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Enhancing Intellectual Capital through Management Accounting System: Evidence from Indonesian State-Owned Enterprises

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Abstract:

The transformation of intellectual capital (IC) through management accounting systems is a critical concern in modern industries, particularly within state-owned enterprises (SOEs). IC, which encompasses knowledge, skills, and innovative capabilities, plays a fundamental role in enhancing firm value and sustaining competitive advantage. Despite its importance, many companies struggle with effectively managing and leveraging their IC. This study investigates the impact of management accounting systems on the development of IC and the subsequent effect on firm performance in Indonesian SOEs. A survey method was employed, collecting data from 320 respondents, and the analysis was conducted using Structural Equation Modeling-Partial Least Squares (SEM-PLS). The findings reveal that an effective management accounting system not only significantly enhances IC but also leads to substantial improvements in firm performance. These results underscore the necessity for SOEs to invest in advanced management accounting systems to drive efficiency, foster innovation, and achieve sustainable growth. This study provides valuable insights for policymakers and practitioners aiming to optimize IC management within the SOEs sector.

Keywords: intellectual capital; Management Accounting System; manufacturing industry; performance; SOEs

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Introduction

The transformation of intellectual capital (IC) through management accounting systems (MAS) is highly pertinent in today's industrial landscape (Chowdhury et al., 2019). IC, encompassing knowledge, skills, and innovation, is crucial for companies to remain competitive globally (Rehman et al., 2023). Implementing a robust management accounting system allows companies to efficiently manage and utilize their IC (Ghasemi et al., 2019). Such systems facilitate performance measurement, reporting, and strategic decision-making based on data (Di Vaio et al., 2022). In the digital and globalized era, managing IC with advanced accounting systems is vital for a company's success and sustainability.

This study explores the ineffective implementation of MAS in transforming IC within Indonesian State-Owned Enterprises (SOEs). Reports indicate that SOEs suffer from a lack of skilled human resources, hindering innovation and global competitiveness (Hair et al., 2020b). This shortage makes it challenging

for companies to maximize their IC. Furthermore, without an effective MAS, integrating IC into business strategies becomes difficult (Khosravipour et al., 2017). Accurate accounting data-supported strategies are essential for enhancing a company's operational efficiency and financial performance.

In the context of SOEs in Indonesia, the lack of efficiency and innovation in IC management has a significant impact on their performance and contribution to the national economy (Tjahjadi et al., 2019). SOEs play an important role in various strategic sectors, making IC management crucial (Salehi et al., 2022). In a situation where SOEs' wealth is not separated from that of the state, decision-making is slow and less aggressive than private companies, which can lead to loss of business momentum (Tjahjadi & Soewarno, 2019). A good management accounting system can help SOEs identify, measure and manage their IC more effectively.

According to an article on the Ministry of Finance's DJKN, SOEs have a vital role in the National Economic Recovery (Sasongko, 2020). SOEs contribute through various strategic initiatives such as infrastructure development, industrial development, and employment, all of which have a direct impact on economic stability and growth (Ur Rehman et al., 2022). The importance of efficiency and innovation in managing IC is heightened by the critical role that state-owned enterprises play across various sectors, necessitating an effective management accounting system (Bayraktaroglu et al., 2019). Thus, the implementation of this system not only improves the performance of individual SOEs, but also makes a positive contribution to Indonesia's overall economic growth.

Research by Beretta et al. (2019) indicates that managers perceive IC as having a significant influence on management accounting practices, such as performance measurement, planning and control, capital budgeting, and risk management. The findings demonstrate an evolution in management accounting practices within firms that heavily invest in IC, enhancing their ability to respond to unexpected economic and market changes, ultimately leading to higher performance. Similarly, Novas et al. (2017a) examined how MAS foster the development of IC—encompassing human, structural, and relational capital—and its impact on organizational performance. Their research reveals a significant positive link between structural capital and performance, highlighting the crucial role of accounting systems as information networks in this development.

