

USEFULNESS OF MANAGEMENT ACCOUNTING INFORMATION IN DECISION MAKING AMONG SMEs: THE MODERATING ROLE OF CLOUD COMPUTING

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ABSTRACT

Small and medium sized enterprises (SMEs) are the biggest contributors to the Malaysian economy with more than a third of total gross domestic product (GDP) delivered by these industries. In a competitive business environment, SMEs need to utilize information and technology in making decisions. This study aimed to see the relationship between management accounting information (MAI), decision-making, and cloud computing among SMEs in Malaysia. A quantitative research design utilizing survey questionnaires were used to collect the data. The survey was conducted on 384 Malaysian small and medium-sized enterprises in various sectors. The study obtained 105 useable responses which were analysed using Smart PLS 3.0 (Partial Least Square). The study found all the dimensions of MAI; namely broad scope, timeliness, aggregation and integration, positively related to decision-making. The findings also indicated that cloud computing moderated the relationship between MAI and decision-making. The results provided evidence for organizations to realize the importance of MAI, and strategize how to relate to information characteristics in decision-making. Moreover, it enhances the understanding of SMEs on the role of cloud computing, in light of competitive business environments. Future studies have the opportunity to expand the scope to include samples from other geographical areas and enhance data collection through case studies and interviews to understand the issue in-depth.

Keywords: management accounting information (MAI), cloud computing, decision-making, SMEs

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INTRODUCTION

Small and medium-sized enterprises (SMEs) are still at the early stage of development and are still evolving. Their environment can be characterised as hyper-competitive, changing, and technologically complex (Christauskas & Miseviciene, 2012). SMEs are facing challenges due to their limitations in the areas of finance and human resources as well as lack of technological adoption and information compared to large-sized companies (Ting, 2004). As such, from the resource constraint's perspective, SMEs are different from their large-sized counterparts. Despite their constraints of being small and having limited resources, management accounting information (MAI) is pertinent to the effectiveness and efficiencies of their businesses (Ahmad, 2017).

MAI is defined as an information source which contains information that is both financial and non-financial in nature. It is for the utilization of internal users for their organization's long term well-being; i.e. planning, implementation and appraisals of strategies (Hui & Yusof, 2010). MAI provides information for various purposes spanning from decision-making to as a means of organisational learning. MAI is the basic source of information for an organization's planning, decision-making and monitoring (Ahmad, 2012; Laitinen, 2014). Abu Bakar (2001), and Hui and Yusof (2010) reported that it is helpful and vital to managers in assisting their decision-making, performance appraisal and communication. MAI can serve multiple roles simultaneously and is relevant to managers at all levels (Fitsum, 2014). In Malaysia, earlier studies focused mainly on management accounting practices (Azhar, 2005; Rahman et al., 1997; Sulaiman et al., 2004) with very little emphasis on MAI (Hui & Yusof, 2010). Salmon and Joiner (2006) only focused on the contextual conditions for MAI. The research on SMEs in terms of management accounting is scarce (Ahmad, 2013). According to Mitchell and Reid (2000), and Nandan (2010), there is not enough interest to study the availability of MAI and the utilization of management accounting among SMEs. Very few studies have been conducted on utilization of MAI among SMEs in both developed and developing economies (Alattar et al., 2009). Increasing the trust of managers about management accounting information is needed to increase the level of management accounting applications (Nguyen & Le, 2020).

MAI evolves and covers information which includes internal/external, financial/nonfinancial, quantitative/qualitative and historical/future type of information (Heidmann, 2008). Financial and non-financial information helps in improve decision making (Sherine & McLellan, 2017). Examples of the information are; expenses, revenues, sales growth, capacity utilization, wastage, customer satisfaction and loyalty, product quality, and employee motivation (Mia & Winata, 2008). Chenhall and Morris (1986), first formalized the four main features of MAI and stated that the consideration of information for decision-making can be in terms of the features of general information. They suggested that information has four characteristics; scope, timeliness, aggregation, and integration, as displayed in Figure 1.

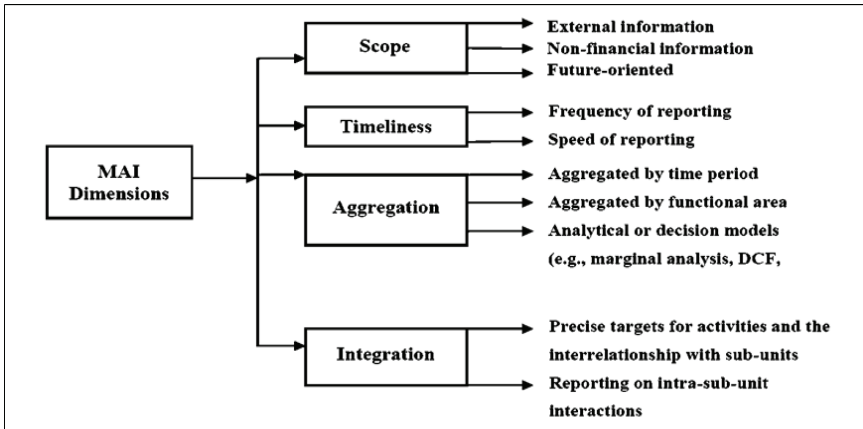


Figure 1: Information Characteristics of MAI

(Source: Chenhall and Morris, 1986)

Literature in the area of MAI indicates the importance of MAI with respect to planning, monitoring, and controlling and decision-making (Ahmad, 2012; Fitsum, 2014; Hui & Yusof, 2010; Kaplan et al., 2011; Lim, 2011; Raman et al., 2009). Mohammed et al. (2019) indicate that SMA information (which encompasses analyses on competitors, clients and product data) has positive significant effects on firm performance.

