

Linking Accounting Information and Internal Controls to Sustainable Performance: Evidence on the Mediating Role of Management Control Systems

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Abstract

Keywords:

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Organizational sustainability is an important issue in the management of Islamic Microfinance Institutions (IMFIs) because these institutions are not only required to achieve economic performance, but also to fulfill social and institutional responsibilities in a sustainable manner. This study examines the influence of the Accounting Information System (AIS), Internal Control System (ICS), and Management Control System (MCS) on Sustainability Performance among 89 IMFIs in Central Java, Indonesia. Data were analyzed using Smart PLS, and the findings reveal that AIS has not been able to support the effectiveness of MCS, thereby failing to contribute to the achievement of sustainability performance. In contrast, ICS has a positive effect on MCS, and MCS mediates the relationship between ICS and sustainability performance. The study concludes that ICS plays a more strategic role than AIS in enhancing sustainability performance within IMFIs. The primary theoretical contribution of this study lies in highlighting the mediating role of MCS in translating the function of ICS as an internal control mechanism into improved sustainability performance outcomes. Practically, this study provides valuable implications for the management of IMFIs by emphasizing the importance of strengthening ICS and developing sustainability-oriented MCS. The findings indicate that improving the quality of supervision, risk management, and integrated performance evaluation can support IMFIs in achieving more sustainable economic, social, and institutional performance. Furthermore, this study emphasizes that the implementation of AIS should be optimized not merely as an administrative tool, but also as a strategic information resource for managerial decision-making processes.

Abstrak

Kata kunci:
Sistem Informasi
Akuntansi;
Sistem
Pengendalian
Internal;
Sistem
Pengendalian
Manajemen;
Kinerja
Keberlanjutan

Keberlanjutan organisasi menjadi isu penting dalam pengelolaan Lembaga Keuangan Mikro Syariah (LKMS) karena lembaga ini tidak hanya dituntut mencapai kinerja ekonomi, tetapi juga memenuhi tanggung jawab sosial dan kelembagaan secara berkelanjutan. Penelitian ini mengkaji pengaruh Sistem Informasi Akuntansi (SIA), Sistem Pengendalian Intern (SPI), dan Sistem Pengendalian Manajemen (SPM) terhadap Kinerja Keberlanjutan pada 89 LKMS di Jawa Tengah, Indonesia. Analisis data dilakukan menggunakan Smart PLS, dengan hasil penelitian menunjukkan bahwa SIA belum mampu mendukung efektivitas SPM, sehingga tidak memberikan kontribusi terhadap pencapaian kinerja keberlanjutan. Sebaliknya, SPI terbukti berpengaruh positif terhadap SPM, dan SPM memediasi hubungan antara SPI dan kinerja keberlanjutan. Penelitian ini menyimpulkan bahwa SPI memiliki peran yang lebih strategis dibandingkan SIA dalam meningkatkan kinerja keberlanjutan pada LKMS. Kontribusi teoretis utama penelitian ini terletak pada penekanan peran mediasi SPM dalam menerjemahkan fungsi SPI sebagai mekanisme pengendalian internal untuk meningkatkan hasil kinerja keberlanjutan. Secara praktis, penelitian ini memberikan kontribusi nyata bagi pengelolaan LKMS dengan menunjukkan pentingnya penguatan SPI dan pengembangan SPM yang berorientasi keberlanjutan. Hasil penelitian mengindikasikan bahwa peningkatan kualitas pengawasan, manajemen risiko, serta evaluasi kinerja yang terintegrasi dapat membantu LKMS mencapai

kinerja ekonomi, sosial, dan kelembagaan yang lebih berkelanjutan. Selain itu, penelitian ini menegaskan bahwa implementasi SIA perlu dioptimalkan tidak hanya sebagai alat administratif, tetapi juga sebagai sumber informasi strategis dalam proses pengambilan keputusan manajerial.

1. Introduction

Sustainability issues have emerged as a major concern for organizations worldwide over the past two decades, as reflected in the significant increase in sustainability reporting among business. Sustainability performance demonstrates an organization's commitment to carrying out business activities that achieve financial success while also maintaining social and environmental responsibility (Indriastuti & Chariri, 2021). Sustainability has become one of the most important determinants in assessing business commitment to social issues, including poverty alleviation (Quesado *et al.*, 2024). Therefore, sustainability is highly relevant to Islamic Microfinance Institutions (IMFIs), such as Baitul Maal wat Tamwil (BMT), as BMTs' sustainability performance can contribute not only to economic growth but also to addressing social challenges (Dawami *et al.*, 2021). Unlike large financial service institutions, which generally operate with more established systems and resources, IMFIs face more complex sustainability challenges because they must simultaneously balance economic objectives, social responsibilities, and Sharia compliance.

