

# Management accounting information system and intellectual capital: a way to increase SME's business performance

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## Abstract

**Purpose** – The paper aims to clarify the unclear relationship between management accounting information systems and SME business performance by having intellectual capital as mediating variable. This will expand the domain of management accounting information usage from SME's perspective.

**Design/methodology/approach** – The paper used a descriptive study using the close-ended questionnaire distributed to 428 SMEs in East Java Region. The data were complemented by statistical analysis using SMART PLS to test the mediation role of intellectual capital.

**Findings** – The paper provided empirical evidence that intellectual capital plays as a quasi mediating for management accounting information system and business performance relationship. This encouraged SME to optimize their IT usage to maximize the benefit of implementing MAIS.

**Research limitations/implications** – Since management accounting system needs for business varied, future study needs to consider the level of IT usage. Therefore, future researchers are encouraged to investigate how to set the usage level.

**Practical implications** – The paper included implications for the development of higher level of IT usage, such as management accounting information system to gain the benefits, that is increased business performance.

**Originality value** – This paper filled the gap in IT usage from SMEs' perspective by expanding the role of intellectual capital on the relationship of management accounting information systems on business performance.

**Keywords:** Management accounting information system; Small Medium Enterprises; business performance, intellectual capital

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## Introduction

Small and Medium Enterprises (SMEs) have a significant role for the economic development of a country (Audretsch et al., 2009; Carter & Jones-Evans, 2009). The existence of SMEs contributes to poverty alleviation efforts through job creation (Adomako et al., 2016), the creation of innovations and potential markets for large industries (Lita, 2018). As other developing countries, the Indonesian government also strengthen the business performance of SMEs through various programs as well as transfer knowledge from government, business and universities (Handoko et al., 2014). Because technological advance is important to improve business performance, small

business must implement management system that is designed to achieve company's goals (Hariyati & Tjahjadi, 2017).

Small business performance received attention from scholars, since SMEs have high flexibility in facing the changing of environment (Berry et al., 2001) even very sharp changes such as during the world crisis in the 1997 to 2000s (Marino et al., 2008). In this pandemic, the situation is different. Those whom acknowledged as having high resilience are not able to block the storm attack (Marino et al., 2008). Government efforts to strengthen their existence through tax incentive programs or others have not been able to sustain the difficulties of SMEs in the pandemic period. Attention to green business is increasing but not followed by good financial performance, as showed by Yin et al. (2022). They explained that the distinctions of utility-model innovation compare to the invention innovation was the causes, where utility-model is characterized by lower application criteria, cheaper fees and shorter application duration, and shorter legal protection duration while green innovation was not. This condition is getting worse for green SME, which has a vision of green business sustainability. Because green businesses itself already have constraints on consumer interest plus pandemic situations, they are increasingly difficult to survive. However, the insistence on becoming a green business can be a competitive advantage in the future. Therefore, this study tested the role of MAIS in driving the quality of business decisions on green SMEs.

Based on previous research, there are several characteristics of SMEs that are suspected to be obstacles in improving their business performance, such as ownership concentrated on individuals rather than spread publicly (Maksum et al., 2020), centralized decision making versus decentralized (Johnston, 2016), product and service development is more comparative than competitive (Kim et al., 2019) and characteristics of using information technology only as administrative work aids (Ritchi, 2018). In fact, these factors are very important in a turbulence world (Raharja et al., 2019). Research in the field of information technology utilization in the SME area has been widely carried out in Indonesia and confirmed that the use of information technology is invested in the form of hardware to facilitate administrating and reporting (Chairoel & Riski, 2018). In fact, the most prominent advantages of accounting information systems are improving the quality of business decisions (Bayo-Moriones et al., 2013). Therefore, this study examined the relationship of management accounting information systems developed by SMEs in improving business performance to provide empirical support for the characteristics of information technology utilization in business decision making. Characteristics of SMEs that are different from large industries, will naturally require different levels of information technology utilization (Rahayu & Day, 2015). Thus, even at lower utilization rates, but due to lower business complexity, do SMEs can still leverage it to improve their business performance? These findings will provide empirical evidence that the use of information technology in the form of MAIS corroborates the implications of technological usage theory on the scope of SMEs.