Previous studies such as Ghasemi et al. (2016), Odar et al. (2015), and Mia and Winata (2014) adopted the instrument used by Chenhall and Morris (1986) to examine MAI. The studies addressed MAI dimensions either individually or collectively in one research setting, and only considered

limited organisational variables in the absence of variables such as decision-making and technology. Most of these studies adopted the Contingency Theory to examine the relationships between the variables. This paper aimed to examine the direct influence of MAI as the independent variable with decision-making, and cloud computing. This study utilized the Resource-based View (RBV) to determine the association between the variables.

According to Baghersefat et al. (2013), the effect of MAI on managers' decisions is an issue of certain interest among researchers. Decision-making is the backbone of managerial functions and one of the most important tasks of managers and administrators in modern organisations (Kidane, 2012). In light of the increase in competition and business uncertainty, the value of information for accurate decision making has increased (Alaarj et al., 2017). Decision making success affects firm growth (Hannimitkulchai et al., Pratoom, 2019). Researchers link the ability of making the right decision under uncertain environments to positive organizational performance (Chin et al., 2014; Jussila et al., 2016; Merigó et al., 2016). Previous studies have indicated that practices such as decision support system are used by Malaysian companies to improve the decision making process and achieve competitive advantage (Nik Abdullah, 2020; Ahmad, 2012, 2017; Nuhu et al., 2016). Findings by Mohammed et al. (2019) show that Malaysian private hospitals moderately used SMA information. To select the best choice, managers have to consider the effectiveness of the decisions. Hence, data and information may provide some guidance in achieving this (Mayr et al., 2006). A study by Hui and Yusof (2010) indicated that MAI, whether financial or non-financial, is highly useful and vital to managers in assisting them in their decision making and performance appraisal at various levels – corporate organizations, operations or functions – based on every level's requirement, resources and competence. Moreover, they also pointed out that the diagnostic and interactive functions of financial and non-financial MAI are helpful and relevant to all companies, regardless of their size.

Hui et al. (2011) reported that MAI facilitates decision-making and its well-consolidated, comprehensive and timely information may enhance the quality of managers' decisions. Another research done by Abu Bakar (2001) conducted a survey on the relationship between the availability of MAI to managers and the decision-making process, using the four dimensions of MAI adopted from Chenhall and Morris (1986). The findings suggested that

MAI was perceived to be an essential element in assisting organisations, especially in helping managers communicate with their colleagues in the decision-making process. The findings also indicated that managers viewed all four dimensions of information to be useful to them. Whereas, a survey conducted on 449 managers from manufacturing companies in Germany by Schäffer and Steiners (2004) in the use of MAI in decision-making, monitoring and scanning found a positive association between them. Meanwhile, the research by Lim (2011) indicated that organizations utilized MAI for their various internal purposes; spanning from decision-making to as means for organizational learning. He also found that MAI facilitates organisational integration, and motivates individuals and groups by helping them in decision-makings. The use of high accounting information quality is required to improve financial reporting that will reduce the risk of making wrong decisions (Houcinel & Kolsi, 2017).

Scholars have highlighted the role of digital technologies in enhancing productivity and performance in SMEs (Papadopoulos et al., 2020). The employment of information and communication technology (ICT) may enhance competitiveness and give real advantage to SMEs, hence allowing them to compete with large businesses (Alshamaila et al., 2013). Nugroho et al. (2017) realized that SMEs have weaknesses in the technological area. Cloud computing offers tremendous advantages to SMEs through reduced financial burden due to adoption of new technology (Carcary et al., 2014). Thus, SMEs can scale down and concentrate on their business activities as their information system and technology requirements are handled by the service providers (Tarmidi et al., 2014).

Cloud computing is a figure of speech that refers to the internet (Tarmidi et al., 2014). It is defined as "...an information technology service model where computing services (both hardware and software) are delivered on-demand independent of device and location" (Marston et al., 2011). It is a tool that benefits its adopters significantly, such as it reduces the run and response time, minimizes the risk of physical infrastructure deployment, reduces entry cost, improves innovation speed, facilitates flexible provision of information, and uncomplicated software updates (Tzagklis, 2013). Thus, cloud computing enables organisations to extend and improve their collaboration and communication in making business decisions through access to factual and up-to-date information over the Internet regardless of their location (Dimitriu & Matei, 2014).