BMT plays a strategic role in strengthening financial inclusion and empowering microeconomic activities in Indonesia, particularly for communities that remain underserved by conventional banks. This role is not merely financial; BMTs also contribute to sustainable development objectives through productive financing grounded in Sharia principles. By adhering to Islamic principles, BMTs are not solely oriented toward profitability, but also emphasize justice, community economic empowerment, and the sustainability of customers' businesses. Therefore, sustainability performance encompassing financial, social, and governance dimensions has become a critical aspect that must be considered in BMT management to ensure organizational resilience and long-term growth amid the dynamic business environment. According to data from the Indonesian BMT Association (PBMTI), there were 351 BMTs operating across Indonesia, serving 3,399,823 members and totaling assets of IDR 15,141,457,335,950. This figure represented an 18.9% increase compared to the previous year's total assets. However, the Non-Performing Financing (NPF) ratio increased from 4.56% to 5.02% (OJK, 2025), indicating the need to strengthen credit risk management and internal control mechanisms to safeguard long-term sustainability.

In applying sustainability principles, organizations aim to incorporate three key dimensions, namely economic profitability, environmental stewardship, and social responsibility into all aspects of their operations (Nogueira *et al.*, 2024; Soewarno & Tjahjadi, 2020). This condition requires reliable information systems to ensure data accuracy, operational integrity, and effective decision-making processes. Accounting Information Systems (AIS) have become the backbone of collecting, processing, and reporting accounting information required for both operational and strategic purposes. Vărzaru (2022) argues that the implementation of AIS establishes a framework for producing environmental information, allowing management to meet its accountability obligations by delivering relevant and reliable data on corporate environmental performance. According to Dillard *et*

al. (2016), socially responsible AIS can promote economic, social, and environmental sustainability by integrating information that supports social goals, including community welfare, employee health and safety, prevention of child labor, and poverty reduction. Although recent literature suggests that AIS can strengthen the performance of microfinance organizations by improving information quality and operational efficiency, empirical evidence directly linking AIS to sustainability performance in the context of BMT remains limited (Wijayanti *et al.*, 2024). Most previous studies have paid limited attention to social and environmental aspects, which restricts their capacity to identify stronger causal links between AIS capabilities and sustainability performance.

In addition to AIS, Internal Control Systems (ICS) also have an important role in protecting organizational assets and ensuring adherence to applicable regulations. Sustainability performance in BMT is not measured solely by profitability; it also encompasses social dimensions and Sharia compliance. Therefore, the effectiveness of internal controls is expected to promote good governance, transparency, accountability, and ultimately enhance the sustainability performance of BMTs. Hamed (2023) found that compliance with internal control procedures and continuous monitoring of the system can improve profit per employee in banks, while effective information and communication mechanisms contribute to higher returns from sustainability initiatives. Furthermore, an effective ICS is particularly critical for BMTs, as it helps ensure that operational processes are conducted in accordance with established procedures, prevent fraudulent practices, and maintain the reliability of financial reporting (Kabuye *et al.*, 2021; Krishnan *et al.*, 2020). Without adequate internal controls, BMTs become more vulnerable to risks of asset misappropriation and inaccurate information, which may ultimately threaten the institution's long-term sustainability.

Previous research has produced inconsistent results concerning the effectiveness of ICS. Several studies have shown that ICS plays an important role in fraud prevention, ensuring the reliability of financial reporting, and reducing operational risks, thereby contributing to the sustainability of BMT's economic, social, and institutional performance (Fachrudin *et al.*, 2024; Noor *et al.*, 2023). In contrast, other studies indicate that the implementation of ICS has not been fully effective in strengthening control management due to weak implementation practices, inadequate monitoring, and misalignment between organizational objectives and control mechanisms (Heinrich & Probohudono, 2023; Widyaningsih, 2015). This inconsistency suggests that the existence of an ICS does not automatically guarantee the effectiveness of MCS. In practice, many organizations formally establish internal control policies; however, they often fail to translate these controls into adaptive and performance-oriented managerial control practices (Fachrudin *et al.*, 2024).

Developing sustainability concepts within BMT requires the utilization of various management control tools to translate organizational strategies into improved performance outcomes. Management Control Systems (MCS) have a strong capacity to support decision-making processes and consequently play a vital role in developing and implementing sustainability strategies (Crutzen *et al.*, 2017; Quesado *et al.*, 2024; Yu & Rowe, 2017). MCS is useful for integrating sustainability principles, including the implementation of AIS and

ICS, into business strategies, organizational policies, and operational practices ([Castellano & Felden, 2021](#); [Mahmoudian et al., 2022](#); [Narayanan & Boyce, 2019](#)). Furthermore, MCS facilitates the development of sustainability indicators through the availability of relevant information and adequate financial control mechanisms to guide organizational activities and strategic decisions.

