ACCOUNTING KNOWLEDGE MANAGEMENT CAPABILITIES, ACCOUNTING FUNCTIONAL EFFECTIVENESS AND OVERALL UNIVERSITY PERFORMANCE: EVIDENCE FROM MALAYSIA

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DEDICATION

This Ph.D. thesis is dedicated to Jehovah Elyon, the LORD most high who is the source of all knowledge. I am whom I am today just by HIS grace. To him be all the glory, honour and adoration.

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ABSTRAK

Sistem fungsi perakaunan Universiti mencerminkan orientasi strategik institusi dan kesan prestasi institusi. Oleh itu, adalah penting untuk mengetahui implikasi potensi dimensi pengurusan pengetahuan (KM) yang ditetapkan dalam sistem fungsi perakaunan untuk memaklumkan kepada aktiviti pembuatan keputusan KM. Walau bagaimanapun, sedikit yang diketahui dalam sastera mengenai bagaimana dan mengapa infrastruktur dan proses KM diterjemahkan ke dalam amalan perakaunan institusi untuk memastikan reka bentuk KM yang betul. Menggambarkan teori berasaskan sumber (RBT) dan penemuan masa lalu, kajian ini membangunkan model hierarki keupayaan pengurusan pengetahuan perakaunan (AKM) untuk menangani jurang. Data dikumpulkan melalui tinjauan soal selidik mengenai persampelan purposive daripada 272 kakitangan perakaunan di universiti penyelidikan awam di Malaysia. Pendekatan dua peringkat untuk pemodelan hierarki digunakan dan model penyelidikan diuji melalui pemodelan persamaan struktur sekurang-kurangnya persegi (PLS-SEM). Menariknya, penemuan mendedahkan bahawa infrastruktur dan proses AKM secara positif mempengaruhi keberkesanan fungsi perakaunan, dan proses AKM sebahagiannya mengantara pengaruh infrastruktur AKM. Selain itu, hasilnya menunjukkan bahawa walaupun keberkesanan fungsi perakaunan sebahagiannya menengahi kesan infrastruktur AKM, ia sepenuhnya untuk keupayaan proses AKM dan keseluruhan prestasi universiti. Penyelidikan ini penting kerana ia memaklumkan penyelidikan dan amalan mengenai corak perakaunan berkaitan dengan infrastruktur KM dan keupayaan proses yang memerlukan perhatian pengurusan yang luas dalam reka bentuk KM institusi dan bagaimana dan mengapa ia memberi kesan keberkesanan. Kajian ini menyumbang kepada pembangunan teori KM dan literatur perakaunan menggunakan teori berasaskan sumber (RBT), dan mewujudkan jalan untuk penyelidikan masa depan

ABSTRACT

University accounting function system reflects the strategic orientation of institutions and impacts institutional performance. As such, it is important to know the potential implications of the defined dimensions of knowledge management (KM) on the accounting function system to inform institutional KM decision-making activities. However, little is known in the literature on how and why KM infrastructure and process translate into outcome in institutional accounting practice to ensure proper KM design. Drawing upon the Resource-based theory (RBT) and past findings, the study developed an integrative accounting knowledge management (AKM) capability hierarchical model to address the gaps. Data were collected through a questionnaire survey of a purposive sampling of 272 accounting function staff in public research universities in Malaysia. The two-stage approach to hierarchical modelling was employed and the research model tested via partial least square structural equation modelling (PLS-SEM). Interestingly, the findings revealed that AKM infrastructure and process positively influences accounting functional effectiveness, and AKM process partially mediates the influence of AKM infrastructure. Also, the result showed that while accounting functional effectiveness partially mediate the effects of AKM infrastructure, it does fully for AKM process capabilities on overall university performance. This research is significant as it informs research and practice on the patterns of accounting related KM infrastructure and process capabilities that require extensive management attention in institutional KM design and how and why they impact effectiveness. The study contributes to theory development in KM and accounting literature using the Resource-based theory (RBT) and creates avenues for future research.

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LIST OF ABBREVIATIONS

ACPE	Accounting Acquisition Process
AKM	Accounting Domain Knowledge Management
AKMI	Accounting Knowledge Management Infrastructure
AKMPC	Accounting Knowledge Management Process
APPE	Accounting Application Process
CDFC	Cost Determination and Financial Control
CIE	Accounting Culture
CPE	Accounting Conversion Process
FE	Accounting Function Effectiveness
HOCs	Higher Order Construct
ICT	Information, Communication Technology
IEE	Infrastructure Related Effectiveness
IHL	Institution of Higher Learning
IMA	Innovative Management Accounting
IMAA	Innovative Management Accounting Approach
KBT	Knowledge Based Theory
KPI	Key Performance Index
KM	Knowledge Management
KMIC	Knowledge Management Infrastructure Capability
KMPC	Knowledge Management Process Capability
KMS	Knowledge Management System
LOCs	Lower Order Constructs
MEE	Managerial Related Effectiveness
PIE	Accounting People
PPE	Accounting Protection Process
RBT	Resource-Based Theory
SCT	Social Capital Theory
SEE	Strategic Related Effectiveness
SEM	Structure Equation Modelling
SIE	Accounting Structure
SKMI	Social Knowledge Management Infrastructure

SPSS	Statistic Package for Social Science
TIE	Accounting Technology In Use
TKMI	Technological Knowledge Management Infrastructure
UE	Overall University Performance
UKM	Universiti Kebangsaan Malaysia
UM	Universiti Malaya
UPM	Universiti Putra Malaysia
USM	Universiti Sains Malaysia
UTM	Universiti Technologi Malaysia

CHAPTER 1

INTRODUCTION

1.1 Study Background

The 21st century is a knowledge economy that has emerged as a challenging competitive environment for businesses, universities and government (Jennex, 2008; Patil and Kant, 2014). It is characterized by the competitive necessity for every aspect of a university to become knowledge based in order to advance in teaching, research, practice and overall performance (Lee, Daniel, Lim, Kai and Peng, 2009; Svatošová, 2012). The government of Malaysia has proposed knowledge management (KM) applications and implementations as a response strategy to enhance the performance and sustain the competitive advantages of public universities in Malaysia. Meanwhile, universities need to be aware of the possible impact of KM to actualize their knowledge-based goals as Tan and Noor (2013) argued. More so, KM is the change in management approach in this era that universities need to generate more income, offer higher quality services and do it all with knowledge accountants and at lower cost (Holtshouse, 2013). Furthermore, Metcalfe (2008) argued that exploring KM principles in institutions will not be too challenging in universities given their historic connections with knowledge possession and similar KM practices.

According to Grant (1996) and Villar, Alegre, and Pla-Barber (2014), KM is a dynamic process of strengthening universities effectiveness by maximizing the utilization of knowledge that is shared among employees. It entails the application of knowledge processes and tools that enable functions or institutions to transition from a current state to a future state to achieve the desired knowledge outcome. KM scheme offers a variety of benefits derived from an efficient application of information and knowledge that result in improved performances. These improved performances could further lead to a better improved performances. These improved performances could

further lead to a better sustained return on universities limited resources even in a period of uncertainties and changes in government regulations. Moreover, KM has the potential to enable university fund managers to rethink their methodological approach and to develop proactive internal processes and competencies that most critical (Mohayidin, Azirawani, Kamaruddin, and Idawati, 2007; Mahmoudsalehi, Moradkhannejad, and Safari, 2012; Ahmad, Farley, and Naidoo, 2012; Massaro, Dumay, and Garlatti, 2015). However, drawing from Massaro *et al*. (2015), the implication of KM in institutions in Malaysia is a quest to move beyond information management and into the realm of KM by public universities.

. The realm of KM is a complex undertaking involving the development of knowledge-based structures, cultures, and technologies that allow institutions to recognize, create, transform, and distribute knowledge (Chang and Chuang, 2011; Gloet and Samson, 2013). However, the need to empirically assess KM before implementation has been put forward as not every aspect of an institution is poised for the application and implementation of KM initiative. In the integration of any new initiative, institutional accounting practices can be adversely affected (Kanellou and Spathis, 2013) if not aligned with the nature of what is required to get the task done in such domain (Mciver, Lengnick-Hall, Lengnick-Hall, and Ramachandran, 2013). Usually, institutional accounting practices emphasize highly principled diverse traditions and processes compared to other practices. More so, institutional accounting functions are critical actors in the success of every organization and agent of transformation. Besides, the role of KM in accounting practice has been a debatable issue in practice and literature. Thus, institutional accounting practices are emphasized drawing from these arguments (Modell, 2015).

Accounting functions of universities have long histories of proven accounting practices involving processes for gathering, applying and communicating accounting information linked to university resources management success (Ozdil and Hoque, 2017). Accounting function or finance section of a university is the department within the university that handles the financial (revenue and expenditure) aspect of the institution according to various stipulations. Although these functions play a prominent role in the management of the university funding resources, nevertheless KM is yet not a key strategy in it as indicated in Kanellou and Spathis (2013). Meanwhile, accounting

staff unique competencies are fast becoming a strategic asset for the success and financial sustainability of every university which is yet to be leveraged upon (Milton and Lambe, 2016). Also, due to the nature of accounting practices, many might doubt the need and viability of KM in accounting functions of universities. Yet, many research scholars are heralding KM integration to be the most secret weapon of sustaining the competitive edges of public universities in Malaysia (Mohayidin *et al*., 2007; Amran *et al*., 2014). Neglecting how universities can adopt KM to obtain value without affecting the current nature of their accounting practices negatively in Malaysia.

Importantly, authors like Asma and Abdellatif (2016) stated that KM is usually embedded in institutions employing existing similar knowledge related structures and processes. Theoretical bases serve as vital mediums to understanding the success and failure of KM before implementation within any institutional setting (Gold *et al*., 2001; Shajera and Ahmed, 2015). While using relevant KM theories, Gold *et al*. (2001) argued that these structures and processes are proven capabilities that provide important definitional and empirical context for assessing KM in any institutional setting. Besides, KM capabilities are powerful necessities for sustaining institutional competitive advantage and enhanced performances (Lee and Lee, 2007; Nguyen, 2010; Shajera and Ahmed, 2015). Consequently, KM implementation from the perspective of KM capability has been widely explored in literature. Drawing from the above arguments, the question is 'are these critical knowledge-based infrastructures (structures, cultures, technologies) and processes capabilities obtainable in public universities accounting practices in Malaysia bearing in mind that KM is usually integrated using existing similar features?

The Resource-based theory (RBT) of Penrose (1959) indicated that cultures, structures, humans, technology, and processes are important resources needed for improved performances. Furthermore, Barney (1991) argued that these resources can be bundled and differentiated at diverse levels. Resources is synonymous with capabilities in literature (Gold *et al*., 2001, Shajera and Ahmed 2015). Invariably, capabilities can be bundled and differentiated at higher levels to achieve specific outcome depending on the underlying interest. Contrariwise, authors like Wills and Smith (2011) argued that focusing on the individual capabilities is better than aggregating the capabilities as it enhances management decisions at the capability level. The challenge with focusing on

individual capabilities is that the result neither inform managers of what makes up a context KM capability nor provide them with their relative importance or contribution which serves as the basis for differentiation at diverse levels leading to competitive advantages.

This research is interested in understanding how capabilities add up to translate into outcome from an individual level to the group level. Besides, in practice, capabilities do not function alone. Rather, similar capabilities complement one another and work together to translate into relevant outputs. As a result, the study is in line with prior works that adapted the capabilities bundling perspective. For instance, the works of Mao *et al*. (2016) and Zheng, Yang, and McLean (2010) that examined how KM capabilities in their composed forms influence outcomes institutional effectiveness. Nonetheless, Mclver *et al*. (2013) argued that KM capabilities whether in their composed state or not, do not always contribute to overall organization effectiveness especially if not aligned with the nature of knowledge required to get a task done in such practice. These contradictory findings emanating from diverse research streams signify that issues revolving KM capabilities and institutional effectiveness are still unresolved. More so, those existing theories on KM are not well defined to support how diverse research streams on composed infrastructure and process capabilities can be harmonized and aligned with accounting practice to lessen the difficulties in making decisions at the level. In this study, accounting related KM (AKM) capabilities signify the synthesized pattern of composed KM process and infrastructure capabilities that align with institutional accounting practices.

Botha *et al*. (2014) pointed out the necessity of assessing KM at functional level apart from the overall institutional level. Generally, institutional functions of which accounting functions is a strategic one enforcing institutional accounting practices, serve as mediums through which organizations goals are attained (Hackman and Morris 1975; Trembley 2017). In line with this reasoning, Appelbaum, Kogan, Vasarhelyi, and Yan (2017) identified mediating as one of the key roles of accounting functions. Meanwhile, Shang and Seddon (2002) indicated that operational related benefits, related strategic benefits, IT related benefits and managerial related benefits are core benefits of any good institutional accounting system put in place. The study posits that for institutional accounting functions to perform well in the mediating role argued by Applebaum *et al*.

(2017), the accounting system must be effective in the related beneficial aspects opined by Shang and Seddon, (2002). Management decision making based on the combinations of strategic, managerial, operational and IT related accounting information are what create the enabling auspices for continuous institutional performance. Unfortunately, despite the application of capabilities approach to investigate KM in institutions from prior studies, how and why AKM infrastructure and process capabilities translate into outcomes or affect the system effectiveness at accounting functional level, however, remain an open question. Also, whether the integration of KM from the capability perspective would promote the mediating role of accounting functions is not well grasped. This scarcity of information on assessment of AKM infrastructure and process capabilities in institutional accounting practices is regrettable because it is this sort of additional evidence that institutional managers seem to require in designing proper KM strategies.

According to Pandey and Dutta (2013), the first strategy phase in every KM investigations involves the identification and assessment of related knowledge infrastructure and process capabilities due to their vital role in defining KM success. Moreover, Tanriverdi (2005) argued that a better understanding of the possible connection between KM capabilities and a setting performance depends on both theoretical and empirical research. The present study extends RBT while incorporating previous research to investigate composed AKM capabilities (infrastructure and process) in university accounting practices in Malaysia. As KM infrastructures are enabling strategies to KM process in the general institutional context (Mao *et al*., 2016), it will as well test the predictive relationship between AKM infrastructure and process capabilities at this level. It is important to recall that capabilities have been linked to improved effectiveness and performance by prior studies (Lee and Lee 2007; Botha *et al*., 2014). Consequently, the study examined the effect of both capabilities on accounting functional effectiveness at higher levels. Furthermore, test whether accounting functional effectiveness mediates both capabilities influence on the overall university performance at higher levels since accounting functions serve as mediating mechanisms in institutions.

1.2 Research Problem

KM is a new initiative through which government in Malaysia intend to drive the performance of public universities (Massaro *et al*., 2015). The need to design KM with features fitting to the differences in the cultural values and processes within the institutions to avoid debilitating results have been advocated for by scholars like Grabski, Leech, and Schmidt (2011). Compared to other institutional functional practices, accounting functional practice emphasizes somewhat unique strategic cultures, processes and traditions that institutions need to realize their financial and non-financial goals (O'Leary-Kelly and Flores, 2002; Kanellou and Spathis, 2011). Consequently, designing KM capabilities to fit the specificities of institutional accounting cultures becomes vital to avoid possible trade-offs between benefits derived from accounting practices and potential KM practices. Interestingly, the patterns of individual features making up the composed KM capability dimensions that are cognizance with institutional accounting practices are not well grasped in literature to ensure KM suit the practice. Invariably, individual KM capabilities may have been implicitly over-generalized as what makes capabilities differ across contexts (Asma and Abdellatif, 2016). The over-generalization of the features comprising KM capability pattern is making it difficult for university managers to understand what makes up KM capabilities at individual capability level in an accounting context. To clarify the problem and inform stakeholders, the concept of accounting knowledge management (AKM) capabilities is introduced to serve as an overarching construct that comprises the patterns of individual capabilities KM dimensions that are like accounting practices.

From the reviewed literatures, increasing attention has been paid to the assessment of the relationships between the dimensions of KM capabilities both outside Malaysia (Gold *et al*., 2001; Aujirapongpan, Vadhanasindhu, Chandrachai, and Cooparat, 2010; Mills and Smith, 2011; Andreeva and Kianto 2012; Pandey and Dutta, 2013; Shajera and Ahmed, 2015) and inside Malaysia (Mohayidin *et al.*, 2007; Panigrahi, Zainuddin, and Azizan, 2014). Though these studies give insight into the mechanisms of the relationships between the understudied KM capabilities, the results cannot be directly applied to this context of study due to mix research perspectives underpinning the studies. The diverse conceptualizations of KM infrastructure and process capabilities at the aggregate level are making the management decision on their

underlying relationship difficult. As this study integrates and synthesizes prior research on KM capabilities under the term AKM capabilities, AKM infrastructure, and process capabilities are the main dimensions of AKM capabilities in the context. The connection between AKM infrastructure and process capabilities as synthesized major research streams on aggregate KM capabilities pertaining to accounting practice need to be tested. More so, accounting practice emphasizes different traditions, examining the relationship between AKM infrastructure and process is necessary to avoid patchy conclusions.

There is broad recognition of the importance of institutional accounting functions mediating roles in literature (Appelbaum, Kogan, Vasarhelyi, and Yan, 2017). Meanwhile, the government of Malaysia has urged public universities to fashion out agile KM strategies especially in terms of managing resources and providing cutting-edge services in the country as stated in Bakar *et al*. (2013). Importantly, no institution can sustain its performance without effective and efficient management of its resources. As, institutional accounting functions controls and manages institutional resources on behalf of stakeholders, achieving desired superior institutional services is indirectly tied to the effectiveness of their accounting functions (Lukka 2010). Although, in practice, institutions are aware of how KM might foster the desired cutting-edge services, however, institutions are finding it difficult to understand how to use KM to make their accounting functions effective (Panigrahi, Zainuddin, and Azizan, 2014). Consequently, a research into KM and institutional accounting practice in Malaysia is expedient to inform practice, otherwise, desired cutting-edge university services may not be attained. Besides, existing research framework on university KM lacks how accounting context function effectiveness can act as an intervening mechanism that explains the path of influence from KM capability and institutional performance (Lee and Choi, 2003; Chuan and Chang, 2011; Zaied, Gawaher, and Hassan, 2012; Asma and Abdellatif, 2016; Mao, Liu, Zhang, and Deng, 2016). The problem with this is that management is not sure if integrating KM would foster the crucial intervening role played by accounting function. Thus, examining the mediating role played by accounting functions in institutional KM mechanisms is vital. Unlike other literatures, investigating the mediating role of accounting functions in the study could provide novel insight to management regarding if the relationship between KM strategy and institutional performance is explained by them.