Cloud computing has been the focus of many studies (Amini, 2014). There are several previous studies which addressed cloud computing from different aspects. These studies pointed to the importance of cloud computing in information technology in contemporary organisations, and its role in flow information and access to actual and up-to-date information. Downie (1997) pointed out that the increased capacity and capability of computing technology leads to improvements of the contemporary information systems, i.e. in terms of presentation and analysis of information. Whereas, Mohammadi et al. (2015) stated that the users of cloud computing enjoy the various advantages it offers. These include acceleration of time, follow without physical presence, connect to other computer systems, availability, low-cost computers for users, increased computing power, unlimited storage, capacity building, improved matching between document formats, and access to the latest version. Abdalrahman and Mahmoud (2015) suggested that cloud computing provides the end users a service through the internet the flexibility and unlimited ability of information technology (IT) resources. Moreover, they suggested that cloud computing improves the establishment and transmission of IT solutions, particularly accounting in terms of the way financial information is exchanged and the presentation of interpreted and analysed financial data to the end user or the customer.

Furthermore, some studies have highlighted the role of cloud computing in improving access to information, and the increase in magnitude, rate, and volume of data handling that will enhance the speed and quality of decision-making throughout the organisation. Mia and Winata (2008) stated that utilization of MAI by managers in their decision-making has a positive association with ICT, which consists of a computer networks and the Internet. Moreover, they indicated that ICT utilization by managers improves the magnitude, rate and volume of data being handled and enhances the sharing of information and communication across roles, parties, places and time zones. The increased capacity of managers to immediately receive and deliver real-time information results in greater decision-making process. Similarly, the research by Quinn et al. (2014) addressed the role of cloud computing in management accounting and decision-making. They pointed out that cloud computing provides access to information for decision-making through new methods, and at various time using smart devices (tablet or smartphone). The findings showed that 93% of those interviewed agreed that the information from cloud-based systems was rated as detailed, timely

and complete, and could promote collaboration and contribute to decision-making, while 90% of managers saw no disadvantages to decision-making using cloud technology.

Bachmid (2016) indicated that lack of new technology and the low level of accounting information system may cause poor performance of SMEs. In SMEs, the usage of IT is understudied and remained unique (Riemenschneider et al., 2003). The existing literatures need a comprehensive view of the IT that leads to effective utilization of accounting information systems (Klovienė & Gimzauskiene, 2015; Bachmid, 2016). Most prior research on cloud computing concentrate on the effect of its adoption and the technical issues that arise due to its implementation (Obeidat & Turgay, 2012). Moreover, they did not go beyond the adoption stage to examine the implementation of the system and its effectiveness in the accounting field. The advances in accounting information technology have moved towards online accounting (Christauskas & Miseviciene, 2011). Therefore, the adoption of cloud technology by businesses is becoming important and is gaining attention (Ekufu, 2012). To date, limited studies on cloud computing in Malaysia have dealt with the factors pertaining to the adoption of cloud computing (Tarmidi et al., 2014).

Recognizing the importance of MAI and cloud computing in decision making, this study examined the influence of MAI upon SMEs in Malaysia. In particular, this study looked into the effect of MAI on organizations' decision-making process, and the moderating role of cloud computing on the association between MAI and decision-making. In the next section, the discussion on hypotheses development and research methodology are presented, followed by data analysis and discussions of findings. Finally, this paper ends with the conclusion.

THEORETICAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

This study is based on the RBV Theory which originates from the view that an organization has competitive advantage due to its internal resources. To achieve competitive advantage that is not easily imitated by competitors, resources that are valuable, scarce, not duplicable, and have no substitutes

are needed. Resources can also be in the form of factors that can be utilized to carry-out value-creating strategies. These resources may be tangible or intangible, and encompass all assets, abilities, organizational processes, firm characteristics, information, knowledge, technology, etc. (Barney, 1991).

MAI is considered one of the valuable information resources for an organization. It is employed for many purposes such as decision-making, strategic planning and performance evaluation (Lim, 2011). Hui and Yusof (2010) suggested that the utilization of MAI helps organizations to maintain their competitive advantage and be leaders among their competitors. In addition, Gaidienė and Skyrius (2006) stressed that MAI improves decision-making, assists in strategic development, appraises current strategy, concentrates on the efforts of enhancing organizational performance and involves in the appraisals of the contributions and achievements of everyone. MAI can offer a competitive advantage to a company by providing suitable information for decision makers thereby giving it the opportunity to select the best course of action or a specific level and combination of resources to achieve its goals (Schäffer & Steiners, 2004).

RBV emphasizes on the harmony between available opportunities and business abilities. RBV considers the utilization of available resources for creation of core competencies so that competitive advantage can be achieved and sustained (Al-Dhaafri et al., 2013). The resources can serve as the input to a process. In contrast, a capability is a resource that has the purpose of improving other resources possessed by the business (Chapman & Wieder, 2015). Theriou et al. (2009) argued that capabilities allow the creation of relations between resources and their utilization, hence encouraging the business to create value by influencing the conversion of input into output.

Cloud computing is perceived as one of the information technology capabilities (Rockmann et al., 2014). Truong (2010) argued that cloud computing establishes and maintains competitive advantage by the association with other resources of the business. Flack and Dembla (2014) pointed out that cloud computing is an additional resource used by the firm to gain competitive advantage by propelling significant application utilization, sustaining competitiveness and reducing the cost of IT operations and maintenance. Nuseibeh (2011) stressed that cloud computing could help organisations to gain a unique competitive advantage by giving the opportunity to better interconnect and collaborate within the organisation.