The implementation of Accounting Information Systems (AIS) will provide more optimal benefits when supported by adequate MCS in organizational decision-making and monitoring processes. Furthermore, the effectiveness of MCS in modern managerial practices is also highly dependent on the implementation of ICS, which serves as the primary foundation for ensuring effective organizational control, accountability, and compliance. Therefore, the influence of AIS and ICS on sustainability performance may be strengthened through the mediating role of MCS. However, according to [Traxler et al. \(2020\)](#) and [Quesado et al. \(2024\)](#), research examining the interaction between sustainability and MCS remain limited. Based on this research gap, empirical studies integrating objective AIS indicators, ICS indicators, multidimensional sustainability measures, and the mediating role of MCS are expected to fill an important gap in the literature and provide more practical policy implications for the development of BMT in Indonesia. This issue is particularly important because, in practice, BMTs continue to face challenges in integrating information systems, internal controls, and management control mechanisms into measurable sustainability strategies. However, the majority of prior studies have concentrated on large corporations or the formal banking sector, whereas studies within the context of BMT, remain relatively scarce. In fact, both AIS and ICS require effective MCS to facilitate organizational decision-making and control processes.

This study aims to identify the antecedents of MCS, particularly ICS and AIS, and to analyze the effect of MCS on sustainability performance. Understanding the extent to which ICS and AIS are integrated into MCS and how such integration influences sustainability performance in the context of BMT may provide new insights for stakeholders. Furthermore, identifying the challenges and opportunities that contribute to strengthening ICS and promoting the effective utilization of AIS may enhance governance practices and support the sustainability of BMTs in Central Java.

2. Literature Review

2.1. AIS, MCS and Sustainability Performance

AIS integrates accounting, financial, and managerial approaches with specialized software capabilities to improve the effectiveness of accounting activities and produce valuable information for decision-making ([Huy & Phuc, 2020](#); [Vărzaru, 2022](#)). The emergence of sustainable development concepts has significantly expanded the role and functions of AIS. AIS is no longer confined to recording and reporting corporate economic activities and their effects on financial conditions; it is now also capable of accurately assessing organizational contributions and impacts related to the natural environment and social responsibility. AIS offers the technological and procedural infrastructure necessary for collecting, processing, and reporting both financial and non-financial information, which

functions as an essential input for MCS (Kalbouneh *et al.*, 2023; Tu Le *et al.*, 2024; Vărzaru, 2022). Tu Le *et al.* (2024) found that AIS and MCS are increasingly integrated into sustainable development, particularly in supporting organizational sustainability planning, control, and performance measurement. According to Kalbouneh *et al.* (2023), sustainability accounting has developed into a mechanism for incorporating economic, social, and environmental dimensions into organizational decision-making processes, including through the support of information technology and accounting systems. With these capabilities, AIS can contribute significantly to organizational sustainable development.

According to Chopra *et al.* (2024), companies that possess advanced information systems tend to exhibit higher-quality ESG reporting and greater transparency. Knauer *et al.* (2020) further demonstrated that sustainability governance becomes more effective when management accounting systems produce higher-quality data. Vărzaru (2022) found that improvements in AIS significantly influence performance management, particularly in financial and customer-related dimensions. In addition, Dudic *et al.* (2020) found that enhancing organizational AIS through digital transformation significantly aligns organizational strategies with performance improvement and sustainable development objectives. AIS can create a competitive advantage when it is integrated into organizational routines and connected to firm-specific processes for sustainability integration (Agnihotri & Gabler, 2024). Petcu *et al.* (2024) emphasized that integrating digital technologies into AIS enhances the effectiveness of sustainability accounting, particularly in managing ESG data and non-financial information. More specifically, high-quality AIS is capable of accurately identifying and recording corporate investments and achievements related to environmental protection, social responsibility, and internal governance, thereby supplying management with detailed and reliable data support (Kalbouneh *et al.*, 2023; Nazir *et al.*, 2024). Furthermore, Odintsova (2024) highlighted that the sustainability agenda has driven significant changes in information practices, accounting, reporting, and management assurance in order to support ESG value creation and sustainability governance.

On the other hand, the effectiveness of AIS largely depends on how efficiently managerial performance is implemented to facilitate the operation of its components (Chopra *et al.*, 2024). Therefore, without strategic management, planning, and operational control, AIS implementation may fail to meet organizational demands in supporting operational processes. AIS is believed to have the capability to enhance sustainability performance by providing added value to users through financial information for planning, control, and decision-making (Dudic *et al.*, 2020; Petcu *et al.*, 2024). AIS assists organizations make more informed and sustainable decisions while promoting balanced organizational development across the economic, social, and environmental dimensions. These findings indicate that high-quality AIS can improve the quality of accounting information and strengthen management control processes, ultimately enhancing sustainable organizational performance across economic, social, and environmental dimensions. Therefore, it can be assumed that the more effective the implementation of AIS, the greater the organization's ability to achieve sustainability performance. In addition, higher AIS quality will improve

the quality of accounting information, thereby promoting sustainable organizational performance. Accordingly, the following hypothesis is proposed.