Laila et al. (2023) explored the relationship between management accounting and structural capital within the knowledge-intensive Irish information and communication technology sector. Through the use of surveys and partial least squares (PLS) structural equation modeling, their results indicated a positive influence of MAS on management accounting information. However, no statistical support was found for a direct influence on structural capital (Hair et al., 2020a). This study corroborates previous findings on the relationship between the dimensions of IC and business performance.

Although the transformation of IC is widely recognized as important, the effective implementation of MAS to support this process remains suboptimal in many companies. Previous research has highlighted the potential benefits of MAS in managing IC; however, a significant gap persists in their practical application within strategic sectors, such as SOEs. Moreover, earlier studies have often overlooked the specific role of MAS in enhancing IC performance, particularly in SOEs, which face unique challenges and possess distinct characteristics. Furthermore, insufficient attention has been given to the issue of inadequate skilled human resources within SOEs, which hampers innovation and global competitiveness. This shortfall has not been adequately addressed by current MAS, resulting in the suboptimal utilization of IC and the failure to integrate it into effective business strategies. Ultimately, this has negatively impacted the operational efficiency and financial performance of these enterprises.

The importance of this study lies in the urgency to improve the management of IC within Indonesian SOEs. In the context of increasingly intense global competition, SOEs play a strategic role in the national economy. However, a major challenge they face is the lack of skilled human resources, which negatively impacts innovation and global competitiveness. Furthermore, the existing MAS have not effectively supported the transformation of IC into competitive advantage. Therefore, this research is crucial as it offers solutions to

optimize IC through the implementation of more effective MAS tailored to the specific characteristics and needs of Indonesian SOEs. The proposed solutions aim to address the fundamental issues that have hindered SOEs from enhancing their operational and financial performance, while also strengthening their contribution to national economic growth.

Therefore, this study aims to explore the implementation of MAS in the transformation of IC within Indonesian SOEs. The primary focus of this research is to identify the existing barriers in managing IC and to develop a framework that can support SOEs in maximizing the potential of their IC. Consequently, this study is expected to make a tangible contribution to improving efficiency and innovation in the SOE sector, which will ultimately have a positive impact on Indonesia's overall economic growth.

Based on the objectives of this research, the following hypotheses are proposed: Firstly, it is hypothesized that MAS have a significant positive influence on the effectiveness of IC management within SOEs. This hypothesis is grounded in the assumption that well-implemented accounting systems provide the necessary tools and information networks to optimize the use of IC. Secondly, the study hypothesizes that IC, when effectively managed, has a significant positive impact on the overall performance of the firm. This includes not only financial outcomes but also operational efficiency and innovation capacity. To validate these hypotheses, a structural equation model (SEM) using the Partial Least Squares (PLS) approach will be employed, allowing for a robust analysis of the relationships between management accounting systems, IC, and firm performance within the unique context of Indonesian SOEs.

Research Methodology

Research Design

This research employs a quantitative design to investigate the impact of the management accounting system on intellectual capital and its subsequent effect on the performance of Indonesian SOEs. The chosen quantitative approach facilitates objective measurement and statistical analysis, providing robust empirical evidence. By collecting numerical data and conducting thorough statistical analyses, this study tests formulated hypotheses and accurately evaluates the cause-and-effect relationships between variables (Hair et al., 2020a).
The literature highlights the significant focus on intellectual resource management in management accounting research (Correia & Água, 2023), illustrating the relationship between MAS and IC. Prior studies (Ahmed et al., 2023 ; Thien & Hung, 2023) have examined the influence of IC on MAS development, considering how the levels and characteristics of IC affect accounting practices. Additionally, Ortega-Lapiedra et al. (2019) explored the relationship between human capital and the design of management control systems, emphasizing that MAS is not isolated but is influenced by external factors.