There is empirical evidence that SMEs have not been able to maximize the benefits of information technology (Yuldinawati et al., 2018). On the other hand, Yuldinawati et al. (2018) had a view that information technology is a tool and intellectual capital which is an important factor to produce companies' competitive advantage (Kim et al., 2019), such as green small business. Thus, researchers hope to provide strong empirical evidence that despite considering the limited utilization rate of information technology. Intellectual capital owned by SMEs can be a driver to achieve better SME business performance. SME intellectual capital is the accumulation of the sum of all intangible assets that are important for the creation of products and services in order to have added value for the organization (Khalique et al., 2018). Implementation of intellectual capital has more evidence in developed countries (Khalique et al., 2011). There are still few research results that show a relationship between intellectual capital and organizational success in developing countries (Khalique et al., 2015; Ullah et al. 2015; Khalique et al., 2018). Research conducted on SMEs in Pakistan and Malaysia, where both are developing countries, showed that intellectual capital has a positive and significant impact on the performance of SMEs (Al-Swidi et al., 2019). In Indonesia, research conducted by Mardiana & Hariyati (2014) demonstrated that the implementation of human capital, structural capital, and customer capital has an effect on business

performance in SMEs in Surabaya. Intellectual capital research in Indonesia is more about measuring the company's financial performance as seen from human capital, structural capital, and customer capital. The measurement of intellectual capital began to develop with the existence of research by Khalique et al., (2015) which was viewed from six variables consisting of human capital, customer capital, structural capital, social capital, technological capital, and spiritual capital.

Departing from the above thoughts, this research took the setting of SMEs under green business sector. The development of the green industry was an effort to sustainable economic development because in the nature of the green economy there is optimization of renewable and unlimited resources, ideas, talents and creativity. The character of the green industry that is able to build competitive advantage is one of the important efforts that can be taken by governments and businesses in struggling and growing in the midst of the Covid pandemic and post-pandemic as well as sustainable development goals achievement.

Therefore, this research took the set of research on SMEs particularly a sub-sector of the green industry. The results of this study can provide recommendations for SME development policies and programs by the government. The rest of this paper was organized as follows. Section 2 presented the literature review and hypotheses development. Section 3 explained the research methodology. Sections 4 reported the findings and Section 5 discussed the empirical results. Finally, Section 6 provided the conclusion of the study.

## Literature Review and Hypotheses

There is clear evidence about the advantage of IT use in service industry, i.e. MIS in banking (Al-Dalaien et al., 2020), but adversely unclear results found in SME due to lower level of technology applied. Contingency theory was used in this study to cover unclear relationship between Management Accounting Information Systems and Business Performance in SME's cases. Contingency theory has been used since the study conducted by Argyris in 1952. He found empirical evidence that control system failures which are more often caused by the style of using information than the technical characteristics of a system. The contingency framework developed by Otley (1980) explained that there is no concept of organizational design that can be applied universally anywhere or under any conditions effectively. The contingency theory approach identifies the optimal forms of organizational control under different operating conditions and tries to explain how the operational procedures of organizational control work. This study took contingency theory to support the view that the application of Management Accounting Information System (MAIS) in SMEs will result in an increase of business performance under certain condition. This condition was factors that facilitate all aspects within an organization to focus the effort to create value, that is intellectual capital.

Research on IC has been widely conducted in large companies, but there is still little empirical evidence in SME research that shows that IC exists in SMEs (Leitner, 2011). Whereas IC becomes a driver of the company's competitive advantage (Todericiu & Stăniț, 2015). Previous research has successfully shown that information technology becomes one of the formations of competitive advantage when the company's investment in IT leads to investment in IC. If an IT investment is only a tool, the maximum benefit that can be realized is only efficiency, not business performance as a whole (Patria et al., 2019). Regarding the IC model evolved, Khalique et al. (2011) and (Wang & Chang, 2005) divided IC into 6 components namely human, customer, structural, social, technological, and spiritual capital instead of using less components.

