earnings management by improving operational transparency and monitoring efficiency. Moreover, IoT adoption facilitates capital market functioning, financing and investment activities, and long-term operational efficiency, highlighting its positive impact on firms' accounting information environments.

When AI is integrated with IoT to form AIoT systems, real-time data collection, intelligent analytics, and automated monitoring capabilities are further enhanced. In theory, these features can strengthen internal control mechanisms, auditing effectiveness, and the detection of financial anomalies. Consistent with this view, Kadhim and Al Ani[7] contended that with rapid technological advancement and the widespread adoption of automation, traditional auditing techniques are increasingly inadequate for handling large volumes of real-time financial data. They suggested that integrating AI with data-mining approaches can significantly enhance anomaly detection and constrain earnings management, thereby improving the reliability and transparency of accounting information.

Nevertheless, the effectiveness of emerging digital technologies may be contingent upon governance quality and application contexts. Autore *et al.*[8] examined blockchain technology and argued that its immutability, decentralized consensus mechanisms, and real-time data-sharing features should theoretically enhance data integrity and reduce earnings management. These benefits may be further amplified when blockchain is combined with technologies such as AIoT, which enhance real-time data processing and intelligent monitoring. However, their empirical evidence from supply chain settings reveals that heightened market expectations and speculative enthusiasm surrounding blockchain and its AIoT-enabled applications may instead incentivize increased earnings management by supplier firms following blockchain adoption by customer firms. This finding underscores the possibility of the unintended consequences of blockchain and AIoT in financial reporting contexts.

2.2 Impact of AIoT on performance management

Performance management refers to a systematic managerial process through which organizations enhance overall performance by improving employees' capabilities, competencies, and work motivation. Armstrong and Baron[9] emphasized that performance management aims to establish goal alignment between employees and the organization, thereby increasing the likelihood of achieving organizational objectives. Therefore, performance management can function as a strategic integration mechanism that mobilizes both individual and organizational capabilities to enhance work performance and support the sustainable development of the

organization. Similarly, Weiss[10] highlighted the importance of jointly setting performance goals with employees to increase the probability of achieving desired outcomes. Kuo[11] noted that effective performance management must be embedded in organizational culture and supported by communication, resource allocation, accountability mechanisms, and managerial execution, combining both technical and behavioral dimensions of leadership.

In the context of the information economy and intensified global competition, firms and public organizations increasingly recognize that performance management must simultaneously address goal achievement, organizational values, internal environments, and interactions with stakeholders in order to sustain competitiveness and organizational effectiveness. New public management theory advocates a customer-oriented approach, market-based competition mechanisms, and quality management, emphasizing the pursuit of high efficiency and output under constrained resources.[12] From a managerial perspective, performance reflects the return on management derived from organizational inputs and outputs, which can be strengthened through institutional design and cultural transformation.[13] These perspectives underscore the central role of performance management as a governance mechanism in modern organizations.

With the rapid development of IoT and AI technologies, their integration into AIoT has emerged as a critical enabler of smart operations and performance management. I. Lee and K. Lee[14] indicated that IoT technologies enhance operational transparency and data availability through real-time data collection, sensor networks, and interconnected smart devices. When combined with AI, firms can leverage machine learning and predictive analytics to deepen data analysis and provide real-time feedback to management control processes, thereby facilitating intelligent decision-making.[15] Furthermore, Ben-Daya *et al.*[16] and Al-Khatib[17] demonstrated that AIoT applications in supply chain management strengthen real-time monitoring, cross-functional coordination, and supply chain visibility, enabling firms to dynamically adjust resource allocation, mitigate operational risks, and improve overall performance outcomes.

In addition, Müller *et al.*,[18] from the perspectives of Industry 4.0 and sustainable competitive advantage, argued that firms adopting AIoT-enabled process automation and intelligent monitoring can develop dynamic key performance indicators, thereby enhancing budgetary control, resource allocation, and strategic execution capabilities. Collectively, AIoT technologies—by integrating real-time sensing, intelligent analytics, and automated feedback mechanisms—not only improve the timeliness and accuracy of performance management but also facilitate cross-departmental resource integration and process optimization, making them a foundational component of smart manufacturing and digital operations.