There are several outcomes in literature that have been put forward and measured (Gold *et al*., 2001; Lee and Choi, 2003; Chuang, 2004; Zheng *et al*., 2010; Zaid *et al*., 2012; Pandey and Dutta, 2013). Another outcome that is not well substantiated in KM literature is how to measure KM outcome at accounting functional level. This current lacuna in defining and measuring accounting functional outcome is worrisome as it will mitigate the proper evaluation of KM outcome in university accounting practice. Unlike prior studies, the study examines the measurement of accounting functional effectiveness, proxied by its system effectiveness. Besides, accounting functions due to their system effectiveness in giving relevant accounting information contributes uniquely to the realization of institutional goals. Another challenge with existing studies is that the link between KM capabilities and institutional accounting functions remain under-researched (Mills and Smith, 2011; Obeidat *et al*. 2016). The understudied empirical link between AKM infrastructure and process capabilities is making institutional managers not to be well informed of the implication of KM initiative in the practice. The essence of the research is to shed new light on how and why AKM infrastructure and process capabilities influence accounting functional effectiveness and how effectiveness can be evaluated at accounting functional level. These are all significant research problems and practical issues that merit further study or needs to be addressed.

This research addresses these gaps by developing a research framework to investigate the antecedent of AKM infrastructure and process capability on accounting functional effectiveness and overall university performance in public university accounting practice in Malaysia based on numerical evidence. The study will likewise investigate if accounting functional effectiveness mediates the relationship between AKM infrastructure and process capabilities and overall institutional performance. The theoretical and empirical evidence presented in this research, along with previous research, can then help the university and other public institutions to establish the best way forward in fully exploiting KM potential as a strategic response to the knowledge economy challenges.

1.3 Research Objectives

The objective of this research is to assess why and how AKM capabilities affect accounting functional effectiveness and overall university performance, based on

integrated perspectives from literature. By employing survey as strategy of inquiry, the study is intended to inform institutional KM decisions in Malaysia.

The specific objectives are:

RO1. To identify the key drivers of AKM infrastructure and process capability in an accounting domain.

RO2. To predict the relationship between AKM infrastructure and process capability in an accounting domain.

RO3. To test the influence of AKM infrastructure and process capability on accounting functional effectiveness.

RO4. To examine the impact of AKM process, AKM infrastructure, and accounting functional effectiveness on university performance.

1.4 Research Questions

To address the above objectives and offer solutions to the research problems, the following research questions are targeted to answer:

RQ1. What are the key drivers of AKM process and infrastructure capability in an accounting domain?

RQ2. What is the relationship between AKM infrastructure and process capability in an accounting domain?

RQ3. Does AKM infrastructure and process capability predict accounting domain effectiveness?

RQ4. Does AKM infrastructure, AKM process and accounting functional effectiveness impact university performance?

1.5 Research Scopes

This research is confined to Malaysia with a focus on the assessment of KM drivers from capability perspective in university accounting practices. As the study investigates specific accounting task related KM drivers based on insight from past

studies, accounting function of the university is the population from which data is obtained in this study. Hence, this research excludes other aspects of the public universities in Malaysia. To enhance the degree of internal validity, a relatively homogenous of larger populated public research universities in Malaysia were chosen as the sample frame. Besides, the government of Malaysia has identified the research universities as the fastest route to move the nation towards a knowledge-based economy as indicated in Amran *et al*. (2014). Thus, among the public universities, research universities in Malaysia were considered as they represent other public universities in the different stage of development. Data for the research was obtained through a quantitative method using survey research design. This study covers the examining of the relationships among variables. Apart from demographic profile of respondents, the variables investigated comprises accounting knowledge management (AKM) process capabilities (acquisition, application, conversion, protection), and AKM infrastructure capabilities (people (T-Shaped) skills, culture, structure) as independent while accounting functional effectiveness (operational, managerial) and overall university performance (financial, non-financial) as outcome variables. A five-point Likert scale of agreement was used for measurement running from "strongly agree" to "strongly disagree" with a neutral category for scale midpoint.

1.6 Significance of Research

A study on the identification and assessment of KM drivers from capability perspective in university accounting practices is significant for several reasons. Accounting practice contributes greatly to the realization of every institutional goal and emphasizes different effectiveness compared to other institutional practices. Also, the importance of implementing any new institutional initiative to fit into the peculiarities of its accounting practices have been emphasized in literature (Kanellou and Spathis, 2013). Meanwhile, it is not well understood if KM capability (infrastructure and process) key drivers aligns with university accounting practices to clarify the need for the perspective in KM applications in Malaysia. This study is significant as it helps to highlight the features of KM capabilities that align with institutional accounting practice to enable management and various stakeholders make KM decisions at individual capability level.

There are diverse research perspectives in literature regarding the components of KM infrastructure capability as a key KM capability driver at the composite level. The

most widely referenced among the two major streams up till now are Lee and Choi (2003) and Gold *et al*. (2001) perspectives. From Gold *et al.* (2001) viewpoint, KM infrastructure comprises of culture, structure and technical while Lee and Choi (2003) subdivided into social (culture, structure, people (T-shaped) skills) and technical sub viewpoints. Meanwhile, the importance of combining both social and technical KM perspective to become a better potent KM infrastructure capability have been put forward to improve KM outcome (Pandey and Dutta, 2013). However, there is a dearth of studies that have integrated the mix research viewpoints and examine the outcome empirically to inform institutional KM design at the composite level. This study is significant as it provides an integrated analysis of existing perspectives into a comprehensive AKM infrastructure capability and AKM process capability to inform research and practice on the pattern of KM capabilities that are potent in accounting practice at an aggregate level. Thus, apart from the context of the study, it offers practical insight into the condition in which comprehensive KM infrastructure capability can be employed as a potent weapon for various impressive benefits especially for those that are having challenges with already existing KM designs.

A very important decision confronting university management is how not to trade the benefits of institutional accounting practices at the expense of KM integration in institutions. This study is significant as it reveals how KM can be embedded in institutions using similar structures without trading the benefits of one practice for the other. Thus, provides methodological and practical guidance on how accounting and KM practices can coexist to have synergistic rather than the debilitating effect on the institution. Also, during KM integration, there is a possibility of sub-optimizing some driver strategies if the nature of relationships that exist between them is not well understood. More so, the result of KM studies in a certain context cannot be directly assumed for another as KM capabilities vary across context (Lindner and Wald 2011). Another significance of the study is that it informs both academic and practice on the nature of the relationship that exists between AKM infrastructure and process capability to mitigate sub-optimization issues.

Also, there are bodies of literatures that exist on the diverse theories that can be employed in studying KM. However, little is known on how these theories can advance the relationship between KM capabilities and accounting domain effectiveness. The

research is significant as it extends existing frameworks to develop a model based on the integrated divergent streams of studies using the Resource-based theory (RBT). This study is further significant as it is the first of its kind as at the time of writing, to test the relationship between the synthesized key AKM drivers and university accounting functional effectiveness. Thus, inform managers on which of the AKM drivers are predictors of accounting functional effectiveness. This research model offers a new lens not only in terms of theory but also in terms of how AKM capabilities can be employed to influence effectiveness at institutional accounting functional level. The result furthermore informs managers on how to develop appropriate KM strategies that support accounting functions goals. Thus, could serve as the foundation for academic and non-academic research pertaining to KM capabilities-based effectiveness link in accounting and other settings using the resource-based theory.

Furthermore, the mediating effect of accounting functional effectiveness is assessed in this study for the first time as it has not been adequately substantiated in previous KM literatures. This research is novel as it gives insight into whether KM integration would foster the current mediating roles performed by institutional accounting functions. Consequently, provide direction on how strategic institutional functions can be evaluated and leveraged using this underlying logic in the applications of KM strategies in institutional settings. Focussing on the mediating relationship has the benefit of enhancing research and practice understanding on the main effects of AKM capabilities on overall institutional via institutional accounting functions. Overall, the AKM hierarchical model developed in this study is significant as it informs research on how to achieve theoretical parsimony based on the synthesis of the divergent compositions of KM capabilities in literature.

1.7 The Definition of Terms

This aspect covers terms that are used in the study which individuals outside the field of study may not comprehend.

Accounting function or finance section of a university: The department within the university that handles the financial (revenue and expenditure) aspect of the institution according to various stipulations.

Accounting Knowledge Management Infrastructure: It is a higher order construct comprising a team of capabilities such as accounting technology in use, accounting

structure, accounting culture, accounting structure and accounting people (T-shaped skills) at lower levels.

Accounting Technology in use: The systems (software and hardware) of the function which permit the acquisition, movement, access, and usage of accounting knowledge through the university. It is a lower-order construct measuring accounting knowledge management infrastructure capability.

Accounting Structure: Accounting rules, accounting policies, accounting procedures, accounting processes, the order of working relationships, incentive schemes, and functional task boundaries. It is a lower-order construct measuring accounting knowledge management infrastructure capability.

Accounting Culture: The shared values, beliefs, and practices of the people in an accounting function. It is a first-order construct measuring accounting knowledge management infrastructure capability.

Accounting People (T-shaped skills): The degree of understanding that accountants possess which is equally profound (the upright section of the "T") and extensive (the parallel aspect of the "T") of their own and other accountants task areas. It is a first-order construct measuring accounting knowledge management infrastructure capability.

Accounting Knowledge Management Process: It is a higher order construct that consists capabilities such as accounting acquisition process, accounting conversion process, accounting application process, and accounting protection process as lower order constructs.

Accounting Acquisition processes: The aptitude to pursue and get completely new accounting knowledge out of prevailing accounting knowledge via interactions. It is a first-order construct measuring accounting knowledge management process capability.

Accounting Conversion Processes: The capacity to render existing accounting knowledge more beneficial. It is a first-order construct measuring accounting knowledge management process capability.

Accounting Application Processes: The capacity to employ, and make use of accounting knowledge. It is a first-order construct measuring accounting knowledge management process capability.

Accounting Protection Processes: The aptitude to guarantee accounting knowledge from improper or illegal usage or stealing. It is a first-order construct measuring accounting knowledge management process capability.

Functional Effectiveness: This is the intensity to which the function better achieves its goals (Informational, operational, managerial, strategic) in addition to seemingly challenging goals. It is same as accounting domain effectiveness in this study.

Information technology related effectiveness: It is first order construct measuring the extent to which the accounting system is performing relating to timeliness in the provision of information.

Managerial related effectiveness: This is the intensity to which an accounting function is performing relating to the provision of managerial information. It is a first order construct measuring accounting functional effectiveness.

Operational related effectiveness: This is the extent to which an accounting function is performing relating to the provision of operational information. It is a first order construct measuring accounting functional effectiveness.

Strategic related effectiveness: This is the extent to which an accounting function is performing relating to the provision of strategic information. It is a first order construct measuring accounting functional effectiveness.

Financial Performance: This is the extent to which university can achieve its financial goals and missions. It is a first order construct measuring university performance.

Non-Financial Performance: This is the extent to which university can achieve its non-financial goals and missions. It is a first order construct measuring university performance.

1.8 Thesis Organization

The thesis is organized as follows:

Chapter 1 – gives an outline of the backdrop in which the study delved into. This covers also a concise explanation of the research problem, study objectives, study questions, investigation scopes, research significance and expected result of the study inquiry. Furthermore, explicates the operating definitions of terms and abbreviations employed in the research.

Chapter 2 - The chapter explores the review of knowledge management, knowledge management capability, and knowledge management process, public university and accounting function of the university. This identifies current lacunas in existing studies and develops accounting knowledge management (AKM) model systematically. Here,

based on the insight gained from literatures regarding the derived concepts, their nature of relationships together with logical reasoning, hypotheses are formulated.

Chapter 3 - focuses on research methodology. It entails the development of the questionnaire through design and refinement that involves three steps of item generations which are; through extensive literature review, pre-testing, and then pilot study. After the depiction of the sampling technique and questionnaire instrument employed for the major survey, data analysis procedures and ethical concerns are clarified.

Chapter 4 – Covers data analysis outcome and other findings. Here involves preliminary data screening which includes but are not limited to normality assessment and sample profile clarification employing SPSS version 23.0. Then, a two-step approach to SEM is applied using SmartPLS 3.0 for evaluation of the model. After evaluating the measurement model, the structural model is evaluated for the significance of theoretical relations among the variables via linked hypotheses.

Chapter 5 – Entails the closing chapter of the thesis. Here, discussions, implications and conclusions are reached while considering the study problems together with the study questions stated in Chapter 1 and the major findings revealed in Chapter 4. Furthermore, the study theoretical, methodological, and practical implications are discussed. Following which the research limitations and recommendations for studies in future are given.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter aims to identify the gaps in existing literature and systematically develop an accounting knowledge management (AKM) capability framework for an accounting function of a university modified from prior literatures. In addition, relevant theoretical frameworks are also discussed to enable the conceptualization of the various AKM capability components for further empirical assessment. For better understanding in this study context, issues pertaining to knowledge management are considered first before university accounting practices and so on.

2.2 Knowledge Management

2.2.1 Overview of Knowledge Management

According to Buckman (1998) and Smaglik (2016) knowledge is power. Knowledge is an asset and referred to as the internal know-how, human skills, best practices (Dixon, 2000; Johnsson, 2015). It is as an essential organization resource that provides competitive advantage platform amidst dynamic economic context (Wang and Noe, 2010; Wang and Wang, 2012; Li *et al*., 2014; Eréndira, Rigoberto, and Minerva, 2017). Knowledge is embedded in individuals; stored in their head and in the context in which the individuals reside (Marie *et al*., 2015). According to Alavi (1999) and Ribeiro (2016) knowledge is of constrained departmental worth when not distributed**.**

Knowledge can be created; it is dynamic; context specific and classified into tacit and explicit (Saavedra, Villodres, and Lindemann, 2017). It is only information, if not put into context (Nonaka *et al*., 2000; Świgoń, 2013). Knowledge articulated in systematic but formal expression and disseminated in the manner of databases,

methodical formulae, stipulations, accounting handbooks, financial policy document and employee handbooks as explicit knowledge. On the contrary, tacit knowledge is very individual and rigid to make formal. It is the knowledge that is still tacit in the brain of the employee (Nonaka *et al*., 2000; Chuang, Jackson, and Jiang, 2016). Although this tacit knowledge is frequently overlooked in most organizational practices as they do usually have elaborate systems to capture and share their explicit knowledge, tacit accounting knowledge can be a source of superior performances because it is inimitable, not perfectly moveable, and non-interchangeable (López-Nicolás and Meroño-Cerdán, 2011).

Knowledge is the practical or theoretical understanding of a subject (Haldin-Herrgard *et a*l., 2000; van Tartwijk and Kluijtmans, 2017). Knowledge is personal and complex in nature (Chatti, 2012). It is an object that can be captured, stored and reused; a confirmed true credence that boosts an institution's competency and resides in the intelligence and the competence of people (Nonaka and Takeuchi, 1995; Zablith, Faraj, and Azad, 2016). But in this study, the knowledge we are talking about is an accounting knowledge.

2.2.2 Definition of Knowledge Management

KM is considered to be multi-disciplinary in nature and many different definitions of KM have been proposed by various KM researchers from different disciplines and with different interests (Abdelkader and Ahmad, 2015). O'Dell and Grayson (1998) and Naser, Al-Shobaki, and Amuna (2016) believe that KM is a strategy that can be developed within a university to ensure that knowledge reaches the right people at the right time; furthermore, these people should share and use information to improve university overall performance. Metcalfe (2008) stipulated that it is founded on the notion that a university competitive edge lies in bringing to limelight the essential knowledge hidden in knowledge assets. Knowledge management may be defined as the set of processes that create and share knowledge across an organization to optimize the use of judgment in the attainment of mission and goals as opined by Townley (2001).

García-Álvarez (2014) views it as a discipline that promotes an integrated approach to identifying, capturing, evaluating, retrieving, and sharing all an enterprise's information assets. According to them, these assets may include databases, documents,

policies, procedures, and previously uncaptured expertise and experience in individual workers. As posited by Shajera and Ahmad (2015), KM helps an institution gain insights and further understanding of its own experience. Its activities can assist an institution function in acquiring, storing and utilizing knowledge for the problem- solving, dynamic learning, strategic planning and decision-making in its information processing routine (Takeuchi and Nonaka, 2004). Similarly, Alavi and Leidner (1999) stated that KM provides the possibility of utilizing cutting-edge communication technologies (e.g., the Internet, intranets, browsers, and software managers) to schematize, enhance, and speed up institution knowledge management.

Knowledge management can also be defined as the dynamic mechanism which identifies, locates, creates or acquires, transfers, converts and distributes knowledge for improved operational performance (Cepeda and Vera, 2007). Although some of the definitions of KM found in the literature reveal that there is general agreement on what KM is but researchers do not agree on a generally-accepted definition (Lloria, 2008). But to be able to arrive at what the key integral aspect of KM is in this research, a tabulated review on its various definitions is shown in Table 2.1.