As the importance of IC in achieving a sustainable competitive advantage grows, managers are increasingly recognizing the significance of non-physical aspects in organizational performance (Yusoh et al., 2023 ; Abu Afifa & Saleh, 2021). This recognition creates new demands for internal reporting, necessitating the development of new MAS to identify, measure, manage, and report IC effectively.
The independent variables (X_1) include the style of MAS usage, with interactive and diagnostic dimensions; (X_2) types of information provided by MAS, including coverage, timeliness, aggregation, and integration; and (X_3) types of decisions supported by management, such as resource allocation and performance evaluation. The first dependent variable (Y) is intellectual capital, comprising the dimensions of human capital, structural capital, and relational capital. The literature consistently agrees that human capital (HC), structural capital (SC), and relational capital (RC) collectively form the IC construct. HC reflects employees' knowledge, talent, and experience, representing the individual intelligence within the organization, and is linked to the organization's ability to convert HC innovation and energy into value. The second dependent variable (Z) is performance, measured by factors such as cost, sales, profitability, productivity, quality, service, innovation, and personnel metrics. The instrument used in this study replicates the work of Novas et al. (2017b).

Results And Discussion

This research evaluates how management accounting systems affect intellectual capital development and firm performance in Indonesian SOEs, exploring the impact of human, structural, and relational capital components on underperforming firms.

Intellectual Capital includes intangible assets such as knowledge, skills, and innovation, averaging 6.001 with moderate variation. Performance, indicating achievement levels, averages 8.762 with slightly greater variation than Intellectual Capital. Descriptive Analysis Results are shown in Table 1.

Table 1. Descriptive Analysis Results

	Mean	Observed min	Observed max	Standard deviation
Intellectual_Capital	6.001	-4.229	2.879	0.666
Performance	8.762	-3.936	3.121	0.790

The test results show the model meets criteria (Table 2. Model Fit): SRMR < 0.080, d_ULS > 2.000, d_G > 0.900, NFI > 0.887, confirming the model's fit and suitability for testing the research hypothesis and explaining variable relationships..

Table 2. Model Fit

	Saturated model	Estimated model
SRMR	0.050	0.056
d_ULS	0.267	0.324
d_G	0.258	0.261
Chi-square	273.490	275.406
NFI	0.887	0.887

The validity test shows that all outer loading values are ≥ 0.7, indicating that each statement item is valid for further testing. The Average Variance Extracted (AVE) value for each variable is more than 0.50, demonstrating that all constructs are valid and have high discriminant validity. The reliability test also showed good results, with each variable's Cronbach's alpha value being more than 0.70, meeting reliability requirements. Additionally, the composite reliability value for each variable is more than 0.60, fulfilling composite reliability requirements. Based on the table of outer loadings test results above, an outer loading value of ≥ 0.7 indicates that the statement item is valid for further testing. The values in the outer model output can be seen in the following outer model image:

Table 3. Outer Loadings

	Intellectual_Capital	Management_Accounting_System	Performance
Human Capital	0.961		
P53			0.737
P54			0.808

P55			0.862
P56			0.791
P57			0.864
P58			0.888
P59			0.829
P60			0.835
Relationship Capital	0.942		
Structural Capital	0.959		
Style of Use of Management		0.923	
Type of Decision Supported		0.927	
Type of Information Provided		0.929	

Table 4. Average variance extracted (AVE)