H1: AIS have a positive effect on MCS

H2: AIS have a positive effect on Sustainability Performance

2.2. ICS, MCS and Sustainability Performance

ICS are established to provide assurance over the achievement of operational effectiveness and efficiency, the reliability of financial reporting, compliance with applicable laws and regulations, and the protection of corporate assets. The components of ICS constitute an integrated system that reflects the organization's commitment to strengthening and improving corporate financial performance (Hamed, 2023). Therefore, an efficient, well-controlled ICS within an organization is expected to have a significant impact on organizational performance. Furthermore, Koutoupis & Malisiovas (2023) found that the effective implementation of ICS can reduce organizational risk, improve profitability, and strengthen corporate compliance with regulations. Their study emphasized that well-integrated internal controls enhance corporate governance quality and strengthen overall organizational performance. Similarly, Vu & Nga (2022) demonstrated that implementing ICS improves corporate profitability by enhancing operational efficiency and reducing irregular practices. These findings reinforce the argument that an effective ICS can generate tangible improvements in organizational performance. On the other hand, Hoai & Nguyen (2022) emphasized that ICS has a positive influence on firm performance in developing countries, particularly when supported by strong leadership and consistent implementation of organizational controls. This finding indicates that the effectiveness of ICS depends not only on formal procedures but also on the quality of implementation and organizational commitment to consistently enforcing control mechanisms.

Monteiro *et al.* (2021) demonstrated that the quality of non-financial information is directly influenced by ICS, which subsequently affects the effectiveness of business decision-making indirectly. In addition, operational programs can be discussed and implemented more effectively through ICS, while managers are also supported in enhancing the timeliness of decision-making and improving managerial practices Hoai *et al.* (2022). Good corporate governance practices are further strengthened by effective internal control mechanisms through the provision of a framework that emphasizes transparency, accountability, and responsible decision-making (Hasanudin *et al.*, 2020). This condition aligns with the concept of corporate sustainability, which emphasizes an organization's capability to maintain a balance between financial objectives, environmental management, and social responsibility in the long term.

Implementing effective control systems for sustainability information can yield numerous benefits, including improvements in the quality, comparability, and reliability of financial reporting. Accordingly, ICS can be utilized by organizations to enhance stakeholder trust and, more importantly, improve the quality of sustainability disclosure, thereby adding value to both internal and external decision-making processes. Dewi *et al.* (2023) explained that effective control and monitoring of sustainability information can

enhance the relevance and quality of disclosures used in organizational decision-making processes.

Furthermore, fraud risks that may obstruct the integration of sustainability can be effectively identified through internal control mechanisms. These mechanisms protect stakeholders' legitimate rights and interests, prevent inappropriate actions that may harm corporate reputation, and consequently support the successful attainment of strategic social objectives (Hao *et al.*, 2018). Tu Le *et al.* (2024) also emphasized that organizations use strong internal controls as a crucial foundation for integrating sustainability into MCS. As a result, organizations are better able to achieve long-term economic objectives that are vital for sustainable success in today's socio-economic environment. ICS help ensure that organizational planning, monitoring, evaluation, and decision-making processes are aligned with strategic sustainability objectives. When effectively implemented, ICS enables organizations to integrate managerial controls with economic, social, and environmental targets simultaneously.

These findings reinforce the argument that organizations use ICS not only as a compliance mechanism but also as a strategic factor to enhance the effectiveness of MCS and support the achievement of sustainability performance. Therefore, it can be assumed that more effective ICS implementation enables organizations to strengthen management control effectiveness and achieve higher sustainable performance. Accordingly, the following hypotheses are proposed:

H3: ICS have a positive effect on MCS

H4: ICS have a positive effect on Sustainability Performance

2.3. MCS and Sustainability Performance

Developing corporate sustainability concepts involves using various management control tools to formulate strategies that are oriented not only toward market objectives but also toward broader societal interests. MCS represents accounting practices that facilitate integrating financial and non-financial issues with sustainability concerns, thereby serving as a key pillar in the development of integrated reporting (Quesado *et al.*, 2024). MCS has been shown to support sustainability practices and integrated reporting (Arjaliès & Mundy, 2013; Bui & de Villiers, 2017; Ditillo & Lisi, 2016). Such reporting promotes a long-term orientation that supports achieving the SDGs through a sustainability vision integrated into corporate strategy (Ahmed *et al.*, 2024).

Ussahawanitchakit (2017) demonstrated that organizational renewal and corporate sustainability are positively influenced by MCS. Sustainability principles can also be integrated into business strategies, organizational policies, and operational practices through the use of MCS (Castellano & Felden, 2021; Mahmoudian *et al.*, 2022; Narayanan & Boyce, 2019). The integration of sustainable MCS into organizational operations is essential to ensure that business activities are conducted effectively and efficiently (Wijethilake, 2017). In addition, previous studies have revealed that the integration of sustainability performance measurement into MCS enables organizations to balance financial and non-financial objectives (Schaltegger & Wagner, 2006) and helps organizations maintain environmentally

friendly and sustainable operations (Pramono *et al.*, 2023). In this context, Corsi & Arru (2021) emphasized that sustainability-oriented management control tools are more effective than formal control mechanisms alone.