2.3 Impact of AIoT on CSP

CSP refers to the overall performance exhibited by firms in response to stakeholders' demands through corporate governance, organizational commitment, social engagement, and environmental protection initiatives.[19] Carroll[20] further conceptualized CSP as encompassing four dimensions—economic, legal, ethical, and philanthropic responsibilities—indicating that firms are accountable not only to shareholders but also to a broad range of stakeholders. With the promotion of the United Nations Global Compact and the emergence of the ESG framework,

CSP has become a critical indicator for evaluating corporate sustainability and competitiveness. Moreover, CSP evaluation and disclosure mechanisms help reduce information asymmetry, leading investors to regard social responsibility performance as an important source of decision-relevant information.[21] From a corporate governance perspective, board structure, the proportion of independent directors and supervisors, managerial ownership, and information transparency all exert positive effects on CSR implementation performance, [22] suggesting that sound governance mechanisms facilitate stronger corporate social responsibility outcomes. Within the sustainability and ESG framework, most studies support a positive relationship between CSP and firms' financial and operating performance, with effects that are characterized by lagged and heterogeneous impacts.[23] Governments also play a pivotal role in promoting CSP and socially responsible finance, such as microfinance, and empirical evidence indicates that fulfilling social responsibilities can simultaneously enhance financial performance and operational efficiency in financial institutions. [24]

In recent years, alongside the Fourth Industrial Revolution and the advancement of AIoT technologies, scholars have increasingly focused on the potential role of intelligent technologies in enhancing CSP and ESG performance. Prior research suggests that AIoT enables firms to strengthen resource efficiency, carbon emission management, risk control, and responsible supply chain governance through real-time data collection, intelligent analytics, and supply chain visibility, thereby supporting sustainable decision-making and the achievement of social responsibility objectives.[16,25,26] In addition, the integration of big data and intelligent sensing into product life cycle management allows firms to monitor environmental impacts in real time and conduct dynamic optimization, thereby reinforcing circular economy practices and sustainable competitive advantage.[27]

Overall, the extant literature indicates that corporate social performance not only contributes to firm value enhancement, risk reduction, and governance effectiveness but is also increasingly intertwined with ESG considerations and the development of intelligent technologies. However, how AIoT can comprehensively support CSP strategy implementation and performance measurement across different industries and organizational contexts remains an open question that warrants further investigation.

3. Hypothesis Development

Amid the concurrent trends of digital transformation and sustainable development, enterprises are increasingly leveraging AIoT information systems to integrate internal and external resources, thereby enhancing operational efficiency, management transparency, and long-term competitive advantage. Existing studies indicate that, beyond technical factors, internal governance mechanisms, management systems, and external social responsibility pressures are critical determinants of the effectiveness of intelligent information system implementation.[17,19] Accordingly, in this study, we considered earnings management, performance management, and CSP as core explanatory variables to examine their effects on AIoT information system construction, while introducing "fit" as a mediating variable to clarify its role in the underlying mechanisms.

Earnings management reflects a firm's approach to financial reporting, internal controls, and information transparency. To reduce information asymmetry and enhance the reliability of financial data, firms often rely on real-time, accurate, and traceable information systems as managerial support. AIoT systems, through real-time data collection, intelligent analysis, and automated feedback mechanisms, help strengthen internal monitoring, reduce the scope for earnings manipulation, and improve the quality of financial information. Therefore, firms facing pressures related to earnings management are more likely to actively adopt AIoT information systems to support financial governance and decision-making needs.

Performance management emphasizes institutionalized processes for goal setting, performance measurement, and feedback. Its effectiveness heavily depends on timely, comprehensive, and analyzable information. AIoT technologies enable the real-time collection of operational and process data and, when integrated with AI and big data analytics, assist firms in developing dynamic performance indicators, enhancing performance tracking, resource allocation, and management control capabilities. Consequently, firms that prioritize the implementation of performance management systems are more inclined to adopt AIoT systems with real-time monitoring and intelligent analysis functionalities.