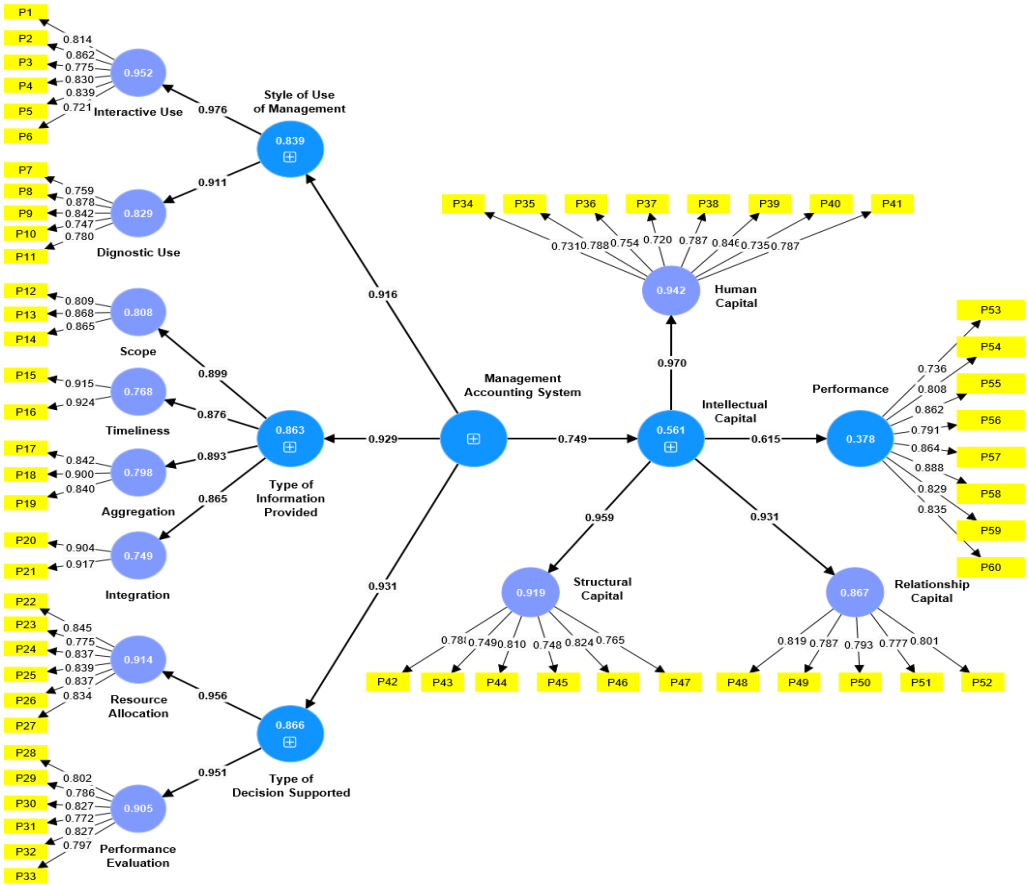

Figure 1. Outer Model

	Average variance extracted (AVE)
Intellectual_Capital	0.910
Management_Accounting_System	0.858
Performance	0.685

Table 5. Reliability Test

	Cronbach's alpha
Intellectual_Capital	0.951
Management_Accounting_System	0.917
Performance	0.934

Based on Cronbach's alpha values, each variable shows a construct value > 0.70, indicating that they meet the reliability criteria. Similarly, each variable's construct value > 0.60, as shown in the composite reliability table.

Table 6. Composite reliability

	Composite reliability
Intellectual_Capital	0.968
Management_Accounting_System	0.948
Performance	0.946

