# Information System Integration, Knowledge Management, and Management Accounting Adaptibility

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Abstract: Management accounting practices are expected to adapt and evolve along with changes in expected information needs and changes in information technology. The influence of knowledge management and information system integration on management accounting adaptibility has become an important concern. Knowledge management enablers (KME) and knowledge management process (KMP) is an important tools for improving information system utilization. Internal information system intergration (IISI), external information system integration (EISI) and information system flexibility (FSI) together with knowledge management roles are expected to improve management accounting adaptibilty (AAM) to change in information needs and expected adjustments. The questionnaire survey was conducted at the managerial level for middle and upper level companies in Riau Province Indonesia using the use of information systems in activities for decision making. 159 respondent were obtained andmet the criteria for use in this study. By using partial least square SEM (SEM-PLS) obtained FSI, IISI and KMP have significant effect on AAM. KME is supporting KMP to improve AAM. Increasing KMP level can effect FSI and IISI level. Increased IISI level can improve EISI utilization level.



## 1 INTRODUCTION

Contingency theory suggest that management accounting practices in organization should develop and change the environment for the better at internal and external conditions. Management accounting change related to global competition, changes in manufacturing technology (Innes *et al*., 2000), information technology (Waweru, *et al*., 2004), organizational structure (Abernethy & bouwen, 2005) and strategy (Fullerton, 2012). The ability of management accounting to change over time or its effectiveness is a critical point to achieve management accounting conformity (Yigitbasioglu, 2016). Despite the known technological resources as a facilitator for change (Innes & Mitchell, 1995), but information system integration can lead on technological embeddedness, and the stability of management accounting (Rom dan Rohde, 2007). Information integration is a present challenge in data management (Quix & Jarke, 2014). The development of new technologies and application will form new conformity criteria that enhance the information system integration.

Krumwiede & Charles (2014) show that for firms with low price strategy had a positive impact on earnings performance, especially when the activity based costing is used with high quality information system. Support to improve the quality of management accounting can be facilitated by information system integration, such as the availibility of software budgeting, enterprise resources planning systems,business intelligence and analytics (Rom & Rohde, 2009; Yigitbasioglu & Prasad, 2013). Business intelligence technology can provide data collection, analysis and information presentation as a decision making tool that support the activities of management accountiants (Rikhardson & Yigitbaisoglu, 2018; Appelbaum *et al*., 2017). In addition, the use of business intelligence and analytics with visualization techniques in management accounting in big data becomes an interesting concern because of the relative lack of knowledge and empirical finding (Rikhardson & Yigitbaisoglu, 2018). Thus, data



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limitation are not related to manager accountability, although data problems do not inhibit the development of measurement systems, but tend to hamper goverment employees using the resulting system to evaluate performance (Cavalluzzo & Ittner, 2004). Thus, the availability of data as information seems to be inconsistent. Therefore, it needs to be seen how the integration of information systems affect managers in providing management accounting information.

Yigitbasioglu (2016) show that the share knowledge among managers positively associated with management accounting adaptibility. Information system integration can affect the share knowledge between IT and managers in improving performance. In relation to organizational performance, share knowledge is part of knowledge management. While knowledge management consist of knowledge management enabler and knowledge management process that can improve performance (Lee & Choi, 2003). However, the influence of knowledge management and information system integration in improving management accounting adaptibility is still uncommon in empirical research.

Accordingly, knowledge become an important factor in business development. Although some forms of intellectual capability can be transferred, but intrinsic knowledge is not easy transferred. Therefore, the fundamental objective of management is to improve the process of acquisition, integration, and utilization of knowledge known as knowledge management (Kovacic, Bosity & Loncar, 2006). Knowledge management still has obstacles. One of the impediment is that organizations often do not know what they know (William, John & Peter, 2012). The particular skills and knowledge possessed by employeses can sometime be of no value to their colleagues and superiors, at those who can make use of this knowledge do not know who is knowledgeable and unaware of its existence (Nevo *et al.*, 2012). Therefore, this research needs to be directed to the elements those who have a knowledge management that would support management accounting adaptibility that will in turn improve performance. McKeen, Zack & Singh (2009), Nnabuife (2015), and Wahda (2017) shows the effect of knowledge management on organizational performance. Knowledge management (KM) can consist of different elements, such as on Lee & Choi (2003), Awan dan Khalid (2015), Hermawan et al. (2015). To show the effect of enablers on knowledge management then used KM enablers (KME). KME will support KM creation process (KMP) consisting socialization, externalization, internalization, and combination (SECI) (Lee & Choi, 2002; Hermawan et al., 2015).