Based on the RBV perspective, the research framework is highlighted in Figure 2. MAI, as one of the organisation's resources, is expected to influence decision-making. The model illustrates the role of cloud computing as a technological capability to promote the relationship between MAI and decision-making.

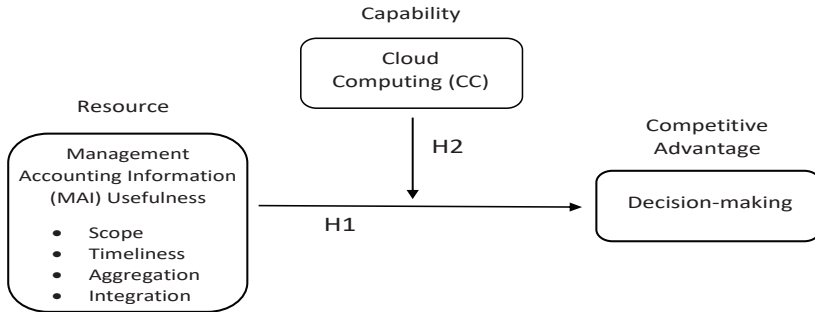


Figure 2: Research Framework

Lim (2011) indicated that MAI is capable of facilitating the integration to inspire everyone and helps in decision-making. The findings of his study documented a positive relationship between the usage of MAI in planning, for decision support, and performance evaluation. Meanwhile, Abu Bakar (2001) pointed out that MAI is perceived to be an important element in helping organisations, particularly managers, to communicate with their colleagues in the decision-making process. Hui et al. (2011) suggested MAI has an important role in the facilitation of decision-making by its supply of information. Similarly, Ahmad (2012) claimed that MAI is the main source of information for decision-making and monitoring. Therefore, the following hypothesis is proposed:

H1: There is a positive relationship between the usefulness of MAI and decision-making.

Pierce and O’Dea (2003) indicated that the wide scope of information is valuable to managers for their decision-making. Mia and Chenhall (1994) indicated that researchers agreed that the wide coverage of MAI system significantly helps managers in their decision-making. Chong (1996) discovered that for a highly uncertain situation, the extensive utilization of management accounting system results in great managerial decisions;

thus, improving the performance of managers. Moreover, Soobaroyen and Poorundersing (2008) pointed out that the coverage and timeliness of information are vital for managers and decentralised managers in their decision-making. Therefore, the following is the hypothesis:

H1a: There is a positive relationship between the usefulness of the MAI characteristic of a broad scope and decision-making.

Hui and Yusof (2010) suggested that to make the correct decisions, information that is timely and relevant is needed. Similarly, Rahman et al. (1997) found that to decide on various problems and issues, managers require timely and accurate information. Furthermore, Ramli and Iskandar (2014) stated that timely information is valuable to decision makers as outdated information may no longer be useful in assisting the decision-making. Also, timely information assists the managers in making right decisions as it provides fast and up-to-date information. Therefore, the following is the hypothesis:

H1b: There is a positive relationship between the usefulness of the MAI characteristic of timeliness and decision-making.

Gaidienė and Skyrius (2006) stated that aggregated MAI is useful for those who make decisions and have financial responsibilities. Similarly, Choe (1998) stated that in monitoring and coordinating interdependent sub-unit's activities, managers found aggregated information to be useful to them. In addition, Ramli and Iskandar (2014) pointed out that the correct aggregated information helps in the prevention of information overload. The appraisal of relevant aggregated information is better and faster than individual information. Hui et al. (2011) found the MAI's aggregated-information to be useful to managers as it enhances the quality of decisions. Therefore, the following is the hypothesis:

H1c: There is a positive relationship between the usefulness of the MAI characteristic aggregation and decision-making.

Salmon and Joiner (2006) stated that MAI harmonizes the sections in a sub-unit, as well as among sub-units, where the manager is responsible for the information concerning the impact that their decision will have on

the organisational sub-unit. Mayr et al. (2006) found that the integration of MAI has the ability to influence the decision process at almost every stage. Furthermore, Abu Bakar (2001) pointed out that the integration of information within sub-units will help managers of different departments to easily obtain useful information from other departments. Therefore, the following is the hypothesis:

H1d: There is a positive relationship between the usefulness of the MAI characteristic integration and decision-making.

Chang et al. (2003) suggested that information processing that is effective assists the smooth delivery of information to managers. Business can gain significant competitive advantage through better and faster decisions. Ekufu (2012) stated that cloud computing improves information access, assists managers by presenting methods, improves communication in the organization, and increases productivity. Additionally, it assists in critical decision-making by providing real-time information. Kinkela (2013) found that the use of cloud computing leads to efficiencies through the utilization of an outside expert who is capable to immediately modify the software instead of sending patches to meet users' needs. Furthermore, in view that users can log-in safely and remotely, cloud facilitates the transmission of data and software. With cloud computing, the organisation can make decisions faster; by communicating better through sharing and receiving information on the cloud with only a network connection, the access of files and software can be done from any device at various times (Quinn et al., 2014). Therefore, the following is the hypothesis:

H2: Cloud computing moderates the relationship between MAI and decision-making.