Table 2. 1 A summary of KM definitions from literature

Knowledge management definitions	Reference
Knowledge management is concerned with the exploitation and development of the knowledge assets of an organization with a view to furthering the organization's objectives.	Rowley (2000)
A process of leveraging and articulating skills and expertise of employees, supported by information technology	Chong *et al*. (2000)
Referred to knowledge management as a process of knowledge creation, validation, presentation, distribution, and application.	Bhatt (2001)

Table 2.1 Continued

Knowledge management definitions	Reference
A process of knowledge acquisition, documentation, transfer, creation and application.	Yahya and Goh (2002)
As a joint expression for a cluster of processes and procedures utilized by organizations to increase their value by improving the effectiveness of the generation and application of their intellectual capital	Marr *et al*. (2003)
The access and ratification of experience, knowledge, and proficiency that helps to produce new capabilities, greater performance, novel ideas, and boost customer's worth.	Gloet and Terziovski (2004)
As a method of exploiting or transforming knowledge as an asset for organizational use to facilitate continuous improvement.	Robinson *et al*. (2005)
As a management motion, which advances, transfers, diffuses stores and applies knowledge, as well as offering the adherents of the organization with information to respond and take the right decisions to achieve institution's goals.	Hung *et al*. (2005)
The application of knowledge assets available to a tourism organization to create competitive advantage.	Ju *et al.* (2006)
A process that comprises activities that utilize knowledge to accomplish the organizational objectives to face the environmental challenges and stay competitive in the market place.	Greiner *et a*l. (2007)
A process used to describe an organizational approach to handling knowledge that comprises both human and system mechanisms.	Bishop *et al.* (2008)
A strategic and worthwhile attempt for enhancing an organizational effectiveness in the varying societal and business setting.	He *et al*. (2009)
Any structure activities that improve an institution's ability to survive and succeed through sharing, acquiring and exploiting knowledge.	Adhikari (2010)

Table 2.1 Continued

Knowledge management definitions	Reference
The level to which the university formulates, distributes, and employ knowledge resources amid departmental boundaries.	Chang and Chuang (2011)
As the management actions required to source knowledge, form suitable settings, and handle the knowledge procedures for aligned outcome.	Reich *et al*. (2012)
Creating or locating knowledge, managing the knowledge flow within the firm, ensuring that the knowledge is used effectively and efficiently for the benefit of the organization in the long run.	Lee *et a*l. (2013)
A capacity of an institution to harness prevailing knowledge to generate and keep new knowledge.	Tseng and Lee, (2014)
A set of organizational activities to achieving organizational aims by ensuring the greatest use of knowledge	Zhang *et al*. (2015)
A structural technique for fashioning, organizing, using, collating, exchanging, assessing and retaining knowledge to respond to situational confronts and add extra value.	Sigala and Chalkiti (2015)
The process of collecting knowledge where it exists, and distribute them where they help to produce the best results.	Gutierrez *et al*. (2016)

Reviews of the prior studies above clearly reveal a lack of consensus on the definition of KM as there are different perspectives on it. But a consistent theme that can be deduced in definitions of KM delved into is that it contains processes or a group of actions or activities and involves infrastructures (Gold *et al*., 2001; Yahya, 2002; Metcalfe, 2008; Reich *et al*., 2012; Liu and Abdalla, 2013; Gutierrez *et al*., 2016). This knowledge infrastructure and process perspective taken by these authors is in cognizance with the line of expertise development in a modern-day university accounting practice. Therefore, summing up together, KM is believed to be structural function or group knowledge processes and infrastructures approach for creating knowledge, managing the knowledge flow as a response to environmental challenges and for additional value-creating purposes. But also, very important to point out is that most of these existing KM

definitions are either from a general perspective or lacks accounting function context specific KM definition. Integrated KM that is aligned with accounting practices is referred to accounting knowledge management (AKM). Thus adapted from Gold *et al.* (2001) and Rowley (2000), AKM is defined in this study as an accounting knowledge based process capability of collecting and creating useful accounting knowledge (i.e. accounting knowledge acquisition), stowing the accounting knowledge in the storeroom to enable accountants to access them stress free (i.e. accounting knowledge conversion), utilizing and applying the accounting knowledge (i.e. accounting knowledge application), and avoiding unauthorized accounting knowledge use (i.e. accounting knowledge protection) enabled by accounting infrastructure towards the exploitation and development of its knowledge assets so as to achieve desired functional outcome (s).

2.2.3 Knowledge Management Theories

Various KM theories have been reported in the literature. The following section explains in detail some of the widely referenced theories in literature.

2.2.3.1 Social Capital Theory

Social capital is a theory that posits social capital as the aggregate of known and potential resources embedded within, obtainable through, and from the network of relationships possessed by the individual in an organization (Gold *et al*., 2001; Nguyen, 2010; Huang, 2016). According to Boland Jr and Tenkasi, (1995), it encourages the improvement of scholarly capital or knowledge by influencing the conditions fundamental for the procedure of exchange and blend to happen inside the social association of an institution. To explain what these conditions mean further, Gold *et al*. (2001) stated that infrastructures and processes are the basic requirements for combination and exchange of knowledge to occur in a social unit. Social capital is infrastructures providing mechanism for knowledge to be created through social interaction (process) of individuals in the various function that makes up an institution. This is the link between some past KM studies and social capital theory. This, therefore, emphasizes the importance of infrastructure and process elements in this study as knowledge is generated through both elements. Accounting function of a university already possesses these preconditions that support. Moreover, infrastructure components facilitate the expansion of social capital by creating a means for social collaboration of

persons to ensue (Gold *et al*., 2001). Accounting knowledge is generated via the procedure of exchange and combination that ensues inside the interpersonal net of an accounting practice.

2.2.3.2 The Resource-Base Theory

The resource-based theory (RBT) of an institution examines the link between the institution distinctive attributes and performance (Pee and Kankanhalli, 2016). It is based on the premise that internal strengths (resources) help institutions to cash in on prospects and counteract threats in the environment. RBT goal is to create strategic superior performances through the acquisition, utilization, and exploitation of institutions particular resources consisting assets, institution procedures, features, information, knowledge, and capabilities (Mao *et al*., 2016). Thus the reason some institutions with their associated functions eventually succeed and others fail can be found in understanding their resources and capabilities, which influence both the strategic choices that stakeholders/managers make and the implementation of those chosen strategies (DeNisi *et al*., 2003; Hitt, Xu, and Carnes, 2016). Moreover, resources are the source of a university capability while its capabilities, in turn are the main source of operational effectiveness and competitive advantage (Cepeda and Vera 2007; Pee and Kankanhalli, 2016). Thus, a university must have the necessary resources such as structure, culture, people, and technology as they are potential sources for improved performances. In addition, inputs for defining KM capabilities. On this basis, prior researchers have applied RBT in several KM studies. But among all the embedded resources of an institution, knowledge which resides in the people brain has become the most strategic resource according to the knowledge-based theory (KBT). This stance, however, the RBT did not emphasize, though the people resource overlap with KBT.

2.2.3.3 Knowledge-Base Theory

Another theory often led credence to in previous KM studies is the knowledge-based theory (KBT). KBT is an offshoot of the RBT which assumes that knowledge (know what and know how) is the institution's most important resource ((Jashapara, 2004; Cepeda and Vera, 2007; Liu and Abdallah, 2013). The reason is that expertise provides the greatest ability to sustainable differentiation that culminates in superior performances (Nieves and Haller, 2014). KBT defines organizations as bodies that

produce, integrate, and allocate knowledge (Low and Ho, 2016). It is an approach which studies KM capabilities with special importance placed on the intangible resource, specific knowledge or expertise, KM process and management of diverse sources of knowledge (expertise) (Martín-de Castro, 2015). According to this view, knowledge is converted from one form to another in institutions as Arbabi (2016) study buttressed further. This conversion process was not emphasized by the RBT traditional perspective. The underlying logic under this perspective is that knowledge can be developed along with other intangible resources through KM process to become capabilities so that institution can achieve their goals through KM. In line with this notion, Wu and Lin (2013) assert knowledge as a transformer which helps in converting other resources into capabilities for improved performances. Moreover, maintaining these superior performances overtime is only possible through capabilities since they allow institutions to modify their resource base to adapt to changing conditions as Nieves and Haller (2014) argued further. This is because the mere owning of resources does not guarantee improved performance. Rather, it is what the resources can do (capability). Thus, the capability perspective is emphasized in this study. Universities comprise knowledge resources that are embedded in their various functions (Islam and Khan, 2014). These knowledge resources embedded in functional routines are potential sources of performances that bring about benefits like the competitive advantage when managed (Nonaka and Takeuchi, 1995; Jashapara, 2004; Nguyen *et al*., 2010; Aujirapongpan, 2010; Shajera and Ahmed, 2015).

It is based on these theories that prior studies could first conceptualize each key KM capabilities driver as higher-order constructs with their sub-dimensions as first-order constructs; second, establish the relationship between KM capabilities and success derived from them. Even the organization capability theory propounded by Gold *et al*. (2001) that states that a firm's predisposition to the effectiveness of knowledge management lies in its knowledge management infrastructure and process capabilities is an offshoot of all these three theories. However, despite the wide applicability of these KM theories, there is a dearth of empirical evidence on how they have been used to investigate KM in university accounting practices. Among the theories pertaining to KM studies in literature, the RBT is the most influential perspective applied. As the RBT is the most influential framework for understanding strategic management, this study builds upon this theory to investigate KM capabilities and their outcomes in university

accounting practices. The next section of this study elaborates more on the KM capability perspective to gain deeper understanding and clarifications of the concept.

2.2.4 Knowledge Management (KM) Capabilities

A function's KM capability can be expressed as its process-based ability to mobilize and deploy knowledge-based resources in combination with other resources and capabilities to gain superior performances (Chuan, 2004; Mao *et al*., 2016). They are key resource perspectives that help to foster leveraging of embedded function knowledge. These crucial KM resources are categorized into technical KM resource (the basic IT infrastructure mechanisms, and its KM capability) and the social KM resource encompassing structural, cultural, and human resource, and its KM capability (Chuan, 2004; Tseng and Lee, 2014). Similarly, Nguyen (2010) opined that KM capability of an organization is a multifaceted construct reflecting technical infrastructure capability, social infrastructure capability, and process capability. Darroch (2005), indicated that it is hinged on two roles of knowledge, viz. a supporting role and a coordinating role. Pandey and Dutta (2013) viewed them as essential preconditions for effective KM and classified them into infrastructural and process capabilities. According to Gold *et al*. (2001) and Pandey and Dutta (2013), the two essential preconditions are knowledge management infrastructure capabilities (KMIC) and knowledge management process capabilities (KMPC). KMIC consist of technology, structure, and culture, while KMPC is covered acquisition, conversion, application and protection processes. Furthermore, collectively drives the KM capability of an organization (Gold *et al*., 2001). One of the benefits of this perspective according to Masadeh, Mohammad Maqableh, and Karajeh (2014) is that it enhances functions or groups innovativeness and performance due to the efficiency in resources usage. Similarly, KM capabilities are what undergird an institution's tendency to positively innovate and attain sufficient value to render greater long-term financial performance (Tseng and Lee, 2014).

On the necessity of both social and technical KM infrastructure being in a KM capability, Nguyen (2010) argued that their development provides the required stand for increasing the efficacy and efficiency of processes in KM. Furthermore, he stated that KM process capability, social infrastructure capability, and technical KM infrastructure capability should be combined to fit the specificities of the intended context application. This will help to provide a mechanism for social interaction of individuals which can

lead to innovative ideas (Nguyen *et al*., 2010). Thus, organization ought to possess key capabilities that provide a mechanism to manage explicit and tacit knowledge mutually effectively (Gold *et al*., 2001; Maruta, 2014). These key capabilities are important and interwoven according to Zheng (2009). Besides they provide a valuable theoretic underpinning for crucial features of an institution or a function capability as stipulated in Gold *et al*. (2001). Both concepts are discussed further in the next section while highlighting their components for better clarification.

2.2.4.1 Knowledge Management Infrastructure Capability (KMIC)

From previous relevant studies, the following are the major sub-components of KM infrastructure capabilities (KMIC):

- **Technological Knowledge Management Infrastructure (TKMI)**

According to Gold *et al.* (2001), TKMI is a crucial component needed to mobilize social capital for the creation of new knowledge. It provides linkages that support the transfer of distinct types of knowledge and communication that are vital. As opined by their work, depending on the type of technology in use, TKMIC to an extent determines the quantity and quality of knowledge that can be generated, converted, applied and stored in a collaborative unit or institution. Besides, some other scholars like Pandey and Dutta (2013) indicated that with greater TKMI readiness and higher TKMI system quality institutions are more likely to create sources of sustainable improved performances and pursue KM best practices. But on the contrary, if the TKMI are not well integrated with the embedded institutional practices, it will restrict knowledge sharing and new knowledge creation as explained further by Tseng and Lee (2014). However, it is important to note that too much emphasis on IT as a capability can hinder KM effectiveness as indicated by Tseng (2014).

- **Social Knowledge Management Infrastructure (SKMI)**

Adopted from Chuan (2004), social KM infrastructure generally comprises the sum of the actual and potential resources available that is derived from the relationships possessed by humans in the social function. Chuan (2004) further posited that strategic functions with strong social KM resources can (1) integrate the KM and business planning processes more effectively, (2) develop reliable and innovative applications that

support the business needs of the institution in which the function is based faster, (3) predict future strategic needs of the institution and innovate valuable new services before other counterparts. Social KM infrastructure includes structure, culture, and people sub-dimensions. The **structure dimension** of SKMI comprises rules, policies, procedures, hierarchy and reporting relationships and so on according to Nguyen (2010). According to Zheng *et al.* (2010), structure impacts institutional effectiveness via medium other than knowledge management.

The **culture dimension** of SKMI refers to shared values, beliefs and practices binding on a group of persons in a function or an organization (Chuan, 2004) and further determines the reason and way knowledge is generated, sharing and utilization in an institution as indicated in Zheng *et al*. (2010) while the **people dimension** of SKMI refers to the level of employees understanding of the environment, their own and others task areas, which is both deep and broad (Lee and Choi 2003; Pirkkalainen and Pawlowski, 2014).

2.2.4.2 Knowledge Management Process Capability (KMIC)

According to Abdullah, Selamat, Sahibudin, and Alia (2009), knowledge management involves the process of creating knowledge, the process of storing knowledge, the process of re-using knowledge and the process of disseminating knowledge. KM activities can assist any function in acquiring, storing and utilizing knowledge for processes such as problem- solving, dynamic learning, strategic planning and decision-making (Takeuchi and Nonaka, 2004; Fu, 2015). Process capability in KM is the institution's ability to create novel knowledge through the course of transforming tacit to explicit knowledge and finally converting it to institutional knowledge (Nonaka and Takeuchi, 1995; Mathew and Rodrigues, 2017). According to many scholars, processes in KM can be fused into routines (daily work activities) to become widespread procedure towards successful integration (Zheng, 2010; Donate and Sánchez de Pablo, 2015). The summary of this perspective can be shown in Figure 2.1. Both infrastructure and process capability have been adduced in literature to result in impressive organizational outcomes. These possible KM outcomes are further discussed.

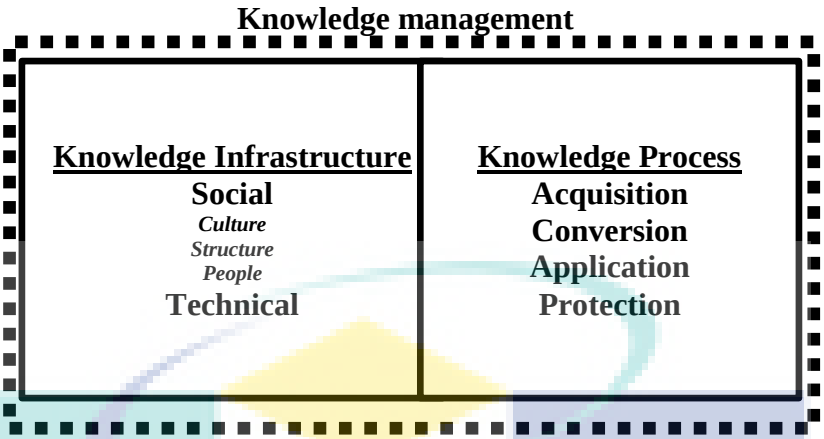

Figure 2. 1 Components of Knowledge Management from Capability Perspective

2.2.5 Knowledge Management (KM) Outcome and Measuring KM Outcome

In prior literatures, there are different outcomes associated with knowledge management practices in organizations. These outcomes are often referred to as KM effectiveness (Gold *et al.*, 2001; Oltra, 2005) or KM success or satisfaction derived (Lindsey, 2003; Jennex, 2017) or KM performance (Chen and Fong, 2015; Chen and Fong, 2015). Some authors believed that KM results in the ability to create knowledge and the application of knowledge by integrating various resources and activities in KM to positively affect performance and empower practitioners (Aujirapongpan *et al.*, 2010; Shajera and Ahmed, 2015). Furthermore, Aujirapongpan *et al.* (2010) indicated that effective KM is dependent on KM capabilities and KM capabilities are used for effective KM. Similarly, Alavi and Leidner (1999), having the capability to manage knowledge is deemed crucial to the realization of intended KM outcomes in organizations. Besides, it has been predicted by many that KM success requires both infrastructures and processes (Lindsey, 2003; Nguyen, 2010; Lin, 2014). This is the link between AKM capability components and AKM outcome in this study. Accounting function of a university possesses these infrastructures and process resources thus the possibility for achieving some level of KM success from capability perspective can be measured.

According to some prior studies, KM effectiveness may be assessed in relations to efficiency, adaptability, and innovativeness (Aujirapongpan *et al.*, 2010; Moon and Lee, 2014). Efficiency is savings in terms of period and effort; adaptability is the capability to adapt the resources of a university to be responsive to the changes in the environment to solve the bedevilling challenges; and innovation which is the generation,

acceptance, and implementation of new ideas, processes, products, or services (Calantone, Cavusgil, and Zhao, 2002; Aujirapongpan *et al*., 2010; Moon and Lee, 2014)). KM institution effectiveness is the degree to which an institution achieves its goals in addition to seemingly challenging goals through KM (Aujirapongpan *et al*., 2010; Tan and Nasurdin, 2011). KM university effectiveness is the same with institution performance in this context and its measurement is derived from past findings. The existing relationships between KM and their respective outcomes in literatures are further considered to serve as guide into the present study.

2.2.6 Relationship between Knowledge Management (KM) Capabilities and Outcomes

To understand the existing relationship between various AKM capability perspectives and their respective outcomes in an accounting function of a public university in Malaysia, an assessment of prevailing literature is carried out in this study. Gold *et al*. (2001) were among the first scholars in the field of KM to provide a comprehensive model of KM capability dimensions from the perspective of organizational capabilities. Using analysis of surveys collected from senior executives, their studies opined that a knowledge infrastructure capability consisting of technology, structure, and culture along with knowledge processes are preconditions for effective knowledge management. Thus, it can be deduced that both the presence of KM infrastructure and KM processes are needed in leveraging knowledge for different outcomes in organizations. But though the development of capabilities relates and contributes to key aspects of organization performance, new research using both dimension in specific context are needed to reaffirm this stand.