Inner Model Analysis

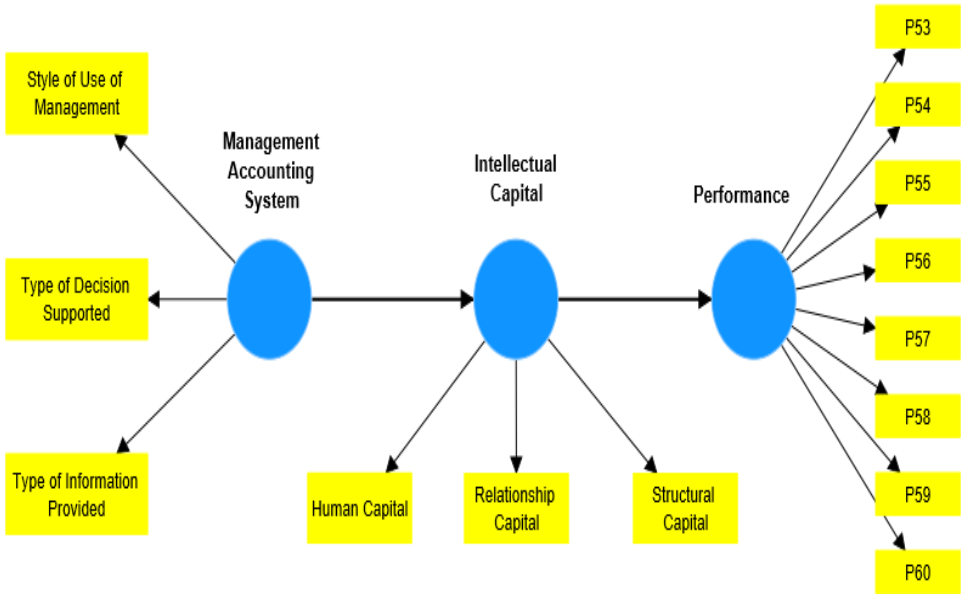

Figure 2. Smart PLS SEM Model

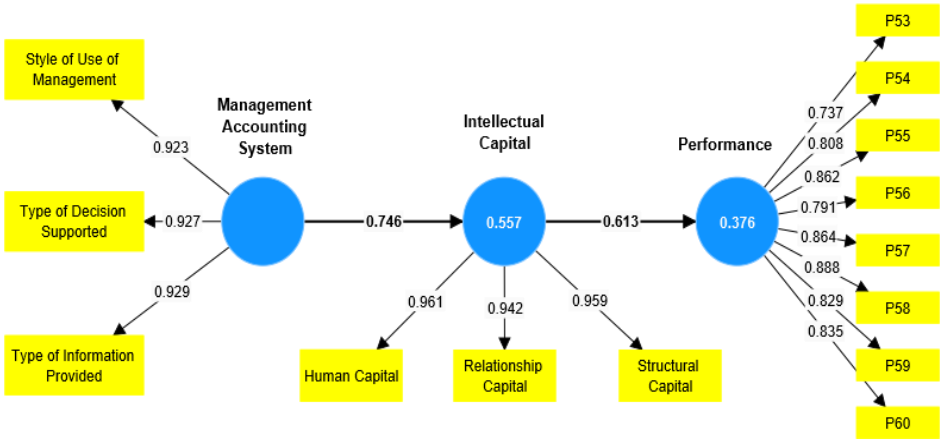

Figure 3. Outer Model

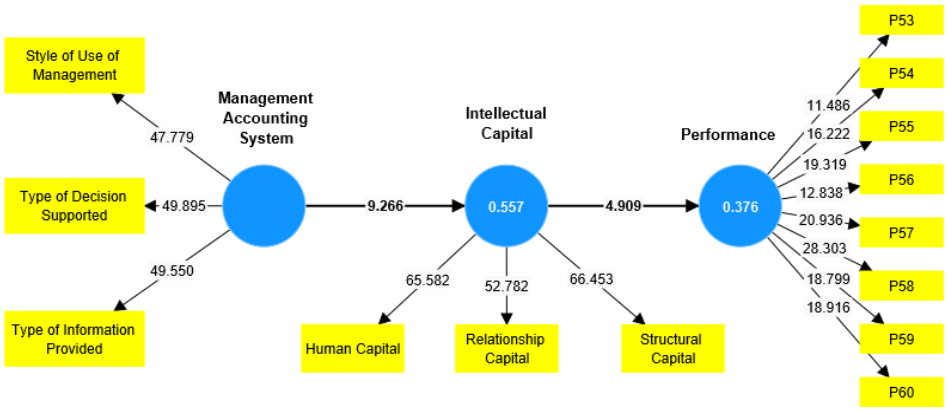

Figure 4. Bootstrapping

Table 7. Hypothesis Testing

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Intellectual_Capital -> Performance	0.613	0.606	0.125	4.909	0.000
Management_Accounting_System -> Intellectual_Capital	0.746	0.738	0.081	9.266	0.000

At a 5% alpha level, T-Statistics is non-significant within -1.96 to 1.96. The test results are shown in the Hypothesis Testing table.