Management accounting adaptibility related to information systems that support the organization. The flexibility of information system is an important element of the organizational information technology infrastructure (Bird & Turner, 2000). Information technology resources related to human resources and organizational skills, knowledge management, competence, commitment, value, norms and orgnizational structure. Thus, the flexibility of information system in information technology infrastructure can improve management accounting adaptibility (AAM). AAM associated with the integration of information system and information system flexibility. The integration of information system makes information processing visible and supports global transparency (McAdam & Galloway, 2005; Chapman & Kihn, 2009). Integration and reconfiguration transform the application of the information system infrastructure into unique capabilites that provide streaming and sharing information within the organization and between the organization (Maiga, 2017). Integratin of internal and external information system relates to AAM and operational performance.

Management accounting that can adapt to changes can improve the effectiveness of management accounting functions. In other word, adaptibility is important because the environment in which the organization operates may change rapidly (Yigitbasioglu, 2016). Changes in technology, market conditions, strategies and organizational style requires a new management accounting practices. Therefore an adaptable management accounting system will be more effective than a relatively static system.

This paper aims to demonstrate knowledge management enablers and knowledge management process affect on the integration of internal and external information system and information system flexibility on management accounting adaptibility at the firm. Characteristics of information systems can be seen in the information system flexibility and information system integration. Maiga (2017) demonstrate the operational performance of manufacturing companies affected by internal information system integration and external information system integration. Based on Maiga (2017) the integration of the internal and external information system can be describe adaptibility level of management accounting. The remainder of this

study is organized as follows. Section 2 provides the hypothesis development, while section 3 discuss the research methods. Section 4 presents the result and discussion, Finally, section 5 presents conclusion.

## 2 HYPOTHESIS DEVELOPMENT

The role of management accounting system has evolved starting form the emphasis of the financial analysis orientied and budgetary control, then evolving into management accounting that includes a more strategic approach with emphasis on identifying, measuring, and managing key financial and triggers operation to the value of shareholder (Ittner & Larker, 2001). The responsibilites of the management accountants evolve from merely reporting aggregate historical value to also include measurement of organization al performance and providing information for decision making (Appelbaum, et al., 2017). The ability of accountant to utilize integrate information system capabilities can dynamically improve the value. Past research has shown that management accounting practices can be effective if suppoerted by integrated information system (He, 2007; Maiga et al., 2013; Quix & Jarke, 2014; Chapman & Kihn, 2009; Yigitbasioglu & Prasad, 2013;Yigitbasioglu, 2016). Integrated information system can be divided into two internal information system integration (IISI) and external information system integration (EISI) (Fayard et al., 2012; Ward & Zhou, 2006; Maiga, 2017), but few research explains EISI and IISI on AAM.

IISI capabilities can provide enhanced role to integrate and coordinate information and diverse activities within the company's internal fuctional areas. Information system can continuously monitor all corporate activities, updating data can be reflected in the information system, and facilitate the sharing information on internal company for decision making. While on EISI, accountants can retrieve informationm share information among members in a value chain whre suppliers and customer can be invited to join a certain information areas that can improve their performance (Maiga, 2017; Saxena & Jaiswal, 2013). Inadequate information in corporate information system infrastructure, resulting in insufficient enterprise data input for decision making. With the integration of information, companies can manage resources to improve their capabilites in certain field so that the information needed is available on time and relevant. In the context of information system, the effect of internal integration on external integration can be explained by sharing information, strategic alliances, and work together (Flynn et al., 2010; Maiga et al, 2015). If the internal information system is not integrated, it will be difficult to share information to supply chain partner and customers. This is because the information to be shared can be inaccurate and not timely. Therefore, improvement at the IISI will impact on EISI. Adequate EISI level will drive AAM improvement. Therefore,

**H1**. IISI is positively associated with AAM.
**H2**. EISI is positively associated with AAM.
**H3**. IISI is positively associated with AAM.