Also from capability perspective, Al-Athari and Zairi (2001) did an empirical study on the building of benchmarking competence through knowledge management capability. The authors' main objective was to examine the actual situation of knowledge management system in Kuwait private and public sectors. The study with aimed to determine how such sectors can be enhanced through KM to achieve organizational and national goal. This is by employing an effective training method as well as more investment in human resources which is directed towards improving and attaining effectiveness and efficiency. Interviews and questionnaires were used by the authors to investigate 77 Kuwaiti private and public organizations. The findings from the study

revealed that the dimensions of KM capabilities investigated influence greatly the extent to which organizational goals can be achieved, developed and benchmarked.

Lindsey (2002) investigated task contingent organizational capabilities to measuring knowledge management effectiveness. The conceptual study showed that task characteristics moderate the level of satisfaction that can be derived from knowledge management. That is, implementation of knowledge processes capabilities that suit the tasks performed by a unit will provide more knowledge management satisfaction than implementation of those that don't. Similarly, though in a different context, Hsieh *et al*. (2002) corroborated the possibility of enhancing the effectiveness and efficiency of an online procurement system by incorporating knowledge management technique to help resolve keys difficulties if the online procurement systems characteristics are considered.

Also Daghfous (2003) used knowledge management capabilities approach based on Leonard-Barton's framework on four dimensions of a core capability (knowledge creating activities, knowledge sets, and core and non-core). The report unveiled that relationships exist between the explored firms' core capability dimensions and the improved competitive advantages of such firms. Nevertheless, the author developed a conceptual framework from key dimensions of skills and knowledge such as managerial system, physical system and values and norms and proposed it to help firms in sustaining their competitive advantage.

Lee and Choi (2003) examined the associations between knowledge management enablers (structure, culture, and information technology), processes, and organizational performance. Using both financial and non-financial performance measures, the finding indicated that knowledge management processes (socialization, externalization, combination) are significant predictors for organization creativity. Meanwhile, culture and structure were found to be significant in influencing knowledge management processes, information technology was not that significantly related. Also from the study, it can be inferred that organizations can achieve strategic benefits of KM from effective knowledge management processes supported by knowledge enablers. But it is worthy to note that one of the limitations of the study is the context. The outcome of the survey was restricted only to Korean firms. Besides, individual perspective was taken in the

study rather than functional perspective as this might have had a different KM implication.

Knowledge management capabilities have been perceived to provide sustainability of an organizational competitive advantages as reported by Chuang (2004). The author conducted an empirical study on knowledge management capability and competitive advantage from resource based theory viewpoint. The empirical study was based on the relationship between knowledge management capabilities (social, technical and human) that are compatible with existing practices and their contribution to the long lasting competitive advantages of firms. The findings based on the analysis of the survey showed that social KM capability strongly influences competitive advantage while technical KM was insignificance. Though technical KM did not positively relate to organization competitive advantage in this context, there is possibility that it can be significantly related to other outcomes and context. Another weakness associated with this study is the non-investigation of the process element of KM capability which perhaps would have improved the relationship between the technical KM and firm competitive advantage. Also, the relationship between the KM capabilities was not scrutinized by the study.

To provide important empirical evidence to support the role of KM within institutions, Darroch (2005) made a critical inquiry into KM, innovation and institution performance. The result of the analysis showed that institutions with knowledge management capabilities will utilize resources more efficiently and so will be more innovative and perform better. In addition, all the three KM components (knowledge acquisition, knowledge dissemination, responsiveness to knowledge) were positively related to one another. Meanwhile there was no conclusive evidence in terms of their relationship with superior financial institution performance. This may be due to the New Zealand institutional context and broad selective institutional perspective taken in the study. This is reflected by the division of innovation into groups instead of the usual general grouping obtained in prior literatures. Perhaps if the research would have stuck to a functional viewpoint the outcome will have been better. Also, KM process in the context of the study was considered in isolation despite the importance of having both KM process and KM infrastructure in a KM initiative.

Ju *et al*. (2006) conducted an empirical study on a contingency model for knowledge management capability and innovation. The contingency model was based on the theories of organizational learning and strategy. The focus of the study was to develop a strategic contingency model for identification of interrelationships behavioral pattern among knowledge characteristics, knowledge management strategy, knowledge integration, organizational learning and knowledge management capabilities and innovation. The study was conducted using 800 survey questionnaires obtained from knowledge managers from semiconductors, LED, precision machinery, communication, and biotech industries. The findings showed that knowledge characteristics which displayed the highest modularity and explicitness have the potential to improve organizational learning and knowledge integration. Moreover, the authors further revealed that levels organizational learning, knowledge integration and knowledge management capability strongly influence firm's innovation and competitive advantage.
Freeze and Kulkarni (2007) investigated the use of knowledge management capabilities to leverage knowledge assets performance to systematically improve firm's process of achieving competitive advantage. Within the context of the study, the authors defined knowledge capabilities in terms of key factors such as knowledge life cycle, tacit/implicit/explicit nature of knowledge, technology and organizational processes. The findings revealed that knowledge capabilities such as expertise, lessons learned, policies and procedures, data and knowledge documents were vital in defining and evaluating an organizational knowledge asset.

Evaluating knowledge management capabilities in an organization is increasingly becoming a norm as this has the advantages of directly providing the means for strategic organizational learning and the capabilities to produce a competitive enterprise. In line with this, Tseng (2008) in their study developed a conceptual frame work to investigate knowledge management system performance measure index. The knowledge management system conceptual frame work which include key components such as knowledge management strategic, knowledge management plan and the knowledge management implementation where used as performance indicators to assess the knowledge management capabilities of the investigated firms.

Fan *et al*. (2009) applied a fuzzy multiple attributes decision-making approach to investigating the knowledge management capability of organizations. Based on this

approach, the authors developed a frame work which include two major key components namely evaluation of hierarchy with attributes and judgement matrix model to evaluate performance of knowledge management capacity. The results of the knowledge management evaluation show that knowledge managers can easily visualize in the matric model and make planning decisions based of the model. Moreover, knowledge managers can if it necessary to promote knowledge management capability and identify which dimensions needs improvement.

Aujirapongpan *et al*. (2010) in their study identified knowledge management capability indicators than can promote knowledge management effectiveness. These indicators were identified by the authors through extensive literature review. The results of the findings show that out of the numerous indicators reviewed, resource-based perceptive which consist of technology, structure and culture, knowledge based process perspective (creation, conversion, application, protection) as well as a knowledge-based perspective which is made up of expertise, learning and information were essential indicators of knowledge management capability that promote knowledge management effectiveness. Even though the study provided detail review of KM capability concepts, it was only conceptual in nature. It did not scrutinize further through in depth empirical analysis to substantiate the concluded assertions. Otherwise, the study will have been a rich context for other research to draw upon empirically using either functional or organizational viewpoint.

Pertaining to how KM expedites firm performance, Chang and Chuang (2011) investigated KM process as a crucial variable via which infrastructure capability and corporate strategy influence firm performance. The result revealed that knowledge infrastructure capabilities (knowledge based culture, structure, technology and human) assist in establishing knowledge management processes in greater flexibility and in turn generate stronger competitive advantages for firms explored. In fact, emphasized that KM processes have positive and remarkable influence on firm performance. Though the outcomes of the study are stimulating and assuring, caution should be applied in generalizing the results to other firms or institutions like the universities that have diverse environmental and competitive contexts.

The linkage between supply chain management and knowledge management capability towards firm performance was investigated by Wong and Wong (2011). The

authors employed three-phase statistical analyses. The first phase was made up of convergent validity, reliability, and discriminant validity while the second and the third phase consist of mediated regression analysis and path analysis respectively. The results revealed that the implementation of supply chain management practices often interact with knowledge management capabilities towards improving firm performance.

A detailed analysis on an integrated knowledge management capabilities framework for assessing organizational performance was carried out by Zaied (2012). It can be deduced from the study that knowledge management capabilities and organizational performance correlates with each other. Assessing each of the KM capabilities performance sector by sector, the result revealed that KM dimensions are well implemented in IT sector; human resources was the highest dimension that affect organization performance in the service sector and so on. Although the framework proposed by the study can be used as a decision tool to decide which KM capability that needs to be improved upon, the capabilities understudied were not contextualized to fit the sectors investigated. Perhaps the KM implication from the study would have been better if each of the KM dimensions reflected the sectors unique characteristics. Another issue from the study is the broad organizational perspective taken without consideration for possible deviance of result if functional perspective was explored.

Using structural equation modelling to point out the relevance of KM practices, Andreeva and Kianto (2012) examined the link between KM practices, firm competitiveness and economic performance. The analytical study revealed that the combination of both social KM resource (human resource management (HRM)) and information communication technology (ICT) greatly influence both financial performance and competitiveness of the firm. That is the interface of social and technical KM practices resulting in institutional outcomes. But the context in which the empirical work was carried out varies from the present studies. Besides the context, the indicators of the KM practices employed are just limited to HRM and ICT which is not so. Thus, in nutshell, the study gave a myopic view of the naturally existing KM practices in institutions like culture and structure. Moreover, the study focus is on companies quoted on stock exchange in three diverse countries (Finland, China and Russia) outside Malaysia and not in universities. In addition, although the paper points out the importance of utilizing a combination of both social and technical dimensions of KM to

improving these company profits, but did not portray the KM implications for each of the departments/functions that make up the companies.

A scrutiny of the role of knowledge infrastructure capability in knowledge management practices within an organization was done by Pandey and Dutta (2013). After an in-depth analysis, the study confirmed the importance of understanding and developing knowledge infrastructure capability in attaining successful KM effort in organizations with organization structure playing the most significant role. Thus, organizations need to consider various aspects of their culture, structure and technology with specific alignment to KM and its learning objectives. One of the cautions to be exercised in the study is that the results were based from a single based case study. Therefore, outcome cannot be generalized to other dissimilar settings like the universities. In addition, the broadened organization perspective taken in the study contradicts this research focus.

Chen and Fong (2013) investigated the growth of knowledge management capability in Construction Company. The inquiry was carried out inside the context of construction contractors using several-case strategy approach which integrate indication from literature and consultations as well as the application of dynamic modeling which helps to visualize the knowledge management evolution. The findings of the study revealed the feasibility of visualizing knowledge management capability of firms in correlation with the operating environment of such firm. The developed dynamic model show that the evaluation of knowledge management capability of any firm can help in better planning and control of the knowledge management practices of such firm.

As a follow up to the evolution of knowledge management in construction firms, Tseng and Lee (2014) conducted a study on the consequence of knowledge management capability and vigorous environment on organizational performance. The study approach entails the use of questionnaire and statistical analytical techniques to explore the knowledge management capability, dynamic capability and organizational performance. Based on the authors' in-depth survey, dynamic capability was perceived as vital intermediate institutional mechanisms via which the gains of KM capability are transformed into outcome effects at the institutional level. Also, advocated in the study is how dynamic capability enhances institutional performance and creates competitive advantage. However, an inadequate number of respondents were obtained for the study.

While the study could establish the basic associations amid the variables, this can be further strengthened by engaging a random sampling method to obtain more responses to increase the generalizability.

Still on knowledge management, Shajera and Ahmed (2015) examined the relationships between knowledge management infrastructure capabilities (KMIC) and knowledge management process capabilities (KMPC). By employing Pearson correlation analysis to assess their associations, the study revealed the existence of relationship between KMIC and KMPC. The research further emphasized the contribution of a knowledge infrastructure comprising technology, structure, culture and people and proposed that better attention be given to them to enable successful transformation through all the stages involved in KM integration. The non-emphasis on the possible link outcome between KMIC, KMPC and the group performance is one of the major flaws of the research. Another drawback is the inability to generalize the study outcomes due to smallness of sample size.

Cohen and Olsen (2015) reported the application of universalistic, contingency and complementarity tests to investigate the correlation between knowledge management capabilities and firm performance. The study was conducted using questionnaire obtained from hospitality services firms operating in South Africa. Based on the complementarity test, the authors find out that codification and human capital knowledge management capabilities strongly influence customer service outcomes. In addition, the contingency test revealed that the interconnection between knowledge management capability and firm performance was contingent on the firm business strategy. However, the study was cross-sectional and might possibly not apply to casual associations. Hence, in subsequent study, a longitudinal research design can be employed to provide stronger evidence of causality. Moreover, the study was restricted to hospitality service firm in South Africa which could be a limitation to the generalizability of the conclusions for other firms.

Similar to the study of Cohen and Olsen (2015), Tseng (2016) investigated the correlation between knowledge management capability, customer relationship management and service quality. The authors employed questionnaire and partial least square techniques to explore the correlations between the three key parameters namely knowledge management capability, customer relationship management and service

quality. The findings show that customer relationship management and service quality were positively influenced by knowledge management capability. However, one of the short comings of the research is the use of slightly inadequate number of respondent due to the use of purposive sampling method used by the authors. Study of this nature can be strengthening by sampling a random sampling method to collect adequate responses to increase the generalizability of the findings.

Table 2.2 summarizes the prior existing literature, showing the different context and combination of KM capabilities also called KM infrastructure/enablers/success factors and their respective KM outcomes in a bid to establishing their existing relationship and revealing the gaps in existing literature pertaining to this study. Together these studies provide important insights into the possible similar knowledge management capability dimensions in an accounting function practice.

Table 2. 2 A summary of previous empirical studies on the relationships between KM capabilities and outcomes

KM enablers/Infrastructure	KM process	Research Objectives/Outcomes	References
- Infrastructure Capabilities: -Technology -Structure -Culture	KM Process: -Acquisition -Conversion -Application -Protection	To scrutinize knowledge infrastructure and knowledge process as crucial institutional capabilities or preconditions for effective KM and their impact on institutional effectiveness.	Gold, Malhotra and Segars, (2001)
Organizational Strategy KM strategy	Knowledge conversion Knowledge transfer	Investigate the actual situation of knowledge management system in Kuwait private and public sectors. knowledge management system is vital tool that has been employed for the organizational development	Al-Athari and Zairi, (2001)
Organizational strategy	Knowledge conversion	Investigated the capability of knowledge management in online procurement systems. An algorithm was developed for minimizing the uncertainties related to induce knowledge in knowledge management system of an online procurement system	Hsieh *et al*.(2002)
Organizational strategy KM strategy	Knowledge sharing Knowledge utilization	Investigated the utilization of knowledge management as firm's core capability. The author developed a conceptual framework employing key dimensions of skills and knowledge such as managerial system, physical system and values and norms, the findings from the studies show that proper implementation of the proposed conceptual frame work can help enhance the sustainable competitive advantage of any firm.	Daghfous (2003)

Table 2.2 Continued

KM enablers/Infrastructure	KM process	Research Objectives/Outcomes	References
Organizational strategy Organizational structure	Knowledge transfer Knowledge utilization	Conducted an empirical study on resource-based viewpoint of knowledge management capability and competitive advantage. The findings based on the analysis of the survey showed that knowledge management capability strongly influence competitive advantage	Chuang (2004)
Organizational strategy Organizational culture	Knowledge utilization	Assessed knowledge management capability for validating a knowledge asset measurement instrument. Based on the confirmatory factor analysis, four knowledge capability areas were conceptualized as latent descriptor variables which provide evidence of the validity of measurement of the knowledge assets.	Freeze and Kulkarni (2005).
Organizational strategy	Knowledge conversion Knowledge utilization	Conducted an empirical study on a contingency model for knowledge management capability and innovation. The findings showed that knowledge characteristics which displayed the highest modularity and explicitness have the potential to improve organizational learning and knowledge integration.	Ju *et al*. (2006)
Organizational strategy Knowledge management strategy	Knowledge storage Knowledge utilization	Investigated the use of knowledge management capabilities to leverage knowledge assets performance to systematically improve firm's process of achieving competitive advantage. The findings revealed that knowledge capabilities such as know-how, instructions learned, policies and measures, data and knowledge documents were vital in defining and evaluating an organizational knowledge asset.	Freeze and Kulkarni (2007)

Table 2.2 Continued

KM enablers/Infrastructure	KM process	Research Objectives/Outcomes	References
People, structure, culture, information technology	Acquiring, converting, using, and transferring	The study examines the structural relationship among various factors of KM value chain/ The KM outcomes are customer performance and financial performance. The study provided strong evidence about the relationships among capabilities, processes, and performance of KM.	Lee and Lee (2007)
Organizational operational capability KM infrastructure Organizational culture	Knowledge utilization Knowledge generation	Investigated the relationship between dynamic capability and operational capability from a knowledge management perspective. The study shows that there is strong correlation between dynamic capability and operational capability from knowledge management perspective.	Cepeda and Vera (2007)
Organizational strategy Knowledge management strategy	Knowledge sharing Knowledge utilization Knowledge transfer	Investigated knowledge management system performance measure index. The knowledge management system conceptual frame work which include key components such as knowledge management strategic, knowledge management plan and the knowledge management implementation where used as performance indicators to assess the knowledge management capabilities of any firm.	Tseng (2008)
Organizational strategy	Knowledge utilization	Applied a fuzzy multiple attributes decision-making approach to investigating the knowledge management capability of organizations. The results of the knowledge management evaluation show that knowledge managers can easily visualise in the matric model and make planning decisions based of the model	Fan *et al.* (2009)

Table 2.2 Continued

KM enablers/Infrastructure	KM process	Research Objectives/Outcomes	References
Organizational strategy Knowledge management strategy	Knowledge sharing Knowledge utilization	Identification of knowledge management capability indicators than can promote knowledge management effectiveness. The outcomes of the findings show that out of the numerous indicators reviewed, resource-based perceptive which consist of technology, structure and culture as well as a knowledge-based perspective which is made up of expertise, learning and information were essential indicators of knowledge management capability that promote knowledge management effectiveness.	Aujirapongpan *et al*. (2010)
Organizational structure Knowledge management strategy Organizational culture	Knowledge utilization Knowledge sharing	Investigated the linkage between supply chain management and knowledge management capability towards firm performance. The results revealed that the implementation of supply chain management practices often interact with knowledge management capabilities towards improving firm performance.	Wong and Wong, (2011)
Organizational culture KM strategy	Knowledge sharing Knowledge utilization	Investigated knowledge management capabilities framework for assessing organizational performance. The results show that there was strong correlation between knowledge management capabilities and organizational performance.	Zaied (2012)
Organizational structure Organizational culture	Knowledge generation Knowledge utilization	Investigated the evolution of knowledge management capability in construction company. The findings of the study revealed the feasibility of visualizing knowledge management capability of firms in correlation with the operating environment of such firm.	Chen and Fong (2013)