Each company activity will provide value if it has an impact on the organization's business processes. Business processes will produce business performance that can be measured by Balanced Score Card (BSC), the most suitable for SMEs (Giannopoulos et al., 2013). Performance measurement is complex tasks; thus, it become a big challenge for researchers (Beal, 2000) due to its construct and performance multidimension characteristic. Performance measurement should use or integrate multidimensional measurements involving financial and non-financial performance. The flexibility of measurement and compactness, an advantage of BSC, can measure the performance of SMEs. Thus, BSC can be used in large and small organizations even though each organization has a different character (Giannopoulos et al., 2013).

There is empirical evidence that Balanced Scorecard (BSC) is considered as comprehensive performance measurement that blends financial and non-financial measures (Hariyati & Tjahjadi, 2018). The BSC developed has a cause and effect relationship; thus, it generates a strategy map and eventually it becomes a strategy management system that can be used to evaluate, not only the measure of performance used but also the strategy used (Kaplan & Norton, 2001). BSC can facilitate communication and coordination between management related to processes and innovation in managerial of SMEs (Hervas-Oliver et al., 2016). According to Malagueno et al (2018), BSC can support company efficiency as well as improve control in the organization. It works by increasing clarity of objectives between employees and managerial and create a structure of accountability to individual performance.

The information generated from management accounting is important for workers, managerial, and executives to make better decisions so as to have an impact on improving the company's performance. Currently, management accounting information is no longer dominated by financial information but also non-financial information as an input to financial decision. Chenhall & Morris (1986) explained that the characteristics of useful management accounting information systems from the perception of managers include broad-scope, timeliness, aggregation and integration. Managers' perception is important since they become MAIS primary users (Kelly & Alam, 2008).

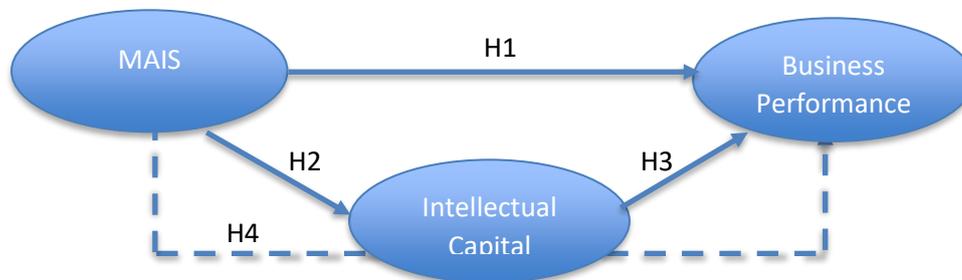
Venkatraman (1994) presented a model that shows the interaction between IT adoption and the transformation of the company's business. Models based on observations within major companies include IBM, Otis Elevators and Bose Corporation. This model is bottom up and consists of 2 levels, namely low and high. At the low level, there are 2 stages, namely localized exploitation and internal integration (evolutionary levels). While at the high level, consisting of business process redesign, business network redesign and business scope redesign (revolutionary levels). This model is able to describe the complexity of the organization, which shows the diversity of business processes in various stages and the relationship of changes in internal structures with external issues. Nevertheless, Poon & Swatman (1997) had a different view. Poon & Swatman (1997) argued that the Venkatraman model was more relevant for large companies. He then proposed a top-down model, which is divided into 3 levels, namely minimum internet-to-internal application integration (purely inter-organizational exploitation), minimum internet-to-internal application integration (selective local integration) and full internet-to-internal application integration (full local integration). Poon & Swatman (1997) viewed that full internet-to-internal application integration (full local integration) is able to provide maximum benefits for the company.