The study's findings reveal crucial insights into the impact of management accounting systems on the development of intellectual capital in Indonesian SOEs and how this intellectual capital influences firm performance. The research highlights that an effective management accounting system significantly enhances intellectual capital, encompassing human, structural, and relational elements. Consequently, firms with robust management accounting systems can better manage knowledge, skills, and relationships, boosting efficiency and innovation. Descriptive analysis indicates Intellectual Capital has a mean of 6.001 (SD=0.666), and Performance has a mean of 8.762 (SD=0.790), suggesting trends despite variability. The data imply that SOEs with superior intellectual capital management generally exhibit higher performance.

Model tests confirm the research model's good fit, with SRMR, d_ULS, d_G, and NFI values validating the model's reliability and validity in answering the research questions.

Research by (Sidik et al., 2019) demonstrates that green intellectual capital, energy efficiency, and environmental management accounting systems significantly enhance environmental performance and competitive advantages in the Indonesian manufacturing sector. These findings align with this study, which highlights the crucial role of intellectual capital in boosting company performance. However, Sidik et al.'s research emphasizes environmental aspects and competitive edge, while this study focuses on general intellectual capital management in SOEs. Additionally, (Khosravipour et al., 2017), shows that management accounting systems significantly influence intellectual capital development, including human, structural, and relational capital, underscoring their importance in achieving better organizational performance.

Based on the R-square value, the Intellectual Capital dependent construct has a value of 0.557, indicating that the management accounting system predicts Intellectual Capital by 55.7%. The dependent construct Performance has an R-square value of 0.376, showing that Intellectual Capital predicts Performance by 37.6%, with the remainder influenced by variables outside this research model. This suggests that factors beyond the management accounting system also impact intellectual capital and company performance in SOEs.

The study emphasizes the crucial role of management accounting systems in developing intellectual capital within Indonesian SOEs. By demonstrating that these systems significantly affect intellectual capital and firm performance, it underscores the tangible benefits of investing in robust accounting systems. This challenges the notion that intellectual capital is difficult to measure and optimize, providing evidence that effective accounting systems can enhance its management and, consequently, improve firm performance.

Additionally, the study underscores the importance of distinguishing between state and SOE property to foster innovation and efficiency. Building on prior research that highlights the role of intellectual capital across various industries, these findings offer new insights into how policies and organizational structures can influence intellectual capital management. The research also sets the stage for further studies exploring the relationship between government policies and SOE performance on a broader scale. Hence, the results are pertinent not only to academics but also to policymakers and business practitioners.

Limitations and Practical Implications

While this research offers valuable insights, certain limitations must be acknowledged. A primary limitation is the use of purposive sampling techniques, which may not fully represent the population of Indonesian SOEs. Additionally, data gathered from questionnaires and interviews could be influenced by respondent bias. Despite its robustness, the methodology has limitations in addressing the complexity of relationships among studied variables. Future research should adopt a longitudinal approach to understand long-term changes in intellectual capital management and firm performance.

These findings have significant practical implications for SOEs and policymakers. By demonstrating that effective management accounting systems enhance intellectual capital and firm performance, this study encourages SOEs to invest in modern, comprehensive accounting systems. Moreover, the findings underscore the need to separate state and SOE wealth to foster innovation. Policymakers can use these results to develop policies that better manage intellectual capital in SOEs, thereby boosting their competitiveness and contribution to the national economy.

Conclusion

This research addresses the lack of human resource innovation in Indonesian State-Owned Enterprises (SOEs), which hinders their innovation and intellectual capital management. This issue is crucial for SOEs as it impacts their competitiveness and the national economy. The findings reveal that an effective management accounting system significantly enhances intellectual capital, comprising human, structural, and relational capital, leading to improved efficiency and innovation. Consequently, SOEs investing in such

systems can better manage their knowledge, skills, and relationships, boosting productivity and operational efficiency. These results underscore the strategic importance of management accounting systems in developing intellectual capital and enhancing firm performance. However, the study's limitations include potential biases due to purposive sampling and data collection methods. Future research should adopt a longitudinal approach to explore long-term impacts and examine the influence of government policies on SOEs performance.

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