RESEARCH METHODOLOGY

Data Collection

The large number of SMEs in Malaysia made it impractical to include all SMEs in this study. The questionnaires were distributed to SMEs located in certain geographical areas, Selangor, Kuala Lumpur, and Johor. These

areas have an estimated total of 279,457 SMEs, which represented 43.3% of SMEs in Malaysia (Malaysian SME statistics 2016). SMEs can be defined by sales turnover or number of full-time staff. Medium sized firm has sales turnover of less than RM50 million or full-time staff is less than 200. Small-sized firm has sales turnover of less than RM20 million or its full-time staff is less than 75 (SME Corp. Malaysia, 2013).

This unit of analysis was small and medium-sized companies from various industries, and the participants for this study were owner/manager of SMEs, which is similar to the approach taken by prior studies (Ahmad, 2012, Ahmad et al., 2015; Koe et al., 2015; Lybaert, 1998). A stratified random sampling was adopted because there are several different industries in the SME sector. A stratified random sample provides the same chance for all population units to be included in the selected sample, which provides a high level of generalizability (Bryman, 2007).

The questionnaire method was utilized to collect the data. Keillor et al. (2001) stated that the questionnaire technique is considered to be the most commonly used survey method. Whereas, Moilanen (2001) argued that the questionnaire technique is appropriate for different levels including the organisational level. To improve the questionnaire's reliability, a pre-test was conducted prior to the actual gathering of data. A total of 384 printed questionnaires were distributed for this study. For each company selected, a questionnaire and a letter specifying the goal of the current study were distributed to the owner/manager of the SMEs. A total of 105 responses were obtained. Kent (2001) suggested that for quantitative analysis to have sensible statistical analysis and meaningful results, a study needs to have at least 100 responses. The response rate of 27% is considered reasonable in the case of the Malaysian environment. Based on past studies, the response rate in Malaysia was between 15% and 30% (Omar & Ali, 2010).

Variable Measurements

The questionnaire items were adopted from previous literature. A total of 19 questions were used from (Haedr, 2012) with regard to the four dimensions of MAI, namely scope, timeliness, aggregation and integration. For this section, questions with two-sided 5-point scales were used. The scales with regard to importance of MAI were positioned at the left side,

ranging from 1 (not important) to 5 (very important). Meanwhile, for MAI availability, the scales were on the right-side, ranging from 1 (not available) to 5 (always available). The usefulness of MAI characteristics is perceived through its importance and availability. Therefore, the scores for each item obtained from both scales (importance and availability) were used to determine the usefulness of MAI (Maelah et al., 2019).

To capture cloud computing service, this study used seven items adopted from Monteiro and Vasconcelos (2013). The respondents were required to rate the quality of cloud computing service provided to the organization based on a 5-point Likert scale ranging from 1(not important) to 5(very important). A similar scale has been used by previous studies (Garg et al., 2011, 2013; Siegal & Purdue, 2012) to measure the service quality of cloud computing. With regard to decision-making, this study utilized six items developed by Awasthi and Varman (2003). The respondents were asked to evaluate the quality of decision-making in their organisations based on 5-point scale from 1 (strongly disagree) to 5 (strongly agree). The measurements of the variables are summarized in Table 1.

Table 1: Variable Measurements

Variable	Dimension	Source	Item	Scale
MAI	Scope	(Chenhall & Morris, 1986) and (Gordon & Narayanan, 1984), which has been further modified by (Haedr, 2012).	6	5-point scale; the scales related to the MAI importance from (1= not important, 5= very important). Meanwhile, the scales related to the MAI availability are from (1= not available, 5= always available). MAI Usefulness (Importance*Availability)
	Timeliness		4	
	Aggregation		5	
	Integration		4	
Cloud Computing		(Monteiro & Vasconcelos, 2013)	7	5-point Likert scale (1= not Important, 5= Very Important).
Decision Making		(Awasthi & Varman, 2003)	6	5-point Likert scale (1= strongly disagree, 5= strongly agree).

Data was analysed using the Smart Partial Least Squares (PLS) to assess the validity and reliability, and test the research hypotheses. The first hypothesis was the direct relationship between MAI and decision making. Four sub-hypothesis encompassing the relationship between

scope, timeliness, aggregation and integration of MAI and decision making were also tested. The second hypothesis was the moderating role of cloud computing on the relationship between MAI and decision making. Smart PLS provides latent variable scores; avoids small sample size problems; estimates complex models with many latent and manifest variables, and error terms; it does not impose any normality requirements on the data; examines the theory and measures simultaneously; and handles both reflective and formative measurement models (Henseler & Chin 2010). The PLS model is analysed and interpreted in two stages: (1) The measurement model that displays the relationships between the constructs and the indicator, and assesses the reliability and validity of the measurement model; and (2) The structural model, which represents the constructs and displays the relationships (paths) between the constructs (Hair et al., 2017).