Table 2.2 Continued

KM enablers/Infrastructure	KM process	Research Objectives/Outcomes	References
Organizational culture	Knowledge utilization Knowledge sharing	Conducted a study on the consequence of knowledge management capability and dynamic environment on organizational performance. Based on the authors' findings, dynamic capability was perceived as important organizational mechanisms for converting knowledge management capability to an improved performance and competitive advantage.	Tseng and Lee (2014)
Organizational culture Organizational structure KM strategy	Knowledge utilization Knowledge sharing	Investigated the correlation between knowledge management capability, customer relationship management and service quality. The findings show that customer relationship management and service quality positively influenced by knowledge management capability	Tseng (2016)
Organizational culture Organizational structure KM strategy	Knowledge utilization Knowledge sharing	Application of universalistic, contingency and complementarity tests to investigate the correlation between knowledge management capabilities and firm performance. Based on the complementarity test, the authors find out that codification and human capital knowledge management capabilities strongly influence customer service outcomes.	Cohen and Olsen (2015)

Table 2.2 Continued

KM enablers/Infrastructure	KM process	Research Objectives/Outcomes	References
Organizational culture Organizational structure KM strategy	Knowledge utilization Knowledge sharing	Application of universalistic, contingency and complementarity tests to investigate the correlation between knowledge management capabilities and firm performance. Based on the complementarity test, the authors find out that codification and human capital knowledge management capabilities strongly influence customer service outcomes.	Cohen and Olsen (2015)
Organizational culture Organizational structure IT People	Knowledge acquisition Knowledge conversion Knowledge application Knowledge protection Knowledge storing	Investigated the relationship between knowledge management infrastructure capabilities and knowledge management process capabilities in Bahrain supreme council for women. The result shows a robust connection between knowledge management infrastructure capability and knowledge management process capability.	Shajera and Ahmed (2015)
Organizational culture Organizational structure KM strategy	Knowledge utilization Knowledge sharing	Investigated the correlation between knowledge management capability, customer relationship management and service quality. The findings show that customer relationship management and service quality positively influenced by knowledge management capability	Tseng (2016)

2.3 University Accounting Practice in Malaysia

2.3.1 Public University in Malaysia

The University as a citadel of higher learning performs a noteworthy role in producing the man-power requirements of any nation (Dowding, 2014). The University as a setting for instructing students in all branches of learning, awards degrees in different disciplines taught within the faculties and colleges of such university. The primary objective of the University as the highest level of education are to train competent manpower that will help in formulation, planning, managing and running the developmental programmes of the country as well as engaging in research in order to facilitate solutions to societal problems (Mintrom, 2008; Kallio, Kallio, Tienari, and Hyvönen, 2016).

A typical University in Malaysia is made up of the students which can either be undergraduate or postgraduate, academic staffs and the non-academic staffs which can be grouped into, the administrative staffs and the laboratories staffs (Ismail, 2008; Hasan, Komoo, Nazli, and Nor, 2017). The general policies governing the day-to-day running of the University are formulated by the University council while the Vice Chancellor who report to the university Council is the Chief Executive Officer who ensures the smooth functioning of the University. The Vice Chancellor work together with the other principal officers such as the deputy Vice Chancellors, the Registrar, the Librarian and the Bursar as well as the deans and directors of the faculties and centre of excellence to ensure smooth administration of the University. The Vice Chancellor is usually assisted in the administration of the university through the administrative staffs who either report to the Registrar or the Bursars. The functions of the administrative personnel are to ensure an enabling environment for the students and academic staffs that facilitate the transferring and acquisition of knowledge (Yap, 2010; Ghaffari, Burgoyne, Shah, and Nazri, 2017). The Bursars are heads of functions of universities popularly called ‘the Bursary’ or ‘Bendahari’ in Bahasa Melayu but in this study, is referred to as accounting functions of universities. The Accounting functions as part of the strategic components of the University have the overall unique responsibilities for managing funds and finances of the University. This function is the emphasis of this study as it enforces and embodies institutional accounting practices, and hence, discussed in detail in the next section.

2.3.2 University Accounting Function

Accounting function, for the purpose of this study, is a department within a university that handles the financial part of the institution typified with traditional accounting process of identifying, measuring, recording and communicating monetary events in every accounting cycle (Carlon *et al*., 2009). Identification means recognising all transactions which affects the university. Transactions are the basic inputs into the university accounting system; measuring and quantifying data in monetary terms; recording involves analysing, documenting, classifying and summarizing the institutions transactions; and finally, the preparation, analysing and interpretation of the accounting reports for potential users of the accounting information. An accounting unit plays significant role in the smooth functioning of the University and without it, no institution can survive.

An accounting function of a University is responsible for providing timely and accurate financial information, and services to allow for effective and efficient management and control of the university. It is usually formed in accordance to the establishment of the University and embodies its accounting practices. In addition, this function calls for maximizing wealth through financial and non-financial resources. The performance of this function is tied to actualizing its vision, mission and objectives. One of the primary objectives for instituting this strategic function is to generate income and provide enough financial resources to fund University management and development. In addition, an accounting function offers business advice to faculties, departments and other units of the university and processes student's tuition and accommodation fees. Among the core university functions, accounting function is distinct from the others as it is acknowledged as a function that is compulsory for the strategic direction, organizing and controlling the use of funds employed in the university processes by other university functions (Hui, Siu and Ching, 2013).

The bursar is the professional financial and management accountant in charge of the function. The function can administrate and manage the financial affairs of the university through different sub-divisions which varies depending on the perceived need of the university bursar. These divisions are not limited to but include investment division (responsible for managing all investments made by the university), payment and expenditure divisions (processes all payments for the university), student financial

management division (provides financial services relating to fees, sponsorship and others), cash management division (responsible for managing the cash inflows and outflows), risk management and compliance division (responsible for identifying, analysing and mitigating the financial risk secured and also ensures that all the financial procedures are in accordance with university rules and regulations), account division (is responsible for the preparation of financial and management accounts to the University), and budgeting and staff financial management division (is responsible for the process of preparing, distributing and controlling the university budget, processing the staff loan, managing university payroll etc). It is worthy to note that all the divisions in an accounting function of a university are parts of its system and operate in accordance with the prescribed laws, policies, standards, rule and regulations governing the university. In addition, have different but interlinked knowledge requirement to complete their various divisional task. The reason is that departments or divisions act as knowledge silos in knowledge intensive institutions according to Lindner and Wald (2011). Figure 2.2 reveal the position of accounting functions in universities along with their respective functional knowledge requirements.

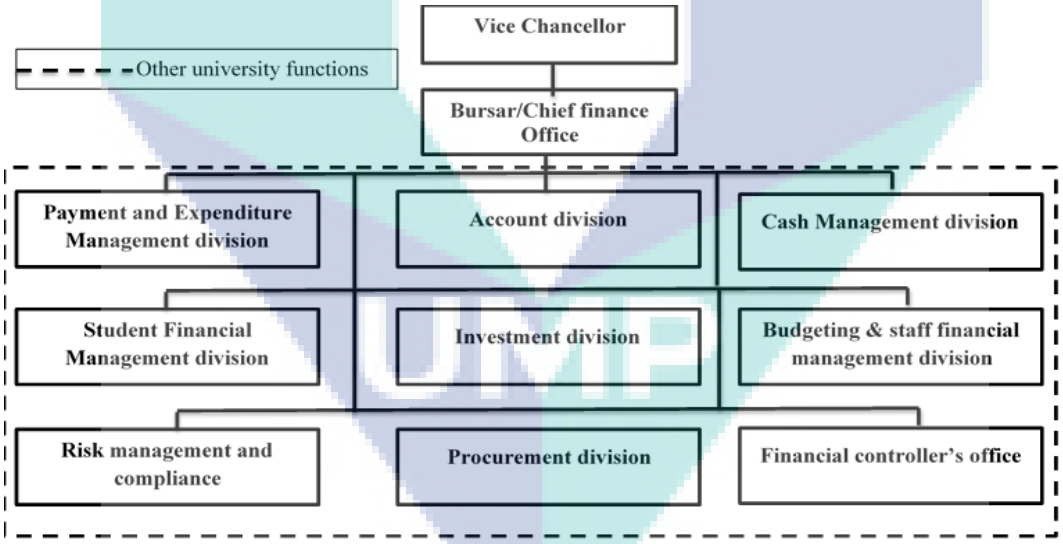

Figure 2. 2 Chart showing the position of accounting function in the university

The accounting system of a university (manual, partially or fully automated) is a particular way in which accounting function of a university records and reports the university financial information (Strumickas and Valanciene, 2010; Haruna, Makama, and Ripiye, 2015). This system can be linked to the central processing unit (CPU) of a

computer as it ensure that all the university accounting data, information and knowledge of resources entrusted to an accounting function are properly managed, efficiently disseminated and reuse for decision- making (Yip *et al*., 2015). According to Cortesi, Tettamanzi, Scaccabarozzi, Spertini, and Castoldi (2015), it is the financial repetitive system starting with recording business transactions, keeping track of expenses and revenues, and leading up to the creation of useful financial information in accordance to the institution' resources provider and standard prescribed formats. The accounting system of an accounting function is an important part of the university structure it is embedded according to Al-Hiyari *et al*. (2013). Invariably, the precise characteristics of such accounting system will reflect the KM features that will be integrated in universities in Malaysia. Meanwhile, KM are embedded using existing structures, cultures, processes, people, and technology as indicated in Pandey and Dutta (2013). These existing mechanisms are what Gold *et al*. (2001) grouped as KM infrastructure and process capabilities, furthermore referred to as preconditions for KM success. However, there is dearth of empirical evidence that ascertain if these knowledge based structures are obtainable in accounting functions of Universities. Moreover, the nature of knowledge required to get task done in such functions are also important consideration in any KM matter as Mclver (2013) argued. Hence, the nature of accounting knowledge and the facilitators of an accounting system designed to fit into the task specificities are discussed starting from nature of accounting knowledge. This is to inform practice the existing similar mechanisms for KM examinations purpose in this study.

2.3.3 Nature of University Accounting Knowledge

Accounting knowledge begins as unprocessed facts and numbers usually called accounting data. Accounting data can be further manipulated in a prescribed way to achieve desired outcome according to Lee (2009). Similarly, as stated in Davenport and Prusak (1995), accounting data only describes a part of what happened and provides neither judgement nor interpretation. However, it is relevant to university accounting practice as it is indispensable in university accounting information creation. Information created by accountant pertains to mainly economic activities of an institution but excludes the context of applicability to the receiver. It is a set of readily captured transactions in documents or in databases. This captured transaction information emanates from embedded skills in accountant and very key to management for planning,

controlling and decision-making. It is only when such information is blended with judgement, capability, understanding and experience, it turns into a complete useful knowledge (i.e. what we know) (Liu and Abdalla, 2013).

Knowledge is information put into innovative use, enabling correct action. Information is converted into accounting knowledge through a social process of shared understanding and sense making at the personal, functional, organizational and discipline level (Holtshouse, 2013).This information is an explicit aspect of the two dimensions of knowledge- tacit and explicit stipulated in Nonaka *et al*. (2000). But often emphasized and accounted for in accounting practice is the explicit aspect which is less difficult to codify. Meanwhile, without the tacit dimension there will be no explicit dimension as both are interwoven. That is why this study characterizes knowledge in accounting knowledge to be highly subjective (tacit) and difficult to codify and highly objective (explicit). From literatures, knowledge that is both objectively and subjectively contextualized can be shared with others and accounted for. On this premise, all accounting knowledge even that of an accounting function of a university if contextualized can be shared and accounted for also.

Accounting knowledge in the perspective of this study denotes specifically to knowledge that is embedded in an accounting function of a university. This accounting knowledge is a tactical weapon that precedes boost in income generation of a university if harnessed. It is both financial (tacit and explicit) and non-financial (tacit and explicit) in nature as shown in Figure 2.3. Financial knowledge means having the skills to successfully manage monetary resources (tax knowledge, transaction knowledge) while non-financial knowledge requires the knowledge or skills to manage resources that are not quantifiable in money terms (relational capital, culture, norms, technical). It is worthy to note that although there is slight clear cut between financial and non-financial accounting knowledge, both are interwoven in nature. Financial and non-financial accounting knowledge comprises analytical skills, know-how, experience, dynamic capabilities, best practices, social intelligence skills, collaborative skills, resource management skills and contextual information that are embedded in the function. In addition, financial and non- financial knowledge of an accounting function of a university can be created, transferred, reconstructed and assimilated by the receiver when processed. But López-Nicolás and Meroño-Cerdán (2011) and several other scholars

argued that the sheer act of possessing knowledge itself does not certify strategic gain but rather its management. As stated in Holtshouse (2013), managing accounting knowledge is decisively and qualitatively different from managing accounting information. Moreover, knowledge management is yet to occur in a structured format in most accounting functions as they only established mechanism for data and information management. Besides, the nature of knowledge needed to get task done in a context is fundamental to the kind of satisfaction derived from KM and the type of KM that is embedded (Mclver 2013). Logically, task do not get just done in accounting domains without the aid of some crucial factors facilitating accounting process to get the functional task done. It is important to recall that KM initiatives are often embedded through conventional mediums. Thus, key elements of an accounting function that serves as accounting task processes facilitators becomes very important in this study and are discussed in the next section. The Figure 2.3 depicts the major components of knowledge in an accounting function of a university:

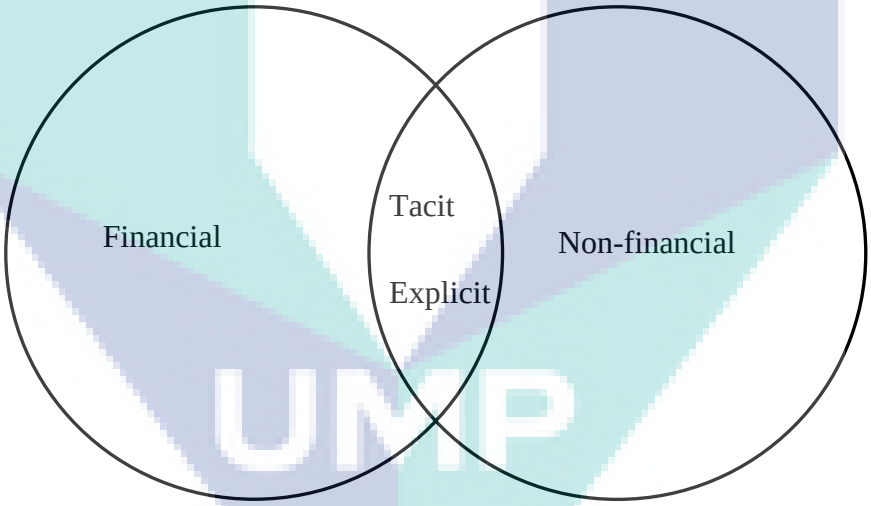

Figure 2. 3 Knowledge in accounting function of a university

2.3.4 Key Elements of University Accounting Practice

In a university setting, Key elements are responsible for the good functioning of an accounting function of a university. According to Broadbent and Guthrie (1992), and Zhu (2017) they are the contextual elements which are often neglected but responsible for the normal function activities. Similarly, Andreeva and Kianto (2012) opined that they are information processes and other accounting practices which naturally exist to

boost the resourceful and effectual management of information for the university gain. These main key elements of an accounting unit of a university are data, internal controls, accounting procedures, stakeholders, the established accounting process, functional context, technology, the bursar and other unit staffs. Accounting data are the basic inputs into the accounting unit (Kurniawati, Kurniawan, and Kristiani, 2013; Werner, 2017) and the essence of accounting practice. They are the universities financial transactions that can be processed by the accounting system. The internal controls are measures put in place to ensure that all account staff performs their task ethically and honestly. The university internal audit and unit control procedures are part of the internal controls. Accounting procedures are the mechanisms for processing and compiling financial information in accordance with the budgetary provisions and for reporting purposes for instance accounting standards e.g. financial policies. Accounting standards are pronouncements made by professional accounting bodies specifying how transactions and other events are to be recognized, measured, presented and disclosed in various financial reports (Bhatt, 2001; Florou, Kosi, and Pope, 2017). The function context is the environment in which it operates its activities and to an extent determines how the accounting function information flow is structured (Willem and Buelens, 2009). For example, the function culture, structure, level of existing relationships between the staffs and stakeholders influence and so on. The accounting function staffs are the employees working in the unit. It is only through their expertise that accounting unit can make clear operating decisions. Even the accounting software still requires knowledgeable staff members to use it. Technology comprises of hardware and software aspect of a computer. It supports the automation of the accounting system. Technology help to streamline the accounting process while efficiently storing financial information for the university (Nordin *et al*., 2012; Taiwo, 2016). It is worthy to note here that these key elements are what determine the performances of the function in the university. For this research, these aforementioned key elements of an accounting function of a university are grouped majorly into infrastructure and process. This is because the other key elements apart from the accounting process are similar to the infrastructure capability elements in KM literature. As KM also involves process, the accounting process is further elaborated in the next section to extricate the possible similar sub-dimensions.

2.3.5 Accounting Process as Key Element of an Accounting Function of a University

A typical conventional accounting process of any institution entails recording, classifying and summarizing of institutional transactions (Bonollo, Lazzini, and Zuccardi Merli, 2016). In some institutions like the universities, their accounting functions comprises of different interconnected divisions. Each of the division has a traditional procedure of documentation, evaluation and communication of university monetary information comprising interrelated phases. These phases are considered traditional because they are a holdover from when accounting and book keeping was a manual process. But present advancement in technology characterized with sophisticated accounting software has made many of these processes obsolete and changed the way accounting information is managed Lukka (2010). Nevertheless, this is discussed in conceptualization section in detail to avoid unnecessary repetitions. Figure 2.4 portrays the traditional accounting process and key elements of an accounting function of the university derived from this section.