Nevertheless, the lack of adoption and implementation in SMEs hinders the value of the benefits that are likely to be obtained (Zmud, 1984) or meet the effectiveness and efficiency targets that have been set (Feher & Towell, 1997). In Indonesia, the adoption and implementation of ICT in MAIS is very important. In broad-scope elements, for example, ICT can accelerate the flow of information within an organization. In terms of timeliness, ICT can increase the probability of achieving effectiveness and reporting efficiency, as well as in terms of aggregation. Lastly, in terms of integration, ICT makes organizations easier to manage its databases. The results showed that the implementation of ICT in SMEs has affected the process of SMEs but they do subjective considerations in determining the decision to use ICT within the scope of the organization. This leads to ICT implementation in SMEs often resulting conclusions that do not support the optimal achievement of benefits of Business Process (Kettinger & Teng, 1998; Grover et al., 1997; Damanpour, 2017). It probably due to the sample heterogeneity where SMEs definitions and classifications are still in questions. The determination of status as SMEs in several countries including Indonesia is based only on the amount of turnover and labor.

A research model is developed based on the theoretical reviews covered. This is presented in Figure 1. The model illustrates that business performance is affected by management accounting information system which is mediated by intellectual capital.

Bromwich (1990) explained that the information in Management Accounting Information Systems can help companies face challenges in competition in the market. The results of his research also explained that the information in the Management Accounting Information System

focuses on increasing the added value of the company; thus, the company has a competitive advantage that exceeds its competitors. This will help managers to monitor their company's performance in a competitive environment and uncertainty. Unfortunately, not all top managers are aware of multidimensional environmental uncertainty (Veršič et al., 2022). They are not aware that ecological and social environment is unpredictable, that insist organization to asses and measure the changing as well as the impact toward organization.



**Figure 1.** The Relationship Model of MAIS-Business Performance

The characteristics of the information available in a company's management accounting are said to be effective and efficient if it can support the user's information for correct, accurate, and timely decision making (Ngo, 2020). Research conducted by Gerloff et al. (1991) explained that the suitability, accuracy, and correctness between information in the company and the needs of decision makers will improve the quality of decisions to be taken and can ultimately improve the company's performance.

According to Chenhall & Morris (1986), business performance needs a reliable management accounting information system. Supported by Basyar & Khanifah (2008; Luther, 2016), they stated that management accounting information systems have a positive influence on business performance, the resulting information is needed by managers in appropriate and effective decision making so as to improve business performance and survive in competition. Based on the above exposure, the hypothesis in this study is as follows:

H1: The application of management accounting information system (MAIS) has a positive effect on business performance.

Harrison & Sullivan (2000) pointed out that the success of the company indicated by the results of its performance is greatly influenced by the company's efforts to optimize the values of intellectual capital owned by the company. Intellectual capital provides support and diversity of different organizational values such as increased profits, acquisition of innovation from other companies, consumer loyalty, efficiency and effectiveness of cost use, and improvement of productivity (processes and products) in innovating and implementing information technology.

Implementation of MAIS is a prerequisite for the formation of qualified intellectual capital. Intellectual capital is the sum of the six main elements of the organization that in this study is the indicator of the intellectual capital variable, namely human capital, customer capital, structural capital, social capital, technological capital, spiritual capital related to knowledge and technology. Intellectual capital provides more value for the company in the form of competitive advantages of the company. The era of globalization, product and process innovation and information technology and intense business competition this century is forcing companies to change the way they conduct their business. To win the competition, companies must quickly change their strategy from labor-based business to knowledge-based business (Borcoși, 2019; Chung & Tseng, 2019). This strategy become more apparent in green business as a science-based company.

A resource can be said to have a competitive advantage if it meets the following criteria: (a) allow the company to capture various business opportunities and overcome various challenges, (b) unique and difficult to obtain in the market and are only owned by a few business players, (c) can be utilized by the company to provide benefits for the company (Negulescu, 2019; Aidara, 2021). Resource-Based Theory explains that the internal resources owned by the company (both tangible

and intangible) affect the performance of the company which will ultimately increase the value of the company. One of the resources that companies have from intangible assets disclosed is intellectual capital. The application of management accounting information system will have an impact on the formation of qualified intellectual capital.