DATA ANALYSIS AND RESULTS

Demographic Statistics

Frequency and percentage were used to develop the profile of the respondents for this study. As shown in Table 2, the vast majority, of the respondents were under 30 years old (41%), had bachelor's degree (61%), specialized in accounting/finance (35.2%) and have less than 5-year experience (36.2%). By looking at the job title and position, 29.5% of the respondents were managerial accountants, 14.3% finance managers, 8.6% general managers, followed by 4.8% marketing managers, 1.9% production managers and 41% others. Although 'others' represented 41% of the respondents, the data showed that 60% of 'others' were directors, administration managers, HR managers, CEOs, and executive managers. The demographic analysis of the respondents indicated that the sample was well represented by various age groups, qualifications, and experience.

Table 2: Demographic Profiles of Respondents (N= 105)

No.	Demographic Variable	Frequency	%	No.	Demographic Variable	Frequency	%
1	Age group			4	Job title and position		
	Under 30	43	41.0		General Manager	9	8.6
	30 to 40	36	34.3		Marketing manager	5	4.8
	41-50	13	12.4		Managerial accountant	31	29.5
	Over 50	13	12.4		Production manager	2	1.9
2	Qualification/Education				Finance manager	15	14.3
	High School	6	5.7		Other*	43	41
	College diploma	12	11.4	5	Experiences		
	Professional Qualification	9	8.6		Less than 5 years	38	36.2
	Bachelor degree	64	61		5 to 10 years	28	26.7
	Post-graduate degree	14	13.3		11 to 15 years	18	17.1
3	Area of specialization				16 to 20 years	9	8.6
	Accounting/Finance	37	35.2		Over 20 years	11	10.5
	Business Administration	33	31.4				
	Economic	2	1.9				
	Computer Science	8	7.6				
	Others	25	23.8				

*Other (Directors, Administration Managers, HR Managers, CEO, and Exec Managers)

As shown in Table 3, 66.7% of the companies were service companies, followed by 25.7% manufacturing, 5.7% construction, and 1.9% agriculture. In terms of size 56.2% had between 5-29 full-time employees, and 39% recorded between RM3 to RM21 million annual sales turnover. The results of the study revealed that 41.9% of organizations had been in operation for 10 to 20 years, followed by 37.1% for more than 20 years, 11.4% less than 5 years, and 9.5% for 5 years to less than 10 years.

Table 3: Demographic Profiles of Companies (N= 105)

No.	Demographic Variable	Frequency	%	No.	Demographic Variable	Frequency	%
1	Main industrial sector			3	Annual sales turnover		
	Services	70	66.7		Less than RM3 million	38	36.2
	Agriculture	2	1.9		RM3 to less than RM21 million	41	39.0
	Mining & Quarrying	0	0.0		RM21 to RM50 million	26	24.8
	Manufacturing	27	25.7				
	Construction	6	5.7	4	Company age		
2	Full-time employees				Less than 5 years	12	11.4
	5-29	59	56.2		5 years to less than 10 years	10	9.5
	30-74	23	21.9		10 years to less than 20 years	44	41.9
	75-200	23	21.9		More than 20 years	39	37.1

Hypothesis Testing

(1) Evaluation of the measurement model:

There are two vital aspects that need consideration when utilising a survey instrument, and those are construct reliability and validity scales. Chin (1998) proposed that the Cronbach’s alpha (α), composite reliability (CR), and average variance extracted (AVE) be used to evaluate the reflective construct properties. If the reliability exceeds 0.70, then the construct is acceptable (Clum et al., 1990). Based on the data, the scores of both Cronbach’s alpha (α) and (CR) exceeded 0.70, which indicated that the item construct scale for each variable has consistency reliability. Convergent validity of the measurement model can be assessed by checking whether AVE of the construct is greater than 0.50 (at the construct level), and the item loadings are greater than 0.50 and statistically significant at the item level (Hair et al., 2011). Consistent with Hair et al. (2011, 2017), the constructs and variables were satisfactory as AVE and factor loadings for each measure exceeded 0.50, as shown in Table 4.

Table 4: Evaluation of the Measurement Model

	Loading	AVE	CR	Cronbach alpha		Loading	AVE	CR	Cronbach alpha
Scope					Integration				
S1	0.818	0.746	0.946	0.932	I1	0.875	0.799	0.941	0.916
S2	0.890				I2	0.909			
S3	0.888				I3	0.909			
S4	0.836				I4	0.883			
S5	0.855				Cloud Computing				
S6	0.893				CC1	0.698	0.562	0.9	0.871
Timeliness					CC2	0.696			
T1	0.944	0.882	0.968	0.955	CC3	0.785			
T2	0.942				CC4	0.779			
T3	0.937				CC5	0.773			
T4	0.933				CC6	0.769			
Aggregation					CC7	0.744			
A1	0.894	0.788	0.949	0.933	Decision Making				
A2	0.879				DM1	0.857	0.751	0.948	0.934
A3	0.905				DM2	0.841			
A4	0.891				DM3	0.872			
A5	0.869				DM4	0.844			
					DM5	0.876			

The issues of discriminant validity appear when constructs are similar to each other (Straub et al., 2004). In PLS, AVE analysis is done to examine the measurement model's discriminant validity. Consistent with the guidelines of Fornell and Larcker (1981), should the AVE is more than the squared correlation, then there is sufficient discriminant validity. Based on Table 5, each construct's AVE exceeded the squared correlation. Thus, all constructs had sufficient discriminant validity.