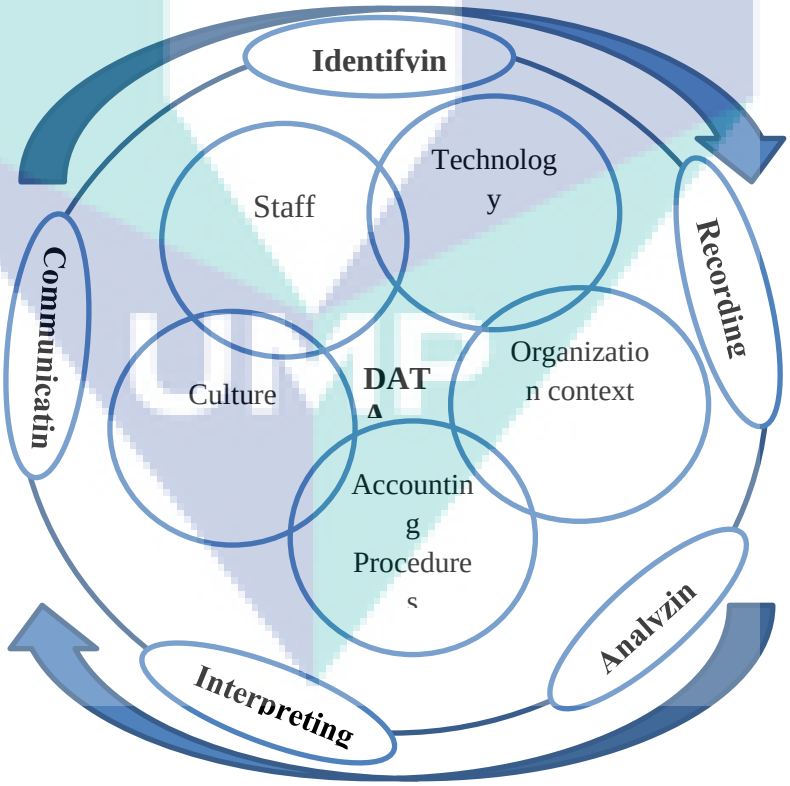

Figure 2. 4 Schematic representation of accounting unit system function with key components

2.4 Universities and KM Applications

2.4.1 Universities in Malaysia and KM Application

In recent time, public universities in Malaysia are faced with challenges such as the decline in governmental support, stringent government policies on key performance index (KPI), internationalization of public universities and so on. To survive these challenges, it has been proposed that the public universities in Malaysia need to adopt a comprehensive and systematic knowledge perspective. In view of this, authors like Abdullah *et al*. (2008) and Mohayidin, Azirawani, Kamaruddin, and Idawati, (2007) investigated the level of KM practices and KM system implementation in the universities in Malaysia. Prior to the work of Mohayidin *et al*. (2007), few published articles which mainly focused on knowledge sharing in the universities in Malaysia have evolved (Kishore, Manjit, and Gurvin, 2007; Suhaimee, Abu Bakar, and Alias, 2006). It was not until 2007, Mohayidin and co-worker emperically investigated the level of KM practices among academic staffs in the public universities in Malaysia using questionnaire-based survey method. Besides investigating the level of KM practices, the authors also emperically investigated the factors which influences effectiveness of KM practices among individuals, faculties and the universities. The questionnaire which was analyzed using multiple regression revealed that KM was routinely practiced among the academic staff in the universities. Although, the result of the factor analysis indicates that info-structure support, infrastructure capacity, info-culture, knowledge acquisition, knowledge generation, knowledge storage and knowledge sissemination were the most important factors that shaped KM initiatives.

However, the implementatio of KM throughtout the universities investigated was most influenced by social-technical factor (info-structure) supported by the university's top management. Since the work of Mohayidin *et al*. (2007) focused on public university, it is not certain if the level of KM practice will be similar to that of private universities in Malaysia. This was the focus of Ramachandran and Chong (2010) who carried out a comparative study on the practice of KM in public and private universities in Malaysia. Just like what was obtained in the public universities in Malaysia as reported by Mohayidin *et al*. (2007), the findings of Ramachandran and Chong (2010) revealed that KM processes are moderately practiced in private universities in Malaysia. Nevertheless, from the perspective of knowledge dissemination and creation, the public

universities were significantly different from the private universities. This could be attributed to the fact that public universities have more manpower and IT support for knowledge dissemination and creation compared to the private universities (Mohayidin *et al*., 2007). In a further study Ramachandran, Chong, and Wong (2013), identified that a gap exist between KM practices and key strategic enablers in the HEI in Malaysia. The author recommended that such gaps should be closed for the successful implementation of KM processes in HEI in Malaysia.

Contrary to the work of Mohayidin *et al*. (2007) and Ramachandran and Chong (2010), Abdullah *et al*. (2008) in their study determned the level of acceptance and implementation of KM system framework in selected public and private universities in Malaysia. Unlike, Mohayidin et al. (2007) who have their respondents mainly from the academic staffs of the universities, the respondents used by Abdullah *et al*. (2008) for their study include the academic staffs, and non-academic staffs. The findings from the study based on the hypotheses testing revealed that KM system implementation in the selected universities was accepted. However, there was lack of awareness of current KM system implementation in the universities. The study did not show the extent of KM system awareness in each of the function comprising the universities. Even the reasons for lack of it awareness in accounting functions of those universities due to the nature of their unique accounting systems were not elaborated on. Moreover, key components of the KM system such as infrastructure, security system, technology, and data repository were not clearly defined in the study. While Mohayidin et al. (2007) clearly state the factors that influence KM practice in the university, it was unknown in the work of Abdullah *et al*. (2008) the possibles factors responsible for lack of awareness of KM system framework in the selected universities investigated.

In furtherance to the work of Abdullah *et al*. (2008), Ahmad, Madhoushi, and Yusof (2011) investigated the dominant success factors for KM in academic institution. The conceptual KM model based on structural equation modelling was developed to enhance better identifications of KM successes from the general institution perspective studied. The study did not however look into the specific university functions viewpoint also. Thus, the dominant factors to successful KM implementations in accounting functions of universities remains unclear in the study. Also, whether the perspective of the study will be suitable for KM investigation in all the functions present in the

institution was not stated. Complementing the work of Abdullah *et al*. (2008), and Ahmad, Madhoushi, and Yusof (2011), Al-Sulami *et al*. (2014) examined the role of information technology in implementing KM processes in HEI in Malaysia. The findings from the study show that the implementation of KM processes in HEI in Malaysia was significantly influences by weak information technological infrastructure. Although the study utilizes functional approach, one is in a handicapped situation to determine if weak IT accounting infrastructure for the accounting function of the university is a barrier to its KM process implementation. Besides, Panigrahi, Zainuddin, and Azizan (2014) reported that knowledge quality, system quality, and service quality were the key determinants for the successful implementation of KM processes in HEI in Malaysia using user's satisfaction as mediating factor. The study could not prove how particular institution function user's satisfaction plays a mediating effect between key determinant factor and KM system successes.

Overall, there is a level of awareness of KM practice among different categories of staffs in the HEIs in Malaysia even though full awareness cannot be guaranteed (Mohayidin *et al*. 2007; Abdullah *et al*. 2008). Several factors such as info-structure support, infrastructure capacity, info-culture, and knowledge acquisition, generation, storage and dissemination have been reported to shaped KM initiatives in HEIs in Malaysia (Ramachandran and Chong, 2010; Ramachandran, Chong, and Wong, 2013). Besides, the reasons for lack of awareness of KM implementation in accounting functions of the universities investigated due to the nature of their unique accounting systems was not elaborated on. Importantly, none of these studies has established the extent of KM system awareness in each of the function comprising the universities, most especially institutional accounting function (Al-Sulami, Rashid, and Ali, 2014; Panigrahi, Zainuddin, and Azizan, 2014). Although, the studies on university KM in Malaysia have advanced our understanding of the nature of relationship between KM dimensions and institutional performance. However, more research is still needed to enquire into why the determinants of KM impacts institutional performance via institutional accounting functions. The reason is that there is broad recognition of the importance of institutional accounting functions mediating roles in literature (Appelbaum, Kogan, Vasarhelyi, and Yan, 2017). As existing research framework on university KM in Malaysia, lacks how accounting context effectiveness can act as an intervening mechanism between KM

capability and institutional performance, university KM outside Malaysia is examined for richer insight.

Table 2. 3 A summary of literatures on KM applications to different component of universities in Malaysia

Higher Education Institution (HEI)	Component of the HEI	Study method	Objectives/Outcomes	References
Public and Private Universities	Academic and Non-Academic staffs	A questionnaire-based survey method	Investigated the key determinant for success of KM system in HEI in Malaysia/The findings show that user's satisfaction plays a mediating effect between key determinant factor and KMS successes	Panigrahi, Zainuddin, and Azizan (2014)
Private University	Technical staffs	A questionnaire and interview-based survey method	Investigated the role of information technology in implementing KM processes in HEI/The findings showed that weak IT infrastructure lead to weak implementation of KM processes	Al-Sulami, Rashid, and Ali (2014)
Public universities	Academic staffs	A questionnaire and interview-based survey method	Investigated the gaps between KM and key strategic enablers in public universities/The study revealed that KM practices and key strategic enablers are important.	Ramachandran, Chong, and Wong (2013)
Public universities	Top management staff	Literature review	The study investigates the dominant success factors affecting KM practice in HEI/A KM model that identified KM common successes factors for HEI was proposed	Ahmad, Madhoushi, and Yusof (2011)

Table 2.3 Continued

Higher Education Institution (HEI)	Component of the HEI	Study method	Objectives/Outcomes	References
Public and Private Universities	Academic staffs	A questionnaire based survey	The study investigated and compared the practices of KM processes between public university and private higher education institutions in Malaysia.	Ramachandran and Chong, (2010)
Public Universities	Academic staffs, non-academic staffs and students	Empirical study based on literature analysis and field survey	Investigates the implementation of Knowledge management system (KMS) in Public institution of higher learning/The study shows that there was lacking of awareness to the implementation of KMS	Abdullah, Selamat, Jaafar, Abdullah, and Sura (2008)
Public university and one private	Academic staffs	A questionnaire based survey	The main objective of the study was to evaluate the level of KM practice among academicians in the University and to determine the factors that contributed to the effectiveness of KM practices at individual, faculty and university level. The result revealed that info-structure support, infrastructure capacity, info-culture, and knowledge acquisition, generation, storage and dissemination were the important factors that shaped KM initiatives.	Mohayidin *et al.* (2007)

2.4.2 Universities outside Malaysia and KM Application

In comparison to what is obtainable in HEIs in Malaysia, studies on KM applications in HEIs outside Malaysia has been widely reported as summarized in Table 2.4. These studies cover theme such as, factors that hinders or promote knowledge creation in HEI, relationship between KM and employee engagement in HEI, factors that influence the successful implementation of KM in HEI, library perception of KM in HEI, relationship between university culture and KM concept, and creation of KM awareness among top management staff of the university.

While KM is gradually being accepted globally as a tool to position the HEI as a competitive citadel of learning and centre of excellence in research, studies have shown that KM seems not to have had much impact on the higher education sector of some country such as Sudan even though there is evidence of involvement in KM practices (Amin, 2006). In their studies, Amin (2006) and Tian, Nakamori, and Wierzbicki, (2009) itemized some facilities such as libraries, electronic collections of learning materials. Information and communication technology, organizational variables and knowledge creation processes to have direct influence on the successful implementation of KM in HEI. In additional to the factors that promotes the implementation of KM in HEI, Tian, Nakamori, and Wierzbicki (2009) opined that not prioritizing factors such as technological support, the people involved in knowledge creation and laboratory culture could act as major obstacles in the implementation of KM in HEI. It is worthy to mention that both the work of Amin (2006) and Tian, Nakamori, and Wierzbicki (2009) mainly focused on academic researchers overlooking university functional practice. Thus, the possible barrier and factors to KM implementations in non-academic part of the university could not be substantiated from the work. Besides, though in a public university context, the study is outside Malaysia. Moreover, their work did not also consider accounting functions factors (culture, processes) as core part of HEI which might make them specifically not predisposed to KM strategies. Their work neither took the functional view point to reach the conclusion on factors that influenced the successful implementation of KM processes in HEIs.

Most of the studies prior to 2010 focused on the KM practices among the academic and non-academic staffs without also considering the top management staffs. This gap was filled by Adhikari (2010) who investigated how KM awareness can be

created among top management staffs of HEIs in Nepal. Utilizing conceptual and descriptive approach, the study proposed a concept of knowledge among top university management to enlightening them about the importance of KM in achieving quality education in the country. To achieve quality in education, the knowledge embedded in all the functions making up the university should be emphasized. Although the study extends the gap in KM applications to academic top management staffs in HEI however did not buttress the knowledge importance of quality service among non-academic top management especially that of the university bursar. The university bursars as heads of accounting functions in a university occupy strategic positions because their knowledge is crucial to the sustaining of universities financial competitive advantages in this age. In addition, the knowledge embedded in accounting functions contribute immensely to achieving quality education in any university. Narrowing down KM application to functional part of universities, Nazim *et al*. (2011) explored the perceptions of library professional towards KM in Indian HEIs. The findings showed that KM is well known to the academic library professionals but however has various degree of understanding of KM concepts. Although the study delves into a specific functional aspect of the university, the KM perceptions of other professionals as integral part of institutions of higher learning were not scrutinized. Consequently, whether professional accountants in university practice are well informed of KM cannot be verified from the study. The same goes for Mavodza and Ngulube (2012) who probed the existence of KM principles and practices put in place in HEIs. The findings also failed to show the extent of KM concepts understanding among the specific functions in the higher institutional of learning studied.

Meanwhile, Siadat *et al*. (2015) inquired into the effects of some factors on the successful implementation of KM in a public university in Iran. The findings showed that factors such as management, organization and culture strongly influenced implementation of KM in Iranian public university. The study did not however consider the accounting function of the public university since its distinctive information practices also characterized by management and culture might prevent it from successful KM implementation. In line with Siadat *et al*. (2015), Ramjeawon and Rowley, (2017) identified KM enablers such as qualified and experienced academic staff in public HEIs, IT infrastructure, digital library and some incentives for knowledge creation and transfer were identified. Nevertheless, whether these enablers can influence successful

implementation of KM at the university functional unit such as the accounting function cannot be ascertained from the study. Similarly, considering the relationship between KM and employee empowerment in HEI in Iran, Hasani and Sheikhesmaeili (2016) revealed that there was significant relationship between employee empowerment and KM, but failed to report on the KM employee implication for each of the functions making up the university. As a result, making decision on the potential impact of KM on each of the distinct functions, especially accounting function of universities will be difficult. Thus, functional perspective of KM is also good to know as it might have different outcome.

Based on the findings of the different authors the following can be deduced regarding the application of KM in the universities: there was significant relationship between employee empowerment and KM; attitudes and subjective norms of the non-academic staffs mostly affected KM practice in the university; management, organization and culture strongly influenced implementation of KM in public university; weak IT infrastructure lead to weak implementation of KM processes; obstacles to KM implementation reflects on various aspect such as technological support, the people involved in knowledge creation and laboratory culture.

The implementation of KM in the university has been reported to be beneficial in several ways. One of such ways is in the curriculum development (Agrawal et al., 2009). The university as knowledge-based organization is constantly engaged in creating, collection, repackaging, and transferring of knowledge. Since 21st century is a knowledge driven economic powered by advancement in ICT, it is expedient for the university to develop a curriculum that offers a good balance between needed job skills that will prepare the students for the job market. The development of course content in the light of KM will enhance the creation of culture of collaboration instead of unhealthy competitiveness. The ease at which knowledge is accessed and shared within the university will enhance cooperation, creativity, mutual respect and competitive advantage. In addition, according to Bakar, Virgiyanti, Tufail, and Yusof (2015), managing knowledge to achieve organizational performance is not only important for private universities, but it is significant for the public universities as well. But often emphasized in past studies is the knowledge management implication for a whole institution without explaining its implication for each of the functions that makes up the

institution which might have different contextual implication. In addition, find it difficult to transform through needed KM programs.

Interestingly, in the last ten years, extensive studies have been conducted on the implementation of KM strategies to improve service (teaching and research) deliveries in the universities within and outside Malaysia (Mills and Smith, 2011). The studies which include both private and public universities mainly focused on the students, academic and non-academic staffs of the university. While some of the authors investigated KM at a higher level (Lee and Lee, 2007), others examined it at individual levels (Mills and Smith, 2011). The research methods adopted in these studies as summarized in Table 2.3 and 2.4 includes, descriptive correlation, questionnaire-based survey method, conceptual study based on qualitative approach, empirical study based on literature analysis and field survey and mixed method. Despite all the growing interest in universities KM initiatives around the world, most of prior studies may be due to oversight or fear that KM might fail to thrive in accounting practice, are yet to investigate KM in accounting functions of universities. Besides, most literatures focused primarily on the academics with less considerations for accounting functions whose innovativeness in universities resources management is needed in this dispensation. In the next section, gaps associated with prior literatures reviewed are discussed.