With the widespread adoption of ESG and sustainability principles, corporate social performance has become an important indicator of governance quality and long-term competitiveness. AIoT systems can support firms in improving resource efficiency, implementing responsible governance, and responding to stakeholder expectations through supply chain visibility, real-time environmental monitoring, and risk control mechanisms. When firms place greater emphasis on social responsibility performance, they typically require higher transparency and auditable information systems to support CSP and ESG-related management and reporting needs.

Fit refers to the degree of alignment between a firm's strategies, organizational requirements, and the functionalities of its information systems. Even if a firm has high demands in earnings management, performance management, or social responsibility performance, the effectiveness of AIoT system construction may be limited if the system does not adequately align with its managerial goals and organizational characteristics. Conversely, when a firm's internal and external management requirements are highly compatible with AIoT system functionalities, this alignment can amplify the positive effects of the aforementioned dimensions on AIoT system implementation. Therefore, fit is considered a key mechanism linking management dimensions with the effectiveness of information system construction.

4. Research Methodology

4.1 Measurement scale development

To enhance the objectivity and reliability of the research findings, we employed a quantitative research approach for empirical analysis. Data processing began with descriptive statistical analysis using SPSS 18.0, which allowed for an examination of the basic demographic

characteristics of the respondents, as well as the mean and standard deviation of each questionnaire item, serving as a basis for subsequent analyses.

To further assess the reliability and validity of the measurement instruments and the fit of the construct measurement models, confirmatory factor analysis (CFA) was conducted using AMOS structural equation modeling software. CFA was applied to evaluate whether the constructs of earnings management, performance management, and corporate social performance effectively capture their respective dimensions in the context of AIoT information system implementation, ensuring satisfactory internal consistency and convergent validity. The conceptual framework presented in Fig. 1 was subsequently tested through structural equation modeling to examine the hypothesized relationships among the constructs.

4.2 Data analysis technique

Following the recommendations of Bagozzi and Yi[28] and Hair *et al.*,[29] standardized factor loadings should exceed 0.50 to ensure adequate convergent validity. The empirical results indicated that all observed variables exhibit standardized factor loadings above this threshold, demonstrating that the measurement items effectively represent their respective latent constructs.

Regarding overall measurement model fit, the chi-square to degrees of freedom ratio (χ^2/df) is 1.955, which is below the recommended cutoff value of 3, indicating satisfactory model parsimony and fit. The adjusted goodness-of-fit index (*AGFI*) reaches 0.944, exceeding the acceptable level of 0.80. The comparative fit index (*CFI*) is 0.998, well above the suggested criterion of 0.90, whereas the normed fit index (*NFI*) is 0.996, further confirming good model fit. In addition, the root mean square residual (*RMR*) is 0.006, which is below the threshold of 0.05, indicating minimal residual variance.

The root mean square error of approximation (*RMSEA*) is 0.076, which is slightly higher than the ideal value of 0.05. However, according to Browne and Cudeck,[30] *RMSEA* values between 0.05 and 0.08 indicate an acceptable model fit, particularly given that *RMSEA* may be affected by sample size and model complexity. Overall, these fit indices demonstrate that the measurement model exhibits adequate convergent validity and overall goodness of fit, providing a sound foundation for subsequent structural model analysis.

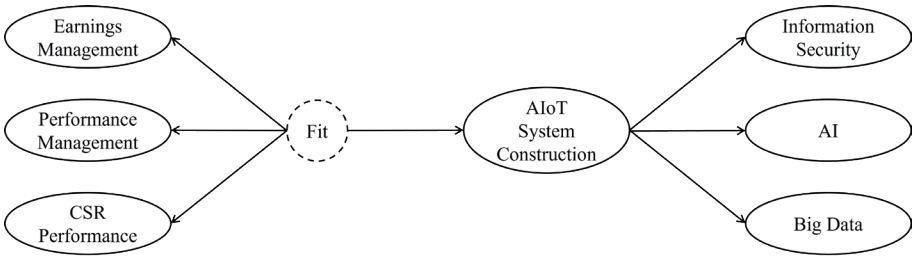

Fig. 1. Conceptual research model.