Table 5: The Result of Discriminant Validity

	AVE	Aggregation	Cloud computing	Decision-making	Integration	Scope	Timeliness
Aggregation	0.788	0.888					
Cloud computing	0.562	0.366	0.750				
Decision making	0.751	0.597	0.465	0.867			
Integration	0.799	0.629	0.498	0.613	0.894		
Scope	0.746	0.558	0.177	0.497	0.417	0.864	
Timeliness	0.882	0.354	0.293	0.472	0.452	0.304	0.939

(2) Evaluation of the structural model:

To verify the hypotheses in this study, the t-value and P-value were derived using the bootstrapping procedure to consider path significance. The strength and significance of the associations between the dependent and independent variables are shown by path coefficients. Generally, a t-value larger than 1.96 (t-value >1.96) is significant (Hair et al., 2011). According to Ifinedo (2011), a P-value < 0.05 indicates a relationship’s significance between variables. The R-square of decision making was 0.566 indicating that 56.6% of the variation in decision making of Malaysian SMEs can be explained by MAI and cloud computing. R-squared value 0.5 < r < 0.7 is generally considered a moderate effect size (Moore et al., 2013). Table 6 shows the summaries of the results of the t-value and P-value and the final results for each hypothesis. Based on this results, we conclude that all the hypotheses are accepted.

Table 6: Summaries of the Results

Hypothesis	T-Value*	P-Value**	Results
H1: The usefulness of the MAI -> Decision-making	9.897	0.001	Accepted
H1a: The usefulness of the MAI characteristic of broad scope -> Decision-making	2.005	0.045	Accepted
H1b: The usefulness of the MAI characteristic of timeliness -> Decision-making	2.12	0.034	Accepted
H1c: The usefulness of the MAI characteristic of aggregation -> Decision-making	2.454	0.014	Accepted
H1d: The usefulness of the MAI characteristic of integration -> Decision-making	2.878	0.004	Accepted
H2: Moderating effect cloud computing -> MAI and Decision-making	2.674	0.008	Accepted

*T-value >1.96= significant; **P-value < 0.05= significant.

Results and Discussion

The first objective of this study was to examine the effect of MAI on decision-making. The discussion below focuses on the results of hypothesis testing.

H1: There is a positive relationship between the usefulness of MAI and decision-making.

The findings of the study revealed a significant relationship between the usefulness of MAI and decision-making ($b= 0.626$, $t= 9.897$, $p<0.05$). Therefore, this finding is similar to the findings of past studies (Akbar, 2010; Abu Bakar, 2001; Fitsum, 2014; Lim, 2011; Mia & Patiar, 2001). Houcinel and Kolsi (2017) and Lim (2011) suggested quality information improved decision making. MAI is perceived to be an important element in helping modern organisations, particularly managers in decision-making in SMEs in Malaysia. SME companies perceive that MAI is useful in improving the decision-making processes in a competitive condition by helping them to make sound decisions based on the information provided. Nevertheless, these companies perceived that for them to maintain their effectiveness and competitiveness, more information is needed.

H1a: There is a positive relationship between the usefulness of the MAI characteristic of broad scope and decision-making.

The results of the study indicated a significant relationship between the MAI characteristic of usefulness in broad scope and decision-making ($b=0.179$, $t=2.005$, $p<0.05$), which supports the previous studies that reported the influence of broad scope MAI on decision-making (Chenhall & Morris, 1986; Chong, 1996; Mia & Chenhall, 1994). Soobaroyen and Poorundersing (2008) addressed the importance of information coverage in decision making. That MAI characteristic of broad scope is perceived as being one of the useful MAI characteristics in organisations, which provides financial and non-financial information of the internal and external environments of an organisation. The surveyed SMEs perceived that the MAI characteristic of broad scope helps managers to obtain greater information about their competitors and future events. Also, they confirmed the desire of decision-makers in their organisations for wide information that provides them with useful information related to their decisions area.

H1b: There is a positive relationship between the usefulness of the MAI characteristic of timeliness and decision-making.

The results showed that relationship between the usefulness of the MAI characteristic of timeliness and decision-making ($b=0.198$, $t=2.12$, $p<0.05$) is significant. This finding is consistent with the findings of earlier studies (Abu Bakar, 2001; Chenhall & Morris, 1986; Fitsum, 2014; Haedr, 2012). Ramli and Iskandar (2014) and Hui and Yusof (2014) emphasized that timely information is necessary for decision making. The MAI characteristic of timeliness is about how fast and often the reporting is, and the information is furnished when asked. Hence, allowing the SMEs to respond expeditiously and make effective decisions soonest possible. From the findings, we conclude that SME companies perceive more frequent or timely information as important to organizational success. Specifically, SMEs' managers prefer up-to-date information. It is seen as information that is presented upon request, more frequent, shows current scenario and responds fast to their decisions. In short, the usefulness of the MAI characteristic of timeliness is perceived by SMEs to be valuable to support their decisions.