Table 2. 4 A summary of literatures on KM applications to different components of universities outside Malaysia

Institution of Higher learning (IHL)	Component of the IHL	Study method	Objectives/Outcomes	References
Public and Private Universities Mauritius	Academics and Researchers	Semi structured interview	The study investigated the factors that hinders or promote knowledge creation, sharing and transfer/ Enablers such as qualified and experienced academic staff in public HEIs, IT infrastructure and library, digital library and some incentives for knowledge creation and transfer were identified.	Ramjeawon and Rowley (2017)
Public and Private Universities in Iran	Academic and Non-Academic staffs	Descriptive correlation	Investigated the relationship between knowledge management and employee empowerment in IHL in Iran/The findings showed that there was significant relationship between employee empowerment and KM	Hasani and Sheikhesmaeili, (2016)
One Public University in Iran	Academic staffs	A questionnaire-based survey method	Investigated the effects of factors on the successful implementation of KM a public university in Iran/The findings showed that factors such as management, organization and culture strongly influenced implementation of KM in Iranian public university	Siadat, Matinvafa, Saeednia, and Moghadasi, (2015)

Table 2.4 Continued

Institution of Higher learning (IHL)	Component of the IHL	Study method	Objectives/Outcomes	References
One Private University in USA	Academic and Non-Academic staffs	Mixed method	Investigated the existence of KM principles and practices in higher institution of learning/The findings showed that KM concepts were not well understood in the higher institutional of learning under studied	Mavodza and Ngulube (2012)
Public Institution of Higher learning in India	Library staffs	Web-based questionnaire survey was employed	Investigated the perceptions of library professional towards knowledge management in Indian institutions of higher learning/The findings showed that KM is well known to the academic library professionals but however has various degree of understanding of KM concepts	Nazim, and Mukherjee (2011)
Public Universities in Slovenia	Academic staffs	A questionnaire-based survey method	The study explored the concept of culture, the concept of knowledge management as well as the correlations among their dimensions at the university level.	(Omerzel, Biloslavo, and Trnavcevic, 2011)

Table 2.4 Continued

Institution of Higher learning (IHL)	Component of the IHL	Study method	Objectives/Outcomes	References
Public Institution of Higher learning in Nepal	Top management staffs	Conceptual and Descriptive approach	Investigated how knowledge management awareness can be created among top management staffs of higher education learning in Nepal/Proposed a concept of knowledge among top university management to enlightening them the importance of KM in achieving quality education	Adhikari (2010)
Universities	MBA students Researchers	A questionnaire based survey	The study examined the relationships between individual capabilities and organizational performance using PLS graph	Mills and Smith, (2011)
One Public University in Japan		Survey and Case study methods	Investigates the application of KM for improving knowledge creation in the academics/The findings showed that obstacles to KM implementation reflects on various aspect such as technological support, the people involved in knowledge creation and laboratory culture	Tian, Nakamori, and Wierzbicki, (2009)
Public Institution of Higher learning in Sudan	Academic staffs	Conceptual study based on qualitative approach	Investigated the application of KM concepts to higher institution of learning in Sudan.	Amin (2006)

2.5 Gaps in literature

From the examined relevant existing literatures, the following gaps were identified:

Outside and inside Malaysia, KM has been implemented in various aspects (non-academic and academic aspects) of the universities outside Malaysia without a specific reference to the accounting functions (Amin, 2006; Kim and Ju, 2008; Tsui *et al*., 2009; Adhikari, 2010; Nazim *et al*., 2011; Mavodza and Ngulube, 2012; Roger *et al*., 2013; Li *et al*., 2014; Siadat *et al*., 2015; Hassani and Sheikhesmaeili, 2016). Similarly, the application of KM to the public universities in Malaysia has also been extensively investigated with focus on the academic staff, non-academic staffs and the library units excluding how KM can be aligned with institutional accounting practices using the generalized perspective (Suhaimee, 2005; Abdullah, 2008; Muda and Yusof, 2015; Rahman *et al*., 2016). Besides, before keying into KM techniques, a strategy phase is often required to evaluate the function present KM practices to create a business case for KM integration from that perspective (Darroch, 2005; Zaied, 2012; Milton and Lambe, 2016). The lack of attention is surprising considering the critical role of university accounting function in creating enabling environment for superior financial performances that lead to competitive advantages. Consequently, there exists a lacuna regarding the condition under which the generalized perspective to KM capabilities can be extended into university accounting practice to avoid the trade-off between the two competing practices. Unlike previous studies both outside and inside Malaysia, this study investigates the similarities between institutional accounting practices and KM practices to inform proper institutional KM design. The similarity capability perspective taken by the study makes it methodologically different from existing literatures.

There are different research frameworks on KM capabilities in literature (Gold *et al*., 2001; Hsieh *et al*., 2002; Lee and Lee 2007; Chuang, 2004; Wong and Wong, 2011; Zaied *et al*., 2012; Chen and Fong 2013; Tseng, 2016). Majority of the authors developed the KM frameworks based on diverse KM related theories though from broad institutional perspectives. As a result, may have overlooked some important variations in the way that distinct kinds of functions activities are structured and coordinated at the function level (Irma Becerra-Fernandez, 2001). Moreover, functional perspective might have different KM implications from the general perspective according to Lindsey

(2002) and Lindner and Wald (2011). Even, Botha *et al*. (2014), emphasized the importance of understanding KM mechanisms at functional level. Distinct from existing works like Mills and Smith (2011) and Tseng (2016), the present research AKM capability framework is built on an integrative institutional accounting functional approach using resource-based theory (RBT). RBT because most of the KM related theories, for instance, dynamic capability theory, emanates from it. The integrative functional perspective taken in this study on university KM, would permit studying the cause and effect relationship between KM and university accounting practices.

In literature, there are diverse research streams on the operationalization of individual and combined KM process and infrastructure capabilities as key KM capabilities. The two major research streams on composed KM capabilities revolve around Gold *et al*. (2001) and Lee and Choi (2003). Due to the different strands of results associated with the different research streams operationalizing both capabilities differently, there is confusion on the best way to exploit KM potentials using these perspectives in university accounting practices. Also, researchers lack clarity on the common ground on which further research can proceed to impact practice and academic. Meanwhile, at a lower level, it can be deduced from the diverse streams that embedded knowledge related culture, structure (Gold *et al*., 2001), technology (Mao *et al*., 2016) and people (Lee and Choi, 2003) are vital individual KM infrastructure capabilities. Likewise, acquisition, conversion, protection, and application are the major individual KM processes capabilities in literature (Mills and Smith, 2011; Rashad *et al*. 2013). Contrary to previous studies, this study integrates the diverse research streams at individual and composed KM capabilities based on a common ground and in relation to accounting practices to inform practice. In this study, accounting knowledge management (AKM) capabilities serve as an overarching concept for synthesized pattern of KM capabilities that are obtainable in accounting practices at lower levels. At higher levels, AKM capabilities are divided into AKM infrastructure capabilities and AKM process capabilities using Resource-based theory (RBT).

The government of Malaysia earmarked KM as one of the fastest ways to enhance the quality of services rendered by the universities in Malaysia. This is premised on past researches that suggested that KM infrastructure and process capabilities have the potential to influences and sustain university performances (Lee *et al*., 2009;

Mohayidin *et al*., 2007, Massaro *et al*., 2015). Meanwhile, in an institutional setting, accounting functions embodies and enforces institutional accounting practices with the aid of their accounting systems put in place. As such, it is crucial for university management to know the potential implications of KM capabilities on the institutional accounting functions. It is important to recall that unlike other functions, accounting functions are not equally predisposed to new initiatives due to the nature of their standardized practices (Alexandra Kanellou and Spathis, 2013). However, among the studies in KM capability literature, most of the scholars did not researched how and why synthesized KM infrastructure and process capability might impact an accounting functional effectiveness (Asma and Abdellatif, 2016; Shajera and Ahmed, 2015). The challenge is that not examining the potential impact of these KM capabilities in university accounting practices before implementation might be counterproductive. Consequently, building on previous studies and unlike them, this study investigates how and why AKM infrastructures and process capabilities, as synthesized perspectives, impacts accounting function effectiveness.

Also, several studies have indicated that there exist direct and indirect relationships between composed KM capability dimensions and overall institutional performance (Lee and Choi, 2003; Lee and Lee, 2007; Mills and Smith, 2011; Chen and Fong, 2013; Mao *et al.*, 2016; Eréndira *et al*., 2017). Although, the works give insight into the underlying direct and indirect relationship, however, how and why the synthesized AKM infrastructure and process capabilities would impact the overall university performance are not well substantiated. As accounting functions perform mainly mediating roles in institutions, whether the impact of KM capabilities on institutional performance is because of accounting function mechanism remain opaque from the reviewed literatures. The challenge with the continued lack of empirical insight into these roles might make university management team based their KM decisions on patchy conclusions. Consequently, there is a need for more investigation into the direct and indirect and mediating mechanisms pertaining to KM capabilities and institutional performance for necessary empirical understanding. Unlike other studies, this study examined the mediating role of accounting functional effectiveness in mediating the relationships between AKM capabilities and overall institutional performance to gain deeper insight into the matter based on resource-based theory (RBT). Furthermore, test

the direct link between accounting functional effectiveness and overall institutional performance based on RBT.

This research is interested in understanding how capabilities add up to translate into outcome from an individual level to the group level. Thus, to fill all the gaps analyzed, the study investigates AKM from its composed capability perspective and their influence on accounting functional effectiveness and overall institutional performance in universities in Malaysia using RBT viewpoint. This, will further help to argue the relevance of KM adoption in accounting functions of universities and inform institutional KM design based on empirical evidence. But before empirical investigation, there is the need to conceptualize the AKM capabilities in this study, both at the lower and higher order level.

2.6 Conceptualization and hypotheses development

Sequel from relevant theories on KM and prior literatures covered, this section deals with the conceptualization and hypotheses development regarding the variables employed in this study. To achieve this, theoretical (relating to existing theories), empirical (past research findings), and logical reasoning are utilized starting with the link between university accounting practice and KM practice.

2.6.1 Similarities between accounting function of a university and KM practice

Based on the reviewed literatures, some major components and activities of an accounting function of a university are like KM in the aspect of infrastructures (enablers) and process. KM is an interdisciplinary discipline involving process wherever people distribute, generate, appraise and join knowledge for its impressive benefits. A typical accounting function of a university also has a process together with key functional elements like data, internal controls, accounting procedures, accounting structure, accounting culture, people (the unit staffs) and technology (Lukka, 2010). These key components of an accounting function of a university as described in section 2.3 and major KM capability components are assumed to be interrelated. The reason is that both fields relies on a foundation of supportive functional or institutional infrastructural elements like culture, structure, people and so on, alongside with processes to overcome barriers to realization of objectives. Thus, reasonable to assume that a relationship between the practices exists.

This relationship perspective though not yet empirically tested, when harnessed, can help to provide a better understanding of where both areas overlap. Importantly, this link serves as an input to the conceptualization of AKM infrastructure and process capability components that are obtainable in an accounting function of a university. It is worthy to mention that this type of relationship between KM and accounting practice has not yet been uncovered within this context and in a country like Malaysia. The reason is that not much attention has been placed in the investigation of KM and accounting practice. The link between KM practice and Accounting function practice is depicted in Figure 2.5 below: Based on the established link (prior research, reasonable assumptions and correlative evidence), the study therefore proposed that similar infrastructure and process dimensions in an accounting practice can serve as defining important aspect of KM in such practice. Some prior studies like Gold *et al*. (2001) subdivided the KM infrastructure capabilities into culture, structure and technical while others for example Chuan (2004) are of the view that infrastructure capabilities can be re grouped into social (culture, structure, people) and technical. However, the combined perspective of authors like Chuan (2004) and Gold *et al*. (2001), different from prior studies is chosen in this study as it is more encompassing and reflects the opinion of the majority on infrastructure capabilities. Besides, not much is known in literature regarding this form of regrouping of KM in this context based on the derived link between institutional accounting practices and KM practices.

The major KM process components considered in this study are acquisition, conversion, application and protection while for KM infrastructure are culture, structure, technology in use and people (T-shaped) skill. The reason why KM process consist of these four sub-dimensions in this study is that the four dimensions are sufficiently broad to permit complete analysis of other KM processes (Rahman *et al*., 2013). It is important to recall that hypothesis is the initial step in developing a theory under quantitative method. As this link can be verified through empirical testing, thus for further empirical evidence, the study therefore hypothesizes that AKM infrastructure capability have these sub-dimensions (culture, structure, technology in use, people(T-shaped) skills) and KM process capability consist of these sub-dimensions (acquisition, conversion, application, and protection) in an accounting practice.

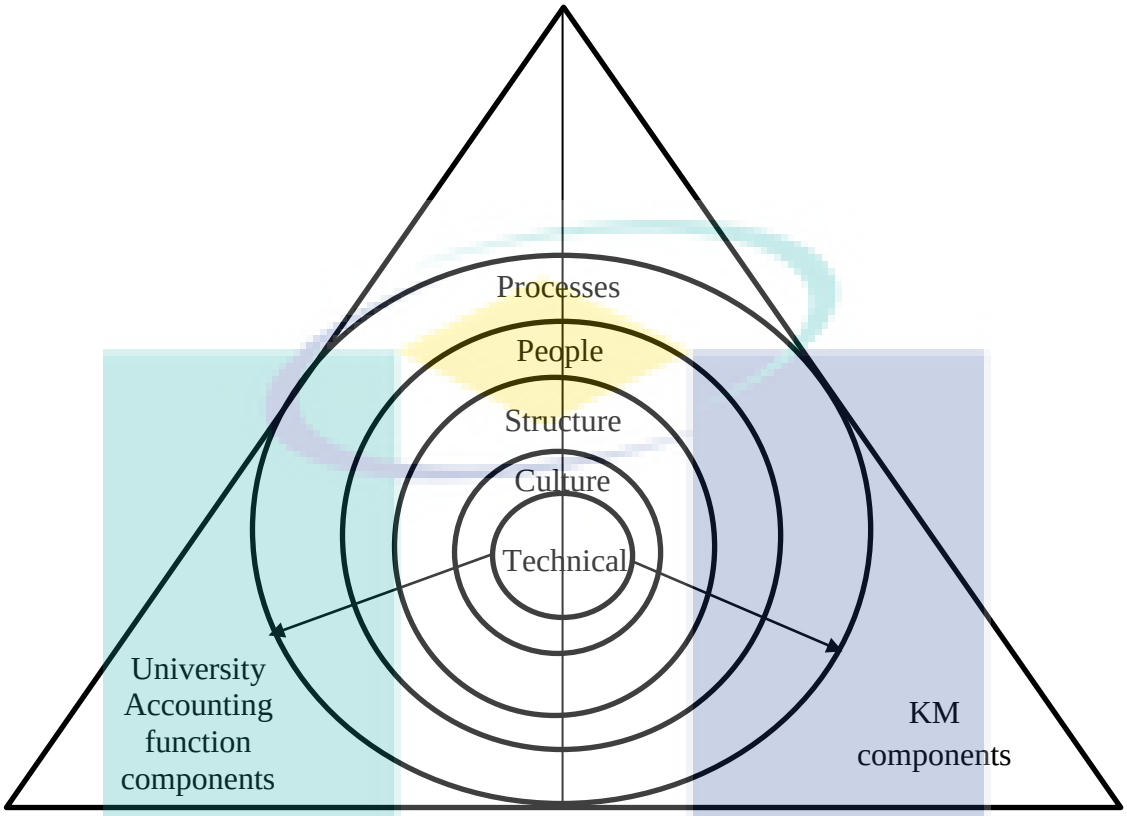

Figure 2. 5 Similarities between Accounting function of a university and KM components

2.6.2 Resource Based Theory (RBT) and Hypotheses development

Accounting knowledge management infrastructure capabilities (AKMI) and accounting knowledge management process capabilities (AKMP)

In literature, there is no agreement on how many elements a knowledge infrastructure should consist of as there are diverse research streams pertaining to KM capabilities which have been developed by scholars like Gold *et al*. (2001) and Lee and Choi (2003) in literature. This study emphasizes the integration of the different major research streams on overall KM infrastructure and process capabilities using RBT as it is interested in understanding relationships between constructs at higher levels. One of the major reason is that accounting functions of universities possesses and develop skills along both accounting infrastructure and accounting processes drawing from the key element earlier discussed. The theory drawn upon in the conceptualization of AKM elements and their proposed relationships in the study is built on resource-based theories (RBT). It is believed that as an overarching theory (see section 2.2.3.2), RBT will help to

conceptualize and explain the nature of relationship between the independent and dependent variables in this study.

Indicated in Chuan (2004), RBT suggests that firms can and do differentiate themselves based on their resources and that these resources relate to one another. As the theory state that institutions are embedded with bundle of resource capabilities that can be restructured or differentiated even though are heterogeneous in nature, it is expected that the key drivers of KM process and infrastructure capabilities in an accounting practice should be multifaceted and modeled as such. Multifaceted is synonymous with multidimensional which entails constructs having more than one dimension according to Edwards (2001) and Becker, Klein, and Wetzels (2012). So, the key AKM capability components of an accounting function of a university are accounting knowledge management (AKM) infrastructure capability and AKM process capability with both conceptualized as higher order constructs (HOCs). HOCs means constructs that are explicit representations of multidimensional constructs that exist at a higher level of abstraction and are related to other constructs (LOCs) at a similar level of abstractions (Becker *et al*., 2012). Unlike prior studies, the study uses HOC and LOCs to enhance the understanding of how individual capabilities that are synonymous with institutional accounting practice contribute to forming overall capabilities and how such composed capabilities translate to outcome at the main level. Besides, the conceptualization of AKM process and infrastructure capabilities in this study is synonymous with renowned prior literatures like Gold *et al.* (2001) who indicated that a higher-order construct provides the best empirical model for KM infrastructure and process capabilities perspectives. Based on the arguments and discussion above, the following hypotheses:

H1 AKMI is a higher order construct made up of accounting structure (SIE), accounting culture (CIE), accounting technology in use (TIE), and accounting people (or T-shaped skills) (PIE) as lower order construct (LOCs).

However, it is possible that some of the individual capabilities summed up as AKM infrastructure capabilities may not contribute to forming the construct at higher order levels. Hence, there is need for additional hypotheses to test the relationship between the LOCs and HOC. The sub hypotheses are:

H1a TIE is positively related to AKMI.

H1b SIE is positively related to AKMI.

H1c CIE is positively related to AKMI.

H1d PIE is positively related to AKMI.

H2. AKMP is a higher order construct consisting accounting acquisition process (ACPE), accounting conversion process (CPE), accounting application process (APPE), and accounting protection process (PPE).

As this study is exploratory, it is possible that some of the individual capabilities summed up as AKM process capabilities may not contribute to forming the construct at higher order levels (Creswell 2014). Hence, there is need for additional hypotheses to test the relationship between the LOCs and HOC. The sub hypotheses are:

H2a ACPE is positively related to AKMP.

H2b CPE is positively related to AKMP.

H2c APPE is positively related to AKMP.

H2d PPE is positively related to AKMP.