Epstein & Roy (2001) argued that essential data for sustainability planning and strategic decision-making are provided by MCS. According to Yu & Rowe (2017), Crutzen & Herzig (2013), and Crutzen *et al.* (2017), in the formulation and implementation of sustainability strategies, MCS is expected to play a crucial role in developing sustainability indicators. This occurs because decision-making processes are effectively supported by MCS through the provision of adequate and manageable information that directs organizational actions. Furthermore, additional benefits, including stronger corporate credibility and reputation as well as higher employee satisfaction and engagement, can be gained by organizations through the use of sustainability-oriented management control tools (Pramono *et al.*, 2023).

However, meeting the requirements of transparency and accuracy in developing integrated reporting is not always easy, especially because standards and guidelines continue to evolve. According to Traxler *et al.* (2020), studies examining the interaction between sustainability and MCS are still at an early stage. Comprehensive MCS that address all sustainability issues have only been implemented by a limited number of organizations, while social issues receive even less attention in organizational discussions (Lueg & Radlach, 2016). Furthermore, Simons (1994), proposed an MCS framework that emphasizes both formal and informal control mechanisms, which has become a successful approach for integrating, measuring, and strengthening organizational commitment to sustainability.

According to Zsóka & Vajkai (2018) and Maas *et al.* (2016), integrated sustainability measurement and management are required for corporate sustainability rather than the isolated use of different tools, allowing organizations to manage sustainability activities in a more proactive and transparent manner. In addition, all employees can be guided to understand and disseminate organizational culture through established procedures and standards, while teams are empowered to perform their daily tasks independently and recognize the consequences of their decisions (Florêncio *et al.*, 2023). The integration of sustainability throughout the organization is largely driven by corporate culture and organizational values. Therefore, sustainable development can be promoted more effectively when strategic planning is combined with organizational mindset and culture. Based on the above arguments, the following hypothesis is proposed:

H5: MCS have a positive effect on Sustainability Performance

H6: MCS mediate the relationship between AIS and Sustainability Performance

H7: MCS mediate the relationship between ICS and Sustainability Performance

Based on the above discussion, the research model is illustrated **Figure 1**.

3. Methods

This study targeted all BMT institutions in Central Java as the research population, comprising 184 BMTs recorded in the Indonesian BMT Association (PBMTI) database. The study was conducted in Central Java because the province is recognized as one of Indonesia's

major centers for micro, small, and medium-sized enterprise (MSME)-based economic growth, where BMTs play a strategic role in supporting financial inclusion, community economic empowerment, and the development of the Islamic economic sector (OJK, 2025). This condition makes Central Java a relevant context for examining the implementation of AIS, ICS, and MCS in supporting the sustainability performance of BMTs.

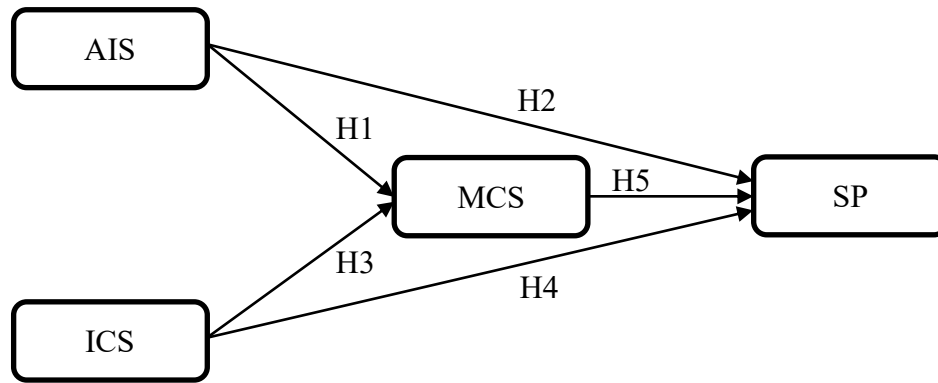


Figure 1. Research model

Data were collected using a survey method via a structured questionnaire comprising several items developed based on the indicators of the research variables. To facilitate the data collection process, an electronic survey (online survey) was administered by distributing a questionnaire link via Google Forms. The participating BMTs were identified based on their use of AIS, implementation of ICS, application of MCS, and sustainability performance practices. The survey data were analyzed using path analysis to examine the effects of AIS, ICS, and MCS adoption on sustainability performance.

The research instrument used to measure AIS was adapted from Wijayanti *et al.* (2024) and consisted of three indicators. Meanwhile, ICS were measured using five indicators based on the COSO framework developed by Kabuye *et al.* (2021). The MCS variable was measured using four indicators adopted from Speklé (2017) and Widener (2007), based on the Levers of Control framework proposed by Simons (1994). Sustainability performance, as the dependent variable, was measured using three indicators adapted from Wijayanti *et al.* (2024). All indicators were measured using a five-point Likert scale and are presented in detail in Table 1.