Based on the above exposure, the hypothesis in this study is as follows:

H2: The application of management accounting information system (MAIS) has a positive effect on intellectual capital.

Intellectual capital is something that needs to be considered related to the achievement of business performance that is expected. The existence of intellectual capital has an impact on performance because it meets the criteria as a unique resource that is able to create a competitive advantage of the company so that it can create value for the company in the form of good business performance. As research by Agostini et al. (2017), intellectual capital components, especially human capital, affect business performance because strong and good human capital will have an impact on processes and innovations that can improve customers so as to bring the company to good business performance. Jardon & Martos (2012) stated that the development of human capital paves the way for other intellectual capital components such as organizational (structured) capital and social capital to have an influence in improving business performance.

Financial performance is still considered as a benchmark of business performance and company objectives. Mondal & Ghosh (2012) concluded that performance on each component of good intellectual capital leads to improve financial performance. The value-added component of intellectual capital significantly affects productivity outcomes with tangible capital playing a major role in performance and profitability. In addition, the capital structure has a considerable influence on Asset Turn Over and ROA (Chowdhury et al., 2018). Ling, (2000) examined the relationship between a company's performance and intellectual capital and find a positive influence between structural capital and business performance. Huang & Hsueh, (2007) also stated that human capital is a prerequisite for social capital that leads to business performance. Based on the above exposure, the hypothesis in this study is as follows:

H3: Intellectual capital (IC) has a positive effect on business performance.

Information in Management Accounting Information Systems can help companies face competitive market challenges that focus on increasing a company's added value to exceed its competitors and helping managers monitor their company's performance in a competitive environment. Management accounting system information as one of the management accounting products plays a role in helping predict the possible consequences of various alternative actions that can be taken on various activities such as planning, control, and decision making. The characteristics of information available in an organization will be effective if it can support information users or decision makers, particularly in dynamic situation. Decision makers need valid and relevant information that need to be shortlisted through process namely sensing, learning, integrating and reconfiguring (Singh et al., 2019). The compatibility of information with the needs of decision makers will improve the quality of decisions to be taken and can ultimately improve the company's performance (Gerloff et al., 1991).

Yuldinawati et al. (2018; Gloet & Terziowski, 2004) explained the importance of human resource management when building innovation strategies that include product and process innovation and information technology implementation. Knowledge management improves performance through the innovation process. This can be achieved by simultaneous approaches of soft Human Resources Management practices and hard Information Technology practices implemented together so that they can synergize properly. The strategy implemented by the company determines the need for intellectual capital in order to lead to good internal process performance.

Intellectual capital provides more value for the company in the form of competitive advantages of the company. The era of globalization, product and process innovation and information technology and intense business competition this century is forcing companies to

change the way they conduct their business. To win the competition, companies must quickly change their strategy from labor-based business to knowledge-based business, making it a key characteristic of its company to a science-based company.

A resource can be said to have a competitive advantage if it meets the following criteria: (a) allow the company to capture various business opportunities and overcome various challenges, (b) have their own uniqueness, difficult to obtain in the market and owned only by a few business players, and (c) can be utilized to provide benefits for the company. Resource-Based Theory explains that the internal resources owned by the company (both tangible and intangible) affect the company's performance which will ultimately increase the value of the company (Nani & Safitri, 2021). In addition, one form of intangible resources owned is intellectual capital.

Management accounting information systems with broad scope, aggregation, timeliness, and integration make the system reliable. A reliable system is needed in order to lead to good internal process performance which further impacts customer performance and good financial performance. Therefore, innovation in the implementation of strategies determines the needs of reliable management accounting information systems which at the end affect the performance of internal processes and customer performance that have an impact on financial performance.

Based on the above exposure, the hypothesis in this study is as follows:

H4: The application of management accounting information system (MAIS) positively affects business performance through intellectual capital.