Environment uncertainty encourage companies working to improve its capability to take advantage of their resources in order to collect, combine, integrate the information needed for decision making. The formulation and implementation of strategies on the flexibility of efficient information systems in an important aspect of risk management (Palanisamy &Sushil, 2003). Information system flexibility refers to Gebauer & Schober (2006) who view the system information from flexible to use and flexibel to change the system. The integration of informatin system is claimed to make the form of analysis more sophisticated and flexible to improve performance (Chapman & Kihn, 2009). The characteristics of the integrated data architecture that underlie the integration of information system affect the perceived success of the system. This characteristics include improvements, internal transparency, global transparncy and flexibility that refers to Adler & Borys (1996). Flexibility in information system is an important part of the enabling approach to control, but does not affect the performance of information system, this is due to insufficient conditions of performance (Chapman &Kihn, 2009). Yigitbasioglu (2016) demonstrate that the flexibility of information system is positively and significantly related to AAM. The flexibility to change hte system is important to consider because in some cases it require changes to management accounting that can be done by user and some other cases should involved technicians for programming or program modification (Yigitbaisoglu, 2016). Therefore,

**H4**. FSI is positively associated with AAM.

Knowledge management deals with the reception and the storage of knowledge and makes knowledge accessible to others within the organization (Meso & Smith, 2000). Reffering to Lee & Choi (2003)

knowledge management enablers (KME) consists of collaboration, trust, learning, centralization, formalization, t-shape skills, and information technology support. Some researcher view knowledge management from a particular perspective and seldom use integrative perspectives. Collaboration explains the degree to which individuals or groups are actively helping each other. Collaborative culture affect the creation of knowledge through the exchange of knowedge. Trust can facilitate openness and influance knowledge exchange. While centralization refers to the locus of decision and control authority within the entity. The more centralized a structure will hinder communication and reduce the sharing of ideas. Without communication and discussion of ideas the creation of knowledge does not occur. The participatory work envirenment supports knowledge creation by motivating the involvement of members of the organization. The same direction also occurs in formalization. T-shaped skills means the owner can explore the domain of certain knowledge and its application to something deeply and broadly. Lastly, information technology support is an essential element for knowledge creation. This seven KMEs as enablers for knowledge creation will become more useful if the knowledge management process (KMP) such as socialization, externalization, combination, and internalization occurs inorganizational entities (Nonaka & Takeuci, 1995). Socialization transform from the tacit knowledge through social interaction among members. Externalization complies tacit knowledge into explisit concepts. Combination convert explisit knowledge into a systematic set way to combine it. And in the internalization of the process of creating knowledge absorbed by individuals, therefore can enrich the tacit knowledge. Accordingly, we argue that KME can improve the management accounting adaptibility. Yigitbasioglu, (2016) explained that share knowledge between IT nd managers in organisations can influence the improvement of AAM. KME can affect the integration of information systems. Therefore,

H5. KME is positively associated with AAM
H6. KME is positively associated with KMP
H7a. KME is positively associated with IISI
H7b. KME is positively associated with EISI
H7c. KME is positively associated with FSI
H8a. KMP is positively associated with IISI
H8b. KMP is positively associated with EISI
H8c. KMP is positively associated with FSI
H9. KMP is positively associated with AAM

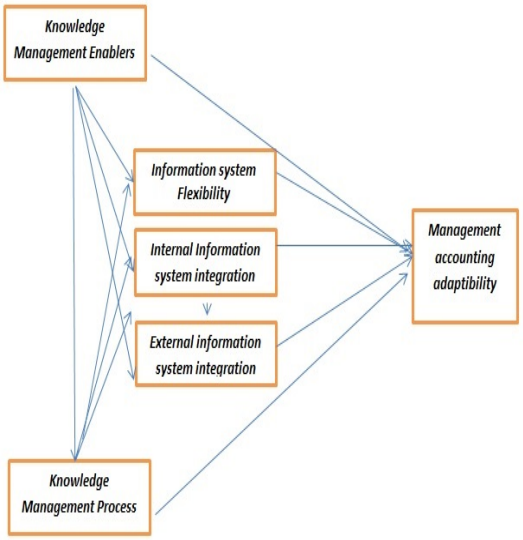


Figure 1 : Research Model

# 3 SAMPLE AND MEASURES

## 3.1 Sample

Sample taken from companies that located in Riau Province. Questionnaire survey method was conducted on the respondents. The sample is not resticted to certain sectors or industries, although the restrictions are applied to companies of middle and upper category companies such as in the category of companies that have SMEs with minimum omzet Rp. 2,5 billion. Respondent should have an involvement in the use of information system or information technology in their work. Respondents used are managerial level who experience working more than two years and also have experience of job involvement with information technology and information system in management accounting field. Through the database in the office of UMKM obtained the list of company and company address. We send a letter and or email to the respondent to ask them to fill in the questionnaire. Due to restrictions, participants with less than 2 years of experience were excluded from the data, so only 159 responden were used. Survey conducted in February-May 2018 at hte company in the Riau Province. This survey is not limited to business sector of the company. Thus the business services, trade, manufacturing sectors are included in the survey.