The data analysis method used in this study is a structural equation model (SEM) with a Partial Least Squares Path Modeling (PLS-SEM) approach to explain the causal relationships among the research variables. Smart PLS 3 software is used to test data quality and to perform hypothesis testing, with a bootstrapping technique used to assess the significance of path coefficient estimates.

4. Results and Discussion

Based on the effective return rate of the questionnaire distribution, data were obtained from 89 (48.37%) BMT respondents spread across Central Java. Although the sample size was less than 50%, this level of representativeness can still be considered

adequate for quantitative survey-based research, particularly in PLS-based analysis (Kono & Sato, 2023). Furthermore, the research sample was drawn from BMTs across various regions of Central Java, thereby reflecting the diversity of operational characteristics, control system implementation, and information system use. Therefore, although the sample proportion did not reach the majority of the population, the fairly broad distribution of respondents still provides an adequate empirical representation to describe the condition of BMTs in Central Java.

Table 1. Research indicator

Variable	Indicator	Reference
Sustainability performance	1. Business/Financial Perspective 2. Social Perspective 3. Environmental Perspective	Wijayanti <i>et al.</i> , 2024
AIS	1. Information Quality 2. System Quality 3. Service Quality	Wijayanti <i>et al.</i> , 2024
ICS	1. Control environment 2. Risk assessment 3. Information and communication 4. Monitoring control activities	Kabuye <i>et al.</i> , 2021
MCS	1. Belief system 2. Boundary system 3. Diagnostic control system 4. Interactif control system	Simons (1994) Speklé <i>et al.</i> (2017) Widener (2007)

Validity testing in this study was conducted by examining the calculation results of the convergent validity and discriminant validity instruments. The results of the convergent validity test showed that the loading factors of all indicators were above 0.70 (Ghozali, 2021); therefore, it can be concluded that it is valid and suitable for use as an instrument for measuring latent variables (Figure 2). Furthermore, validity can be assessed using the Average Variance Extracted (AVE), which must be greater than 0.50 (Ghozali, 2021). Reliability testing was conducted using Cronbach's alpha and composite reliability instruments. Based on the test results, a Cronbach's alpha of 0.70 or higher was obtained, indicating that the construct was reliable (Ghozali, 2021). The reliability test was strengthened by composite reliability values exceeding 0.70 for all constructs. The results of the reliability test are presented in Table 2.

R-square analysis was conducted to assess the strength of the independent variables' influence on the dependent variable. The R-square values for each variable were 0.516 for MCS and 0.529 for sustainability performance (Table 3). The value of 0.516 for the MCS variable indicates that the diversity of the AIS and ICS variables can be explained by MCS to the extent of 51.6%, while the remaining 49.4% is assumed to be contributed by other variables not included in this study. The sustainability performance variable has an R-square of 0.529, indicating that MCS contributes around 52.9% to sustainability performance, with the remaining 48.1% explained by other variables.

Table 2. Validity test result

Variable	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Accounting Information System	0.93	0.946	0.746
Internal Control System	0.922	0.941	0.761
Management Control System	0.955	0.96	0.633
Sustainability Performance	0.909	0.928	0.651

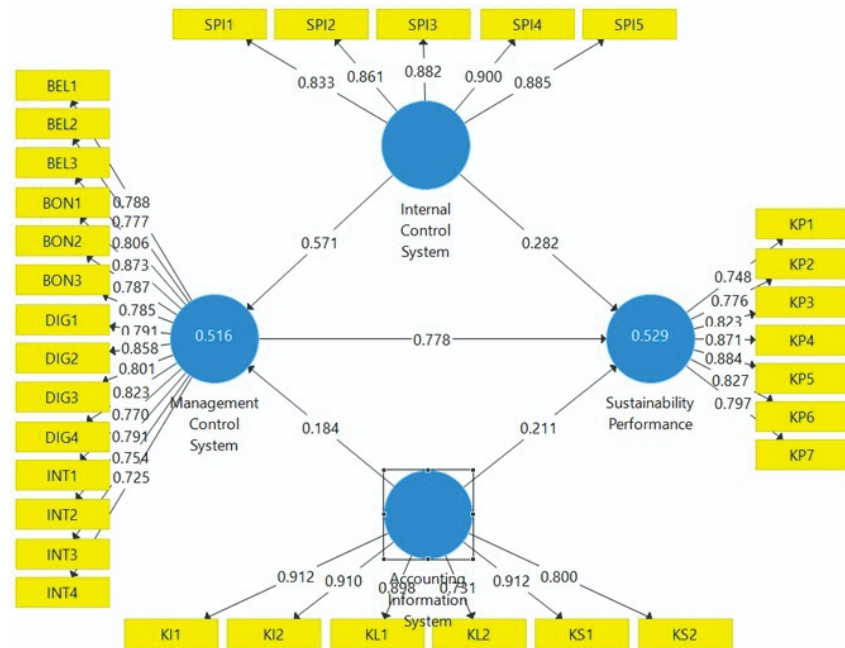


Figure 2. PLS test results

Table 3. R-square analysis

Variable	R Square	R Square Adjusted
Management Control System	0.516	0.504
Sustainability Performance	0.529	0.512