## Research Methods

This research was quantitative with the aim to provide empirical evidence on the influence of management accounting information systems on business performance through intellectual capital. Data analysis in this study was conducted using Structural Equation Modelling (SEM) using PLS. The population in the study was SME in East Java claimed as green business. This study send mail to SME listed in SME directory from Office of Cooperatives and Small and Medium Enterprises in East Java (Dinas Koperasi and UKM Provinsi Jawa Timur) under certain criteria. The mail sends to 428 SME that match the criteria, but only 113 send back the questionnaire. The sample criteria were (1) has been claiming their product or services categorized as environment friendly explicitly stated in their web or other publication media, (2) has been operating at least 5 years to avoid business age bias, and (3) has been using any computer programming to generate any business report.

**Table 1.** Respondent Data

No	Item	Green explicit statement	Number of respondents
1	Handicraft	Using environment friendly material and packaging	9
2	Culinary	No plastic packaging	45
3	Other services	No damage effect to earth	9
4	Furniture	Consider plant size and age	18
5	Beauty care	No animal tested, recycling packaging	2
6	Fashion and apparel	No plastic use, less damaging material	20
7	App-shop	Less carbon material used	8
8	Others		2

Source: Primary data processed (2022)

Since there was no single definition of the variables, the operational definition was needed. Business performance is anything produced by a company in a certain period with reference to the standards set in accordance with the concept of BSC with four perspectives namely Financial Perspective, Customer Perspective, Internal Process, Learning and Growth. Variables were measured using a previously validated questionnaire and Likert scale. The instrument consisted of 19 question items developed by Ismail (2005; Tovstiga & Tulugurova, 2007). Intellectual capital consisted of intellectual knowledge, intangible assets, and resources that can create and develop the value of a

product or service, so as to help the company's business survive (Khalique et al., 2011). Intellectual capital was assessed using questionnaires that had been validated. The research instrument used six indicators with 79 question items based on study by Tovstiga & Tulugurova (2007; Ismail, 2005; Young et al. 2007; de Castro & Sápez, 2008; Subramaniam & Youndt, 2005; Chua, 2002; García-Muiña & Pelechano-Barahona, 2008).

Management accounting information systems were needed by organizations to serve as the basis for policy making and evaluation in an ongoing manner in the innovation process. There was no single format yet depend on management decision making level. The more reliable the accounting information generated by a system the better the decisions taken by members of the organization (Chenhall & Morris, 1986). MAIS variable was assessed using the Likert scale. To measure the quality of MAIS, there were four indicators consisting of Broad scope, Timeliness, Integration, and Aggregate spelled out in 24 question items.

## Results and Discussion

### Outer Loadings

According to Hair et al. (2017), the minimum threshold of the indicator's reliability value is 0.70 while the outer loadings value which is in the range of 0.40 - 0.70 is included in the researcher's judgement. This means that researchers can choose to stick with or eliminate these indicators in consideration of the quality of the study. In the outer loadings test, there were many indicators that had a value below 0.70, so researchers set the minimum limit value of indicator reliability was 0.50. As a consequence of the judgment, there were indicators that were eliminated. After eliminating, the rests were 12 business process (BP) indicators, 17 Intellectual Capital (IC) indicators, and 13 Management Accounting Information System (MAIS) indicators. Indicators with the highest reliability consisted of BP11 (0.836), ICTC1 (0.763), and MAIS13 (0.776), while indicators with the lowest reliability consist of BP6 (0.576), ICHC4 (0.514), and MAIS2 (0.596).

### Construct Reliability

A research instrument is declared reliable if the acceptable reliability limit value has the construct reliability value of  $> 0.70$ , although reliability with the value of 0.60 - 0.70 is still acceptable (Ghozali, 2013). From the test, the construct reliability value of all variables in the study was above 0.70. Cronbach's Alpha values of variable Management Accounting Information Systems, Business and Intellectual Capital were 0.907, 0.902, and 0.897, consecutively. While the composite values of Management Accounting Information Systems, Business Performance and Intellectual Capital variable were 0.921, 0.918, and 0.912, consecutively. This showed that the indicators used in the study were reliable (McDaniel et al., 2010).