Accounting knowledge management infrastructure capabilities (AKMI), Accounting knowledge management infrastructure capabilities (AKMI) and accounting function effectiveness (FE)

There is no conclusive research evidence on the relationships between KM capabilities and institutional outcomes. However, past empirical works outside this context suggest that KM capabilities are major determinants of institutional performance and positively influences same (Darroch, 2005; Tseng, 2014; Zoogah, Peng, and Woldu, 2015; Pee and Kankanhali, 2016). There is also the resource-process-outcome relationship emanating from the RBT capability perspective which indicate that input resources affect process directly; while process directly predict outcome, input resources predict outcome indirectly via process. In literature, authors like Botha *et al*. (2014) argued that insight accumulated from infrastructures and processes result into increased effectiveness. Thus, AKM process and infrastructure capabilities in their composed forms are insinuated to influence accounting functional effectiveness in the research. Building upon the RBT underlying logic and previous research in this context, it is expected that AKM infrastructure capability would predict AKM process capabilities; both AKM infrastructure and process capabilities to positively influence accounting functional effectiveness in the context of study. Also, based on RBT capability

perspective and prior empirical research (Rahman *et al*., 2013; Mao *et al*., 2016), process helps in explaining the relationship between input resources and outcomes. Hence, the study assumes that AKMI would affect accounting functional effectiveness (FE) through AKMP as it has not been clarified in prior studies (Zaid *et al*., 2012). Thus, AKMP as a mediating factor is emphasized in the study. Based on the arguments and discussion above, the following hypotheses are developed:

H5 AKMI is positively related to AKMP.
H6 AKMI is positively related to FE.
H7 AKMP is positively related to FE.
H8 AKMP mediate the relationship between AKMI and FE.

Accounting knowledge management infrastructure capabilities (AKMI), Accounting knowledge management infrastructure capabilities (AKMI), accounting function effectiveness (FE) and overall university performance (UE).

The intermediate outcome in this study is accounting functional effectiveness (FE). In literature, there is dearth of studies on how accounting functional effectiveness can be conceptualized and measured. However, it is important to recall that institutional functions serve as mediums through which overall institutional goals are realized. Consequently, institutional functions especially accounting functions are not expected to negatively impact the institution goals and missions. Based on these logical reasoning and drawing from RBT capability perspective, this study assumes institutional functions especially, accounting functions as resources and capabilities to their respective institutions. As it is not a well and widely researched construct even in KM literature, and being a resource, this study proposed that accounting functional performance can be modelled as having more than one dimension also. The number of distinct dimensions for accounting functional performance in this study are two viv managerial, and operational based on initial investigations. The research of Lin and Wu (2014) evidenced that capabilities can acts as mediating variables between resources and performance. Using RBT, Daroch (2005) have evidenced the possibility of an outcome mediating the influence of input and process factors on another outcome. Relying on the above arguments, the study proscribe institutional functions as mediating mechanisms through which AKM capabilities could affect overall institutional performance. In addition, expected that accounting functional effectiveness would positively predicts

overall university performance and mediate the relationships between AKM infrastructure capabilities, AKM process and overall university performance in this study. Invariably, accounting functional effectiveness is serving as a mediating mechanism like AKM process capabilities in this study. However, how accounting functional effectiveness mediates KM capabilities influence on overall institutional performance is under-researched in literature. Based on the arguments and discussion above, the study hypotheses are developed:

H3. FE is a high order construct comprising operational related effectiveness (OEE), and managerial related effectiveness (MEE).

Nonetheless, it is possible that some of the individual capabilities summed up as accounting functional effectiveness may not contribute to forming the construct at higher order level in this context. Hence, there is need for additional hypotheses to test the relationship between the LOCs and HOC.

H3a OEE is positively related to FE.
H3b MEE is positively related to FE.
H9 FE is positively related to UE.
H10 AKMI is positively related to UE.
H11 AKMP is positively related to UE.
H12 FE mediates the relationship between AKMI and UE.
H13 FE mediates the relationship between AKMP and UE.

Overall university performance is the final outcome in this study. Pertaining to the conceptualization of overall university performance in this study, several empirical works can be drawn upon. Surprisingly, there is no consensus on which performance concept, be it effectiveness, competitive advantage or service quality, a researcher brings to inquiry. For instance, authors like Gold *et al*. (2001) and Lee and Choi (2013) indicated an overall institutional performance as a unidimensional construct consisting of multi-items. Some other research streams like Ashad *et al*. (2014) and Lin (2014) suggested overall institutional performance as a multidimensional construct. In this study, the research stream which believed that overall institutional performance is multifaceted comprising of financial and non-financial dimensions is adapted. Besides, these sub-dimensions fit into the specificities of task characteristics of accounting

functions of universities in Malaysia as culled from the various websites. Thus, overall university performance in this context is conceptualized as HOC with first order dimensions. Based on the arguments and discussion above, the following hypotheses are developed:

H4. University performance (UE) is a higher order construct comprise of financial related performance (FPE) and non-financial related performance (NPE).

This study is exploratory in nature**.** Besides, it is possible that some of the individual capabilities summed up as AKM infrastructure capabilities may not contribute to forming the construct at higher order levels. Hence, there is need for additional hypotheses to test the relationship between the LOCs and HOC.

H4a FPE is positively related to UE.

H4b NPE is positively related to UE.

In this study, drawing from Chin (1998) and perspectives considered above, all HOCs are assumed to mediate the influences from their underlying dimensions. The reason is that most strategic management HOCs as entailed in this study, are best modeled as formative constructs according to Becker *et al*. (2012). Moreover, the study believes that all the four HOCs comprises multiple distinct first order dimensions which are not interchangeable according to the insight gained from theory. More so, advocates of the usage of HOCs have contended that they permit for more theoretical parsimony and lessen model complication. Moreover, hierarchical latent variable models permit fitting the extent of abstraction for predictor and criterion variables in conceptual models as culled from Johnson *et al*. (2012). Based on the arguments and discussion above, the next section covers the discussion on the four HOCs and their respective LOCs derived.

2.6.3 Accounting Knowledge Management Infrastructure Capability (AKMI)

In this study, AKMI comprises of factors that determines the success or failure of KM initiative in an accounting domain. These are the whole functional happenings or mechanisms that can excite knowledge creation, keep knowledge, and enable the sharing of knowledge in a function (Lee and Choi, 2003; Shajera and Ahmed, 2015). Similarly, Aujirapongpan *et al*. (2010) referred to them as integrated produce and functional strategies that enable KM process in different settings. An extensive range of these

factors has been recognized in the literature (See Table 2.2) and are summarized as accounting culture, structure, people (T-shaped) skills and technology in use.

- **Accounting culture (CIE)**

Accounting function knowledge culture refers to shared values, beliefs and practices binding on a group of persons in an accounting function of a university. This is a cultural KM resource that has been proposed by many authors though in diverse context which can hinder or encourage human to create and share knowledge within an organization (Gold *et al.*, 2001). Thus, if an accounting function has suitable culture that inspires people to create and distribute knowledge inside it will foster innovation (Nguyen, 2010). Likewise, Davenport and Prusak (1998) argued that accounting values that explicitly favor know-how sharing and integration will encourage debate and dialogue in facilitating contributions from individuals at different sections within the accounting function. Consequently, accounting values becomes one of the most crucial influencer for the effective execution of KM efforts in this study.

- **Accounting structure (SIE)**

Structure KM infrastructure comprises rules, policies, procedures, hierarchy and reporting relationships and so on. Accounting function structure is the means in which obligation and power are allocated and handiwork procedures are undertaken amid members of accounting function of a university. Accounting procedures are the mechanisms for transaction processing and compiling financial and/or management information in accordance with the budgetary provisions and for reporting purposes (Freeze and Kulkarni, 2007). The university management does not originate these procedures but its stakeholders. Accounting policies and government financial policies specifies how transactions and other events are to be recognized, measured, presented and disclosed in various financial reports (Bhatt, 2001). These procedures are unique to accounting functions of any university.

Accounting function of a university must perform its duties in strict compliance to the financial act rule and policy provisions. A function structure can inhibit or enable effective KM. That is how a KM agenda eases knowledge creation and innovation; the effect of KM framework on behavior, and the provision of access to knowledge to foster creativity with the allocation of responsibility to individuals as argued by Nguyen

(2010). Adapted from Zaid (2012), accounting function proficiency-based structure refers to the extent of an accounting function's structural outlook toward inspiring know-how related activities. Besides, structure as a resource and a key component KM infrastructure capability has been put forward by re-known authors like Gold et al (2001) and Mills and Smith (2011). Thus, accounting structure is a sub-component in this study.

- **Accounting people (T-shaped) skills (PIE)**

Knowledge management requires employees to be change agent, and that in turn requires their support and direct involvement (García-Álvarez, 2014). People's skills have been linked with KM infrastructure capability in literature (Chuang 2004; Lee and Choi 2003). Among the key component of an accounting unit, the most essential element is the accounting staffs. The accounting unit staffs are the employees working in the unit and endowed with interpretative ability (Bhatt, 2001). It is only through their expertise that accounting unit can make clear operating decisions. Even the accounting software still requires knowledgeable staff members to use it. Thus, their expertise must be capitalized on to improve its functioning in this economy that believes superior performance resides in people's brain. This made them indispensable when creating knowledge as most studies identified them as essential KM enabler for successful KM implementation in any university setting (Lee and Choi, 2003). Not only are humans' important factor in KM but also their T-shaped skills as buttressed further by Alavi and Leidner (1999). According to them, T-shaped skills are skills linked with people that have the ability both to combine theoretical and practical knowledge and to see how their own knowledge interacts with others while performing accounting function task. Therefore, they can expand their competence across several areas, thus creating new knowledge. So, this study includes T-shaped skills as a key KM infrastructure factor amongst others.

- **Accounting Technology in use (TIE)**

The physical IT assets which form the core of a firm's overall information technology infrastructure comprise the computer and communication technologies and the shareable technical platforms and databases (Chuan, 2004). Gold *et al*. (2001) described an organization technical KM as a major business resource and a key source for attaining long-term performance. Technology comprises of hardware and software

aspect of a computer. It supports the automation of the accounting system and help to streamline the accounting process while efficiently storing financial information for the university (Nordin *et al*., 2012). Also, researchers have emphasized information technology (IT) infrastructure as a crucial element in the linkage of information and knowledge integration in institutions memories development (Teece, 1998).

Adapted from Prakash and Lakshmi (2012), institutions memories refer to the knowledge about transactions, services and products accumulated over a period in institutions. The institutions lose this precious knowledge when the employees who are the key personnel in the institutions leave without proper documentation with the aid of technology (Milton and Lambe, 2016). One way of solving this problem is by capturing only the relevant knowledge by spending some time and money on the process. Strategic function memories play a key role in a function's progress as they have the lessons learnt from previous mistakes and have solutions for problems that occur frequently (Prakash and Lakshmi, 2012). This helps to enhance the processes that are knowledge driven. The implementation of systems for corporate memories should be supported by IT infrastructure. The reason is that majority have found that IT is a key facilitator for the development of efficient knowledge processes in any institution (Davenport and Prusak, 1998; Gold *et al*., 2001; Shajera and Ahmad, 2015). This makes ICT essential in initiating and carrying out KM in this study. Moreover, IT put in place in any an accounting function of a university creates a platform that can be used to facilitate the collection, organization, transfer and distribution of knowledge between employees for effective KM implementation in the unit. Thus, enable KM processes in the function. So, this study includes IT support as a key KM facilitating infrastructure in accounting function of the university. Adapted from Chuang and Chang (2011), accounting function knowledge-based technology is defined as the technical systems within the function, which determine how accounting knowledge travels throughout the enterprise and how accounting knowledge is accessed.

2.6.4 Accounting Knowledge Management Process Capability (AKMP)

AKMP capability in this study means accounting function capacity to make task knowledge via the procedure of changing tacit knowledge into explicit knowledge, ultimately changing it to the functions' knowledge. This perspective is adapted from Nonaka (1994). Likewise, Pentland (1995) described KM processes as continuing

traditional procedures entrenched in the structure of an institution or its function for knowledge creation purposes. Knowledge processes in the accounting function of the university is the formation of new human skills via interaction between the unit tacit and explicit knowledge. Explicit knowledge like data can easily be processed in the accounting unit but the tacit knowledge due to its intuitive nature cannot. So, must be converted in a systematic logical order, before it can be communicated and shared.

From the reviewed literatures, the following are the common knowledge processes: Knowledge acquisition, knowledge conversion, knowledge application, knowledge storage and knowledge protection (Gold *et al*., 2001; Shajera and Ahmed, 2015). But Lettieri, Borga and Savoldelli (2004). Meanwhile, Trevos (2014) noted that the stages involved within a KM process varied by work practices and the repetitive and monolithic nature of accounting process does not truly represent both the cognitive and social nature of institutions knowledge which characterizes knowledge based processes. Similarly, Gold *et al*. (2001), argued that proper knowledge diffusion can only take place if such repetitive processes are transformed to become knowledge based processes; that is those processes have the transformative capacity for staffs to acquire, convert, transfer and apply knowledge. On this note and based on all other arguments, current accounting function processes (identifying, recording, analyzing, interpreting and communication) are assessed in this study in terms of their capacity in allowing staffs to acquire, convert, transfer, apply and protect accounting function knowledge. Moreover, no accounting staff can involve in any of the accounting processes without prior capacity to acquire, convert, transfer, apply and protect accounting knowledge. More so, RBT of an institution speculates that the main root of competitiveness respites in the capability to apply knowledge and not just in creating or acquiring new knowledge per se (Grant, 1996a). It is important to reiterate that these four subcomponents comprise the minimum set that cover all the knowledge process activities (Lindsey, 2002). Hence, AKMP is defined in this study as the degree to which the function existing accounting system enablers empower staff to acquire, convert, apply and protect accounting knowledge. These sub-dimensions are further elaborated on:

Accounting acquisition processes (ACPE) are those oriented towards obtaining knowledge sometimes involving a high degree of experience in identifying and analyzing new knowledge from either existing or new ones (Nguyen, 2010). The ability

to acquire knowledge is predicated on the level of collaborations between individuals and to an extent the institution's absorptive capacity (Cohen and Levinthal, 1990). Absorptive capacity as defined by Cohen and Levinthal (1990) is an institution ability to recognize the value of latest information, assimilate it and apply it for superior performances resulting from prior related knowledge (basic skills, recent developments etc.). Besides as stipulated in Gold *et al*. (2001), developing processes for acquiring knowledge is essential to managing knowledge within a group or function. Thus, accounting knowledge acquisition process is the capacity to obtain relevant accounting task know-how which can be denoted with several other terms, such as acquire, seek, generate, identify, create, capture and collaborate. Active application of knowledge has assisted institutions to enhance their efficiency, effectiveness and adaptiveness.

Accounting conversion processes (CPE) are those concerned with making existing knowledge useful. Thus, an accounting function must carefully transform aspects of tacit knowledge into explicit knowledge into meaningful form for decision making purposes. This can be enabled by processes such as organizing, representing, integrating, structuring, summarizing or distributing knowledge (Davenport and Klahr, 1998). Accounting knowledge acquired from either external or internal sources is ineffective unless it is converted into useful and applicable forms to improve productivity and university operations as Zaid (2012) buttressed further.

Accounting application processes (APPE) are those processes (effective recording, classifying, sharing, storage and retrieval mechanisms) oriented towards the use of accounting knowledge to write up financial report, interpret financial report, solve problems and for strategic purposes. Application process is also a documentation process that concerns the actual use of the knowledge (Gold *et al*., 2001), making knowledge more active and relevant for the function in creating value (Bhatt, 2001). Thus, APPE is expected to be related to the overall AKMP put in place.

Accounting protection processes (PPE) are those designed to store and protect accounting knowledge within the function from illegal or inappropriate use or theft to achieve sustained superior performances. Accounting function control measures is also part of the protection of knowledge within an organization function from illegal or inappropriate use, or theft (Gold *et al*., 2001). Internal controls are measures part of the protective measures put in place to ensure that all account staff performs their task

ethically and honestly. Hence, can also help to keep and protect accounting knowledge within the function according to Zaied *et al*. (2012). Overall, all these sub-dimensions comprises AKMP and are expected to be positively related to it.

2.6.5 Accounting functional effectiveness (FE)

Resulting from section 2.4, it can be argued that KM is within the scope of university accounting practices. Invariably, its practices are expected to be enhanced by both AKMI and AKMP as part of the task performance strategies. Accounting practice comprises task oriented groups of accountants that every institution requires for equitable allocation and judicious management of its scarce resources (Hackman and Morris, 1975). Accounting practices can be characterized as problem solving tasks because it requires specification of a course of action to be followed to resolve task related matters. As such, the information emanating from the group are expected to deliver improved institutional performance. In a university setting, it is with the aid of an integrated accounting system in place that the accounting group or function can contribute to improved university performance. They are mainly involved in the day to day activities (operational) and management of the university resources (managerial). Accounting functions of universities are supposed to benefit from their accounting systems in terms of the provision of operational and managerial related information needed by the university management team. Moreover, existing literature in KM are yet to provide direction regarding the conceptualization and possible dimensions of FE. Thus, reasonable to assess accounting function effectiveness (FE) in terms of the system ability to provide accurate and reliable accounting information that enhances university management decision-making and planning regarding these two broad dimensions in the study. These two dimensions are concretized via FE in this study to evaluate both AKMI and AKMP impact on FE as they are expected to relate to it. It is vital to mention that FE is the intermediate outcome in this study.

- **Operational related effectiveness**

Based on existing relevant knowledge management theories, so many outcomes have been associated with KM strategies such as better decision-making capabilities, improved academic services, improved operational efficiency and effectiveness and overall success in literatures (Yahya and Goh, 2002; Metcalfe, 2008; Nguyen, 2010;

Reich *et al*., 2012; Liu and Abdallah, 2013; Shajera and Ahmed, 2015; Gutierrez *et al*., 2016). Operational activities usually cover the day to day or routine activities of the institutions. OEE in this study is defined as the capacity of the effectiveness of internal accounting system processes to realize its functional task objectives pertaining to cost reduction and time efficiency in the provision of relevant accounting information to management. This dimension is important in this context as operational excellence has been linked with overall institutional performance in some other context.

- **Managerial related effectiveness (MEE)**

According