Testing using Smart PLS produced a model that explained the relationships between the AIS and ICS variables and MCS and sustainable performance (Table 4). Using a bootstrapping process with 5000 samples in Smart PLS 3, four of the seven hypotheses developed were proven correct. Table 4 displays three weak t and p values (i.e., $t < 1.96$ and $p > 0.5$), indicating they are insignificant. Therefore, the corresponding hypotheses (H1, H2, and H6) are not supported. Based on these results, ICS is proven to improve MCS and sustainability performance in the context of BMTs in Indonesia, but the presence of AIS is not proven to have an effect.

Table 4. Hypothesis test

Variable	Total Effects	t statistic	P Values	Result
AIS → MCS	0.184	1.259	0.209	H1 Rejected
AIS → Sustainability Performance	0.211	1.831	0.068	H2 Rejected
ICS → MCS	0.571	4.164	0	H3 Accepted
ICS → Sustainability Performance	0.282	2.114	0.035	H4 Accepted
MCS → Sustainability Performance	0.778	8.14	0	H5 Accepted
AIS → MCS → Sustainability Performance	0.143	1.257	0.209	H6 Rejected

ICS → MCS → Sustainability Performance	0.444	3.431	0.001	H7 Accepted
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The test results for hypotheses 1 and 2 indicate that accounting information system has no effect on management control system, as indicated by a t-statistic of $1.259 < 1.96$ and a p-value of $0.209 > 0.05$. Accounting information system also showed no effect on sustainability performance (t-statistic of $1.831 < 1.96$ and p-value of $0.068 > 0.05$). These findings indicate that accounting information system implementation has no impact on management control system use and cannot improve sustainable performance. Accounting information system utilization is strongly influenced by information quality, system quality, and service quality, so when quality is low, accounting information system alone is often insufficient to drive the necessary changes in management control systems or sustainability performance (Nguyen *et al.*, 2024). In addition, human resource competency also significantly influences accounting information system effectiveness. When the system is not supported by HR competencies or strategic integration, it can weaken the management control system (Mahmoudian *et al.*, 2022; Monteiro *et al.*, 2021). Information provided solely by the accounting information system may be less contextually relevant if it is not tailored to strategic managerial control needs.

Management control system often requires integrating organizational values, strategy, and culture, not just accounting data. The literature generally emphasizes that management control is complex, multidimensional, and relies on interfunctional coordination that goes beyond the basic accounting information system output. An accounting information system can contribute to sustainability performance if the information it provides encompasses economic, social, and environmental performance aspects (Vo Van *et al.*, 2026). Sustainability performance typically involves non-financial metrics that are not automatically available or structured within a traditional accounting information system. An accounting information system may improve data and information flow, but without strong integration within the management control system process, these improvements do not directly impact the quality of control or sustainability metrics.

The research findings on hypotheses 3 and 4 show that internal control system has a positive effect on management control system (t statistic = $4.164 > 1.96$ and p value = $0.000 < 0.05$). MCS (t-statistik $4,164 > 1,96$ dan p value $0,000 < 0,05$). The results also found that internal control system has a significant positive effect on sustainability performance (t statistic $2.114 > 1.96$ and p value $0.035 < 0.05$). This implies that components in internal control system that support processes and systems that ensure fast and reliable information flow have a significant impact on management control system, which, in turn, can increase returns on sustainability initiatives. These findings indicate that BMTs that monitor internal control system more effectively tend to have higher benefits, in line with previous literature (Agbejule & Jokipii, 2009; Hamed, 2023).

Internal control system provides an internal control structure that underpins the evaluation, reporting, and monitoring mechanisms within the management control system, enabling it to operate effectively. Effective internal control system will encourage management control system mechanisms such as planning, decision-making, and monitoring, which can operate flawlessly because errors and irregularities can be detected

early. This is crucial because management decisions depend on credible data free from internal errors. Furthermore, internal control system serves as the foundation for management control system effectiveness, ensuring information quality, risk control, and relevant evaluation mechanisms (Quesado *et al.*, 2024). Su *et al.* (2022) emphasized that internal control system helps ensure the reliability of the information that underpins performance measurement and evaluation, thereby improving the quality of the information and the accuracy of the data used in management control system.

In addition to influencing management control system, internal control system also affects sustainability outcomes across economic, social, and environmental dimensions. Internal control system positively impacts sustainability performance by improving governance, transparency, and management's ability to respond to environmental and social risks (Tao *et al.*, 2023). Internal control system systematically identifies and assesses non-financial risks, such as environmental and social risks, enabling organizations to make more sustainable decisions Su *et al.* (2022). Thus, internal control system improves transparency, risk management, and governance, which supports sustainability.