### Discriminant Validity

Discriminant validity test is a stage to discover whether the variable or indicator in the study has a unique value or is only related to the variable or indicator itself and not from the variable or indicator outside which is represented. The result of Fornell Larcker Criterion test showed that the value of Business Performance is higher compared to other variables, that was 0.696 compared to 0.738 and 0.381. Similarly, the Intellectual Capital variable with the value of 0.617 compared to -0.240 and 0.635. Management Accounting Information System variables also showed a high value that was 0.705 compared to 0.635 and 0.381. Thus, the data model tested in the study had qualified criteria. It proved that the construct on the model had discriminant validity.

### Test of The Hypothesis

The table below showed that Management Accounting Information System, directly and positively (0.429) affects the dependent variable, Business Performance.

**Table 2.** Path Coefficients

	Original sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics	P Values	Decision
Direct effect						
MAIS – BP	0.429	0.467	0.050	8.490	0.000	H1 accepted
MAIS - IC	0.634	0.652	0.046	13.740	0.000	H2 accepted
IC - BP	0.880	0.900	0.070	12.491	0.000	H3 accepted
Indirect effect						
Mediating Effect – BP	0.223	0.210	0.062	3.574	0.001	H4 accepted

Source: Primary data processed (2022)

However, when the mediation variable of Intellectual Capital was added to the model, the results showed a decrease from 0.429 to -0.167. Table 2 also showed that the Management Accounting Information System indirectly and positively affected 0.223 the dependent variable, Business Performance, through the role of Intellectual Capital as a mediation. Based on this result, it can be concluded that Intellectual Capital had a quasi-mediating nature which means that this was categorized as pseudo-mediate independent variables of Management Accounting Information System, against the dependent variables of Business Performance, and mediation variables of Intellectual Capital, can also act as independent variables.

**The Application of Management Accounting Information System (MAIS) Has a Positive Effect on Business Performance**

Based on the test results, it was clear that the management accounting information system had a positive effect on business performance. The world uncertainty and complexity had been required more rigorous data as a basis for sound business decision making. MAIS helped managers to monitor any impacts of the changing toward the company's performance. Nothing can avoid the competitive environment and uncertainty (Gerloff et al., 1991). Thus, the information available in a company's management accounting should be effective and efficient in order to increase decision making quality (Ngo, 2020). By having well MAIS, a manager can have broad scope, timeliness, aggregate and integrated information across department, stakeholders, and sub divisions.

**The Application of Management Accounting Information System (MAIS) Has a Positive Effect on Intellectual Capital**

The hypothesis proved that MAIS was necessary to form intellectual capital. Green SME as one of science-based business, born to have distinct characteristic. Unfortunately, not all green business has the ability to turn this origin features into competitive advantage. They need broad scope, timeliness, aggregate and integrated information in order to develop as well as execute organizational strategy. MAIS enabled companies to adapt their strategic planning to a rapid, changing environment, which required strategies that were flexible and creative, as those in intellectual capital elements. As organizations faced a dynamic environment in which critical external and internal factors often changed quickly and dramatically, strategy evaluation was critical. Dynamism, complexity, and munificence represent the main characteristics of environmental uncertainty, and organizational strategy is based on management respond to uncertainty.

**Intellectual Capital (IC) Has a Positive Effect on Business Performance**

As one of science-based companies, intellectual capital was prerequisite for green business competitive advantage. This study successfully supported the view that intellectual capital was necessary for business performance. Within intellectual capital lay intellectual knowledge, intangible assets, and resources that were necessary to create and develop the value of a product or service, so as to help the company's business to survive (Khalique et al., 2011). A green SME facing their own

challenges did not only have uncertainty of business as usual but above all knowledgeable customers. Thus, they need strong weapon to attract the customers attention as well as place them into certain market, that was green customers.