5. Data Analysis and Results

5.1 Sample characteristics

The study sample consisted primarily of male respondents (60.2%), with the largest age group being 41–50 years old (32.7%). Most participants held a university degree or higher (58.6%). Regarding organizational characteristics, the majority of companies reported capital ranging from NT$1 million to 5 million (57.2%) and employed fewer than 20 staff members (37.9%). The industrial sector was the most represented (52.5%). Overall, the sample demonstrates sufficient professional expertise and practical experience, suggesting that the collected data are representative and suitable for rigorous empirical analysis.

5.2 Hypothesis testing

In this study, we adopted a systems perspective to examine the effects of earnings management, performance management, and CSP on AIoT information system construction. The results of the structural equation model are presented in Fig. 2. These results indicated that the second-order latent variable, integrating the three constructs, significantly and positively affects AIoT system construction (all factor loadings $p < 0.001$), explaining 92.7% of the variance and supporting the proposed hypotheses.

Model fit indices confirm adequacy: χ^2/d.f. = 3.848, *CFI* = 0.953, *NFI* = 0.939, and *RMR* = 0.028, whereas *AGFI* = 0.771 is slightly below the threshold owing to limited regional sampling. Overall, fit indicators suggest a robust model.

Path analysis shows that "information transparency" (0.93) is the most influential subdimension within earnings management, "internal environmental factors" (0.97) in performance management, and "corporate governance" and "environmental protection & social participation" (0.94 each) in CSP. For AIoT subdimensions, "information security" (0.93) is prioritized over "artificial intelligence" (0.91), emphasizing risk mitigation and stakeholder trust.

In summary, all three constructs exert significant positive effects on AIoT system construction. Enterprises aiming for digital and intelligent transformation should enhance transparency, optimize internal environments, implement effective governance, and actively fulfill social responsibilities to ensure successful AIoT adoption and sustainable competitive advantage.

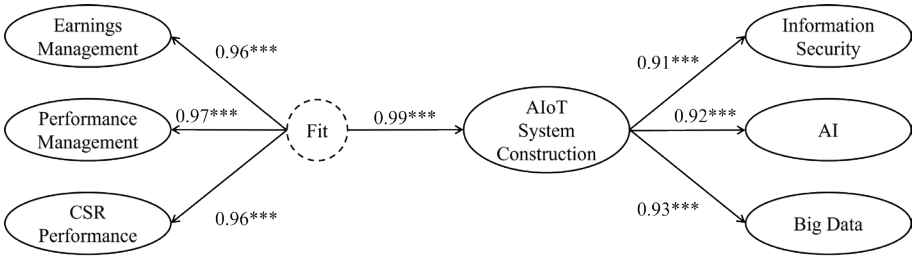

Fig. 2. Results of research model.

6. Discussion and Conclusions

In this study, we examined the integrated effects of earnings management, performance management, and CSP on AIoT system construction from a systems perspective. Results showed that the combined fit of the three constructs significantly and positively affects AIoT development, explaining 99% of the variance and confirming the model's theoretical and empirical validity.

The findings highlight that enterprises should enhance information transparency, optimize internal environments, implement effective governance, and actively fulfill social responsibilities to ensure successful AIoT adoption and sustainable competitive advantage. Within AIoT systems, information security, artificial intelligence, and big data are critical, with information security being paramount for risk mitigation and stakeholder trust.

Future research can expand the model to include resource management and external environmental factors, adopt multi-industry or cross-regional samples, and use qualitative case studies to further examine practical adoption challenges. Overall, the integrated fit of earnings management, performance management, and CSP is a key driver of AIoT system success, offering actionable insights for digital transformation and sustainable development.