The fifth hypothesis states that management control system influences sustainability performance. This is confirmed by the test results with a t-statistic of $8.14 > 1.96$ and a p-value of $0.000 < 0.05$. The results of the study show that organizational performance in BMT is enhanced through the use of management control system. By implementing management control system, BMT managers are better able to manage performance in line with predetermined long-term objectives. These findings support the view of Adler & Chen (2011), who argued that shared commitment and coordinated action toward desired outcomes are promoted by management control system, while goal definition and communication are strengthened, uncertainty is reduced, and higher performance is achieved. With more accurate and systematic information, management can integrate sustainability targets into the management control system, including in the preparation of indicators, reporting, and evaluation of sustainability performance (Quesado *et al.*, 2024).

Another aspect demonstrated by this study regarding BMT is the lack of mediating role of management control system in the relationship between accounting information system and sustainability performance. Based on testing hypothesis 6, it was found that management control system does not mediate between accounting information system and sustainability performance, with a t-statistic of $1.257 < 1.96$ and a p-value of $0.209 > 0.05$. Many standard accounting information system models do not comprehensively accommodate environmental, social, and governance (ESG) metrics or complex non-financial sustainability metrics. As a result, these dimensions of sustainability performance are not directly captured by traditional accounting systems, resulting in weak or insignificant relationships with accounting information systems. Sustainability requires integrating non-financial data, which is not always available or structured in accounting information system, so the empirical relationship often appears weak in statistical analysis (Zulianda & Suwandi, 2023).

Although management control system cannot mediate the relationship between accounting information system and sustainability performance, it has been proven to mediate

the relationship between internal control system and sustainability performance (hypothesis 7) with a t-statistic of $3.431 > 1.96$ and a p-value of $0.001 < 0.05$. Internal control system is an enabler for management control system implementation because it provides checks and balances that ensure sustainability targets are measurable, validated, and auditable. This allows management control system to accommodate environmental and social KPIs, not just financial KPIs (Quesado *et al.*, 2024). In short, internal control system strengthens management control system, which then supports the achievement of organizational sustainability goals, both from internal operational aspects and external social and environmental responsibilities. Internal control system enhances management control system capacity for integrating sustainability goals. This means that internal control system expands the role of management control system from a traditional control function to one that also supports long-term sustainability goals.

Recent literature reviews indicate that management control system is increasingly viewed as crucial for integrating a sustainability focus into a company's internal control structure, beyond financial objectives alone. Organizations implementing management control system demonstrate a positive relationship with sustainability performance (Mahmoudian *et al.*, 2022). Internal controls are viewed as a foundation for reliable organizational governance. When internal controls are strong, management control structures can focus on achieving strategic outcomes, namely, sustainability performance with controlled risks (Su *et al.*, 2022).

Contemporary literature also emphasizes that integrating internal control system and management control system within a broader governance framework can enhance an organization's ability to address the complex challenges of achieving sustainability performance (Quesado *et al.*, 2024). Internal control system conceptually supports management control system in managing and measuring an organization's sustainability contributions through a structured, evidence-based mechanism. Integrating internal control system into management control system enhances an organization's capacity to design and implement measurable sustainability strategies (Sustainability Management Control Systems). Conceptually and empirically, internal control system strengthens management control system, enabling organizations to effectively integrate traditional strategic objectives with sustainability goals. This is highlighted in a bibliometric review, which indicates that the integration of internal control system within management control system is a key focus of modern research on management control and sustainability (Quesado *et al.*, 2024).

5. Conclusion

The study's results indicate that internal control system has a positive effect on management control system, thereby improving the sustainability performance of BMTs in Central Java. Management control system is a mediating factor in internal control system's improvement of sustainability performance. However, accounting information system has no proven effect on management control system or sustainability performance. Management control system also failed to mediate the relationship between accounting information system and sustainability performance.

Several managerial implications of these findings include: first, the need for control in implementing accounting information system in BMT, primarily to improve information quality, system quality, and service quality. Improving accounting information system quality is expected to encourage the utilization of management control system and achieve sustainability. Second, improving human resource competency is crucial for achieving accounting information system effectiveness. This will strengthen management control in management control system, thereby improving sustainability performance. Third, and most importantly, increasing integration in the management control system process involving accounting information system and internal control system through structured coordination involving sustainability metrics. This is crucial, as integrating all decision-support systems, such as accounting information system, internal control system, and management control system, can achieve sustainable performance. Thus, this study not only addresses the research objectives empirically but also offers managerial implications and theoretical contributions on the importance of control system integration in supporting BMT sustainability.

Future studies are recommended to increase the sample size and improve the response rate in order to obtain a higher level of population representativeness and strengthen the generalizability of the findings. In addition, future research may expand the research scope beyond Central Java by involving BMTs from other provinces in Indonesia, thereby enabling broader comparisons across regions with different organizational and operational characteristics.

Authors' Declaration

Authors' contributions and responsibilities

The authors made substantial contributions to the conception and design of the study. The authors took responsibility for data analysis, interpretation and discussion of results. The authors read and approved the final manuscript.

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