H1c: There is a positive relationship between the usefulness of the MAI characteristic of aggregation and decision-making.

The results of the study showed a significant relationship between the usefulness of the MAI characteristic of aggregation and decision-making ($b=0.244$, $t=2.454$, $p<0.05$), similar to studies reported in the literature (Abu Bakar, 2001; Fitsum, 2014; Lederer & Smith Jr, 1988; Odar et al., 2015). Ramli and Iskandar (2014) pointed out the importance of aggregated information to avoid information overload. The MAI characteristic of aggregation involves summarising information across different periods and departments, which allows decision makers to consider more alternatives in making optimal decisions for SMEs in Malaysia. SMEs depend on the aggregated MAI to obtain information related to functional activities from other departments within the organisation. Furthermore, the aggregated MAI is seen to be more useful by SMEs' managers from different functional levels to assist them in their daily operations as well as in making decisions for the benefit of their organizations.

H1d: There is a positive relationship between the usefulness of the MAI characteristic of integration and decision-making.

There is significant relationship between the usefulness of the MAI characteristic of integration and decision-making ($b=0.296$, $t=2.878$, $p<0.05$). This finding is similar to previous studies (Abu Bakar, 2001; Chenhall & Morris, 1986; Fitsum, 2014; Ghasemi et al., 2016; Odar et al., 2015), in that the MAI characteristic of integration is perceived as being the most important dimension among all four MAI dimensions in SMEs in Malaysia. Integration refers to the various departments' interdependence and coordination in the sharing of information throughout the organization. SMEs perceived integrated MAI to be useful by allowing information sharing between each department and sub-units. SMEs' managers see integrated MAI as important in the coordination between departments or sub-units to obtain beneficial information related to their decisions.

The second objective of this study was to examine the moderating effect of cloud computing in the association between management accounting information and decision-making.

H2: Cloud computing moderates the relationship between MAI and decision-making.

Cloud computing moderates the relationship between MAI and decision-making ($b=-0.111$, $t=2.674$, $p<0.05$). The results of the analysis revealed that cloud computing strengthens the relationship between MAI and decision-making in SMEs in Malaysia. The result is similar to the studies examining the role of cloud computing in improving the access and share of information in real-time, and increasing the volume, speed, and capacity of data handling that will enhance the timeliness and quality of decision-making in the organisation, particularly in SMEs. Quinn et al. (2014) pointed out that cloud computing allows new methods for SME managers to obtain decision-making information, in that cloud computing allows managers to access information whenever they require it through smart devices (tablet or smartphone) at a relatively low cost. Marand et al. (2013) stated that cloud computing plays a vital role in the delivering of decision-making information by enhancing information accessibility; data analysis; providing continuous auditing; and information storage. Mia and Winata (2008) argued that the utilization of MAI by managers for decision-making has a positive relationship with cloud computing through the increase in the capacity of managers to immediately access real-time information, hence facilitating faster and effective decision-making.

From the findings, we conclude that cloud computing plays a vital role in SMEs in Malaysia through its role in the flow of information and access to actual and up-to-date information that enhances the speed and quality of decision-making. In addition, it improves business competitiveness for SMEs by reducing the cost load associated with the adoption of modern information technology and by being able to focus more on the business. Based on the findings, SMEs in Malaysia should concentrate on cloud computing to improve the access and share of the information used for decision-making in their organisations. Findings of this study provide signals on the extent of technology utilisation among SMEs in Malaysia. The findings indicate the awareness and utilization of cloud computing among SMEs should be further improved.

CONCLUSION

SMEs are important contributors to the growth of Malaysia. In today's business environment, information and technology plays a vital role in SMEs operations. This study examined the relationships between MAI, cloud computing and decision making in SMEs. The main contribution of this study is to provide empirical evidence concerning the influence of MAI on decision-making and the moderating role of cloud computing in the relationship. The findings contribute to the body of knowledge in the area of management accounting through usage of the RBV Theory to explain MAI as a resource, and cloud computing as a capability to gain competitive advantage in decision making. Moreover, the findings of this study contribute by helping organizations to realize the importance of MAI in managerial tasks, and how they could rely on a selection of information characteristics in the context of their business environment to ensure competitiveness of the company in the marketplace. The findings may also enhance the understanding of SMEs' managers on the importance of cloud computing to improve decision-making in the light of competition. Thus, the findings of this study can be used to determine the effectiveness of existing policies and initiatives as well as the direction sets for the SMEs, with regard to information quality, IT and competitiveness.

This study has several constraints. First, this study took only SMEs in Malaysia as its sample. Thus, the findings could not be generalized to

large businesses or SMEs in other countries. Consequently, future studies may replicate this study on large businesses in Malaysia or other economies (developed or developing economy). Second, this study was confined to certain geographical areas of Malaysia, providing opportunities for future studies to expand the scope to other locations in Malaysia. Third, this study suffered from a comparatively low response rate for its questionnaire survey as a result of the sensitivity and confidentiality of the data required, and cloud computing is a new technology among SMEs in Malaysia. For future research a combination of online survey questionnaires may be used to reach more respondents, while interviews and case studies may be utilized to understand the issue in-depth.

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