References

1 WCED: Brundtland Report (Oxford University Press,1987) 1st ed.
2 K. Schipper: Account. Horiz. **3** (1989) 91.
3 P. M. Healy and J. M. Wahlen: Account. Horiz. **13** (1999) 4. https://doi.org/10.2308/acch.1999.13.4.365
4 W. R. Scott: Financial Accounting Theory (Pearson, Canada, 1997).
5 J. D. Jr. Warren, K. C. Moffitt, and P. Byrnes: Account. Horiz. **29** (2015) 2. https://doi.org/10.2308/acch-51069
6 X. Wang, L. Bu, and X. Peng: China J. Account. Stud. **9** (2021) 3. https://doi.org/10.1080/21697213.2021.2009180
7 Y. A. Kadhim and S. A. M. Al Ani: Navigating the Power of Metaverse and Its Applications **895** (2023) 171. https://doi.org/10.1007/978-3-031-51716-7_12
8 D. Autore, H. (A.) Chen, N. Clarke, and J. Lin: Brit. Account. Rev. **56** (2024) 4. https://doi.org/10.1016/j.bar.2024.101357
9 M. Armstrong and A. Baron: Performance Management Handbook (IPM, London,1998).
10 T. G. Weiss: JSTOR. **21** (2000) 5. http://doi.org/10.1080/713701075
11 Y. Y. Kuo: Pub. Gov. Q. **6** (2018) 3.
12 S. W. Fan and C. P. Wang: Chinese Pub. Adm. Rev. **10** (2000) 1. https://doi.org/10.6635/cpar.2000.10(1).05
13 S. Y. Huang, C. C. Lin, and Y. L. Huang: Taiwan Acad. Manage. J. **12** (2012) 2. https://doi.org/10.6295/TAMJ.2012.1202.06
14 I. Lee and K. Lee: Bus. Horiz. **58** (2015) 431. https://doi.org/10.1016/j.bushor.2015.03.008
15 S. F. Wamba, S. Akter, A. Edwards, G. Chopin, and D. Gnanzou: Int. J. Prod. Econ. **165** (2015) 234. https://doi.org/10.1016/j.ijpe.2014.12.031
16 M. Ben-Daya, E. Hassini, and Z. Bahroun: Int. J. Prod. Res. **57** (2017) 4719. https://doi.org/10.1080/00207543.2017.1402140
17 A. W. Al-Khatib: J. Manuf. Technol. Manage. **34** (2023) 1. https://doi.org/10.1108/JMTM-08-2022-0310
18 J. M. Müller, O. Buliga, and K.-I. Voigt: Technol. Forecasting Social Change **132** (2018) 2. https://doi.org/10.1016/j.techfore.2017.12.019
19 D. J. Wood: Acad. Manage. Rev. **16** (1991) 4. https://doi.org/10.2307/258977
20 A. B. Carroll: Bus. Horiz. **34** (1991) 4. https://doi.org/10.1016/0007-6813(91)90005-G
21 Y. J. Huang, G. X. Wu, Y. S. Chen, and Y. C. Shi: J. Commercial Modernization **8** (2016) 2. https://doi.org/10.6132/JCM.2016.8.2.19
22 T. C. Shih, L. W. Tsai, and H. P. Hsiang: Rev. Account. Audi. Stud. **9** (2019) 1.
23 Y. N. Chuang, J. T. Liu, and C. C. Lee: Fu Jen Management Review **30** (2023) 2.

24 S. T. Huang and Y. Chang: Taiwan Acad. Manage. J. **21** (2021) 1. https://doi.org/10.6295/TAMJ.202102_21(1).0002
25 M. A. Berawi: Int. J Tech. **10** (2019) 4. https://doi.org/10.14716/ijtech.v10i4.3341
26 M. L. Tseng, M. S. Islam, N. Karia, F. A. Fauzi, and S. Afrin: Resour. Conserv. Recy. **141** (2019) 145. https://doi.org/10.1016/j.resconrec.2018.10.009
27 Y. Zhang, S. Ren, Y. Liu, T. Sakao, and D. Huisingh: J. Clean. Prod. **159** (2017) 229. https://doi.org/10.1016/j.jclepro.2017.04.172
28 R. Bagozzi and Y. Yi: J Acad. Market. Sci. **16** (1988) 74. https://doi.org/10.1007/BF02723327
29 J. Hair, W. Black, B. Babin, R. Anderson, and R. Tatham: Multivariate Data Analysis (Pearson Prentice Hall, 2006) 6th ed.
30 M. W. Browne and R. Cudeck: Sociological Methods Res.**21** (1992) 2. https://doi.org/10.1177/0049124192021002005