### **The Application of Management Accounting Information System (MAIS) Positively Affects Business Performance Through Intellectual Capital**

Based on the test results, it was seen that the management accounting information system had a positive effect on business performance. However, when variable mediation, namely intellectual capital was added, the results of the mediation showed a decrease. This implied that the intellectual capital was quasi-mediating. This relationship showed that both variables can have an effect without requiring the 'presence' of the other variable, namely the mediation variable. MAIS was individually proven to empirically improve a company's business performance, as well as intellectual capital to improve business performance. According to RBV views, it was stated that the company's internal resources were important for the company's superior performance. Then, the company's internal information system became an important means in supporting business decisions. However, in a time where the information technology increased rapidly, the information technology became mandatory for all business lines at various levels including SMEs. This made MAIS no longer a unique factor but a mandatory thing in every business. Especially at the SMEs level, MAIS developed less complex compared to large-scale companies. Porter stated that an asset would be a competitive advantage if it was unique so that it was not easily imitated, high-priced, and challenging in its creation.

However, this characteristic did not exist at the MAIS employed in the SMEs level. Thus, to become an independent variable, yet it was not always an advantage that could increase the companies' important business decisions. Nowadays, companies must have a competitive advantage in order to win the competition. One important aspect is intellectual capital that allowed the company to improve business performance. A good innovation strategy required sufficient resources, whether human, organizational, financial, technological, or spiritual. But the establishment of intellectual capital is part of the business process that required information support in investment decision making. When the information system developed was not able to support the process, there would be no optimal intellectual capital investment. This needed to be considered in information technology development programs in SMEs. Application programs developed today had not been able to produce information content that was important for strategic decision making, especially intellectual capital. Intellectual capital was needed in the implementation of innovation strategies that were implemented in a sustainable manner. As stated by Harrison & Sullivan (2000), the company's success shown by its performance results was greatly influenced by the company's routine efforts to optimize the values of intellectual capital owned by the company. Intellectual capital (human, customer, structural, social, technological and spiritual capital) provided support and diversity of different organizational values such as increased profits, acquisition of innovation from other companies, consumer loyalty, efficiency and effectiveness of cost use, and improvements in productivity (processes and products) in innovating and implementing information technology.

### **Theoretical Implication**

This study provided an insight of RBV towards green SMEs. Well-developed MAIS became more prominent if the business itself can change it into competitive advantage, namely intellectual capital. No matter MAIS was, as long as it turned into distinct assets, it will result in business performance.

### **Managerial Implication**

The present study provided additional empirical evidence that SMEs business performance was the result of good intellectual capital management. This was a critical point for SMEs that had so far been considered to have a traditional management that had not valued human resource investment, preferred to hire people based on familial ties, low costs, and insufficient training

processes. Employees had not been able to differentiate the company from other companies despite their best attempts. Employees with ideal skills were few in East Java's manufacturing companies. As a result, employees were unable to operate as a team, had few ideas, and were unable to complete tasks on time.

Intellectual capital played a critical role in the implementation of sustainable innovation strategies in East Java's manufacturing companies. Manufacturing companies in East Java were currently experiencing growth, necessitating the use of competent intellectual capital, but the findings of this study revealed that empowerment over the role of intellectual capital was still inadequate.

## Conclusion and Future Direction

Intellectual capital can be operated as a variable of direct causes but can also be an indirect cause, according to the nature of quasi-moderating. As a result, there was a gap in the development of similar studies on the trend of intellectual capital in the future.

This study should shed light on how intellectual capital management affected management accounting and information systems, as well as corporate performance. The findings implied that managers may improve the design and execution of accounting systems, as well as their business performance. This project can help the company's innovation strategy, which had an impact on the bottom line. The findings of this study support two points: (1) organizations must be more proactive in product and process innovation in order to remain competitive in the global marketplace; and (2) managers must create intangible assets such as intellectual capital in the knowledge economy.

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