### 3.2 Measures

The size of the flexibility of the information system is based on Yigitbasioglu (2016) that derived from Gebauer & Schober (2006). Five point likert-type scale is used for this questionnaire. For the above item size the range is used from "1 = strongly disagree" to "5= strongly agree". All of the variables in this study used range 1 to 5. The size of EISI and IISI refers to Maiga (2017). IISI is measured using four items and EISI is used four item questions with a five point likert-type scale. EISI and IISI used to measure information system integration. KME and KMP size refer to Lee & Choi (2003). KME measures include the seven constructs that include collaboration, trust, learning, centralization, formalization, T-shape skill, and IT support. Some items on KME are acually measured on the negative direction such as in centralization. The size of KMP include four contructs: socialization, externalization, combination, and internalization known as SECI. As for the variable adaptibility management accounting is based on Yigitbasioglu (2016). Data analysis technique used is structural equation modelling (SEM) approach with PLS.

## 4 RESULT AND DISCUSSION

Result for test of influence of contruct presented in the picture 1.

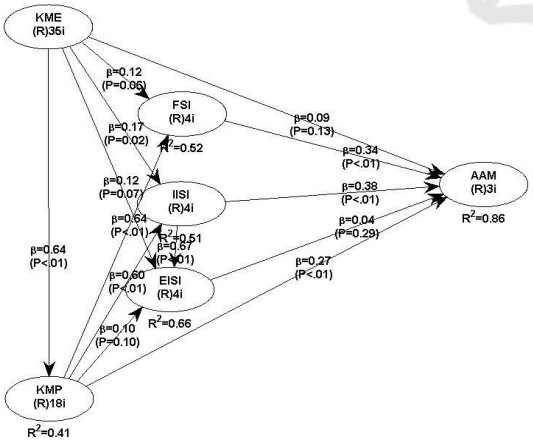


Figure 2 : path diagram and hipothesis test results

Based on the calculation of PLS can be seen that coefficient path of 0,637 and p<0,001 for KME effect on KMP. Thus H6 is supported. This mean that socialization, externalization, combination, internalization (SECI) in KMP run well because it is supported by KME which become enablers. Collaboration, trust, learning, centralization, formalization, t-shaped skills and IT support as part of KME have an effect on socialization, externalization, combination, internalization. The essence of SECI is the alteration to tacit knowledge to exsplicit knowledge or vice versa, or as well as from tacit knowledge to tacit knowledge and from exsplicit knowledge to explicit knowledge (Hermawan et al, 2015; Yeleneva et al., 2017; Nonaka & Takeuchi, 1995). To improve the capability of the management accounting adaptibility that has to move change to adjust the analysis needs for management, it needs to be managed by KME and KMP.

For calculation of KME on FSI, path coefficient =0,121 and p=0,06 which mean bigger than p<0,05. KME has no significant effect on FSI. Thus, H7c is rejected. While the calculation of KMP on FSI, path coefficient = 0,636, p<0,001. H8c is therefore supported. This explained that the creation process, knowledge lead to the success of SECI than KME toward FSI. H8c is therefore supported. For calculation KME to IISI known path coefficient equal to 0,166 and p=0,016. This means H7a is supported. While the result of calculation of KMP on IISI obtained path coefficient equal to 0,599, p<0.001 meaning significant effect. Thus, H8a is supported. Information integration can make visible processing and support cognitve processes so that the presentation of information become responsives. The ability of IISI to provide information can enable user to obtain detailed internal information regarding their work. KME and KMP are very useful to support the integration of information system on internal activites of the company.

The effect of KME on EISI is shown bt hte path coefficient of 0,116 and p=0,068. Therefore H7b is rejected. The effect of KMP on EISI is described by path coefficient equal to 0,101 and p=0,098. Thus H8b is rejected. This indicate that the effect of KME and KMP to EISI are not significant. The integration of information system is sourced from both internal dan external. This insignificant influence is probably because manager feel quite satisfied with existing information system and are reluctant to spend time and knowledge for the new system (Cavalluzzo & Ittner, 2004). In addition, the supply chain information system refers to conformity between firms so that the design of outgoing information system is not the main focus of attention.

The effect of KME on AAM is shown by the path coefficient of 0,087 and p=0,132. Thus, H5 is rejected. The effect of KMP on AAM is equal to 0,273 and p<0,001, so that H9 is supported. This mean that KMP with SECI elements can improve AAM. The result of FSI calculation on AAM obtained the path coefficient equal to 0,337 and p<0,001, so H4 is supported. This indicate that FSI related to changes or modification to the interface or features required can be tailored to the individual needs of the user. In the context of capturing the user's reaction to the financial statements, AAM can be facilitated because of FSI support.

For the calculation of the effect of IISI on EISI, path coefficient equal to 0,668, p<0,001. Hence, H3 is supported. Because EISI is related to standardize information exchange, digitizing sharing between organizational business activities, integration will make information available on time and relevant to information exchange with supply chain partnersfor business decision making (Zou & Benton, 2007). The higher the IISI level the higher the level of EISI, in other words IISI inline with EISI. If you want to build EISI capability, IISI capability will built first (Maiga et al., 2015). For the calculation of IISI on AAM, path coefficient equal to 0,382 and p<0,001 which mean IISI have significat effect on AAM. Hence, H1 is supported. Because IISI deal with the application of enterprise information technology to systematic data acquisition, data processing, and data storage, that support accurately and timely information, its useful for AAM's adaptation capabilities.

To calculate effect of EISI on AAM, the result show path coefficient equal to 0,04 and p=0,290. This mean EISI has no significant effect on AAM, so H2 is rejected. Although the EISI level increases, it does not contribute significantly to AAM. This indicates that EISI is still important to AAM but not sufficient to support AAM performance.

Table 1 : Summary of the results

| Effect | Coeff. Path | p | Description |
|---|---|---|---|
| KME on KMP | 0,64 | <0,01 | Significant |
| KME on AAM | 0,09 | <0,13 | Insignificant |
| KME on FSI | 0,12 | <0,06 | Insignificant |
| KME on IISI | 0,17 | <0,02 | Significant |
| KME on EISI | 0,12 | <0,07 | Insignificant |
| KMP on FSI | 0,64 | <0,01 | Significant |
| KMP on IISI | 0,60 | <0,01 | Significant |
| KMP on EISI | 0,10 | <0,10 | Insignificant |
| KMP on AAM | 0,27 | <0,01 | Significant |
| FSI on AAM | 0.34 | <0,01 | Significant |
| IISI on AAM | 0,38 | <0,01 | Significant |
| EISI on AAM | 0,04 | <0,29 | Insignificant |
| IISI on EISI | 0,67 | <0,01 | Significant |

The indirect effect model can be statistically identified through the path. To know the indirect influence or influence of mediation can be seen through the path diagram. The indirect effect of KME to AAM can be though five liner; (1) KME-FSI-AAM; (2) KME-IISI-AAM; (3) KME- EISI-AAM; (4) KME-KMP-AAM; (5) KME-IISI-EISI-AAM. If one or more of these indirect effect are significant than the indicate partial mediation (Solihin, 2013). Thus there can be a significant direct influence as well as significant indirect influence. On line 1 is not significant because KME-FSI is not significant. In liner 2 significant because KME-IISI and FSI-AAM are both significant. On line 3 and 5 are not significant. While in line 4 significant.

The indirect effect model of KMP-AAM can be explained through four line: (1) KMP-FSI-AAM; (2) KMP-IISI-AAM; (3) KMP-EISI-AAM; (4) KMP-IISI-EISI-AAM. In path 1 of KMP-FSI-AAM is significant and so in path 2. While in path 3 and 4 are no significant. Thus FSI and IISI mediate partial effects of KMP-AAM. In other words, KME positively affects AAM through KMP and IISI as mediating variables. KMP positively affect AAM with FSI and IISI as mediation variables.

# 5 CONCLUSION

AAM can work well if the integratio of internal information system improved. The agility to adapt is determined by how flexible the information system is. Flexible means flexible to use and flexible to change. Thus, flexibility of information system can

improve AAM. Improvement of IISI quality depend on KME and KMP. Knowledge management in this case is important for IISI readiness providing information to accountant. All KME enablers needed to improve KMP quality. The proces of knowledge management can improve the fungtinality of IISI in providing information for the need of management accounting adaptibility in responding to change quickly. It seems that flexibility in the FSI has no significant effect on KME. However, KMP has a significat effect on FSI.

The readiness of information system integration in the context of accounting is associated with big data. The general concensus is that big data can lead to disruptive conditions in accounting. Therefore some management accounting techniques will become obsolate and unused, so that management accounting changes and the role of management accounting can shift. Significant change can occur that require adaptibility of management accounting. However, we did not examine the effect of big data in IT readiness providing information for business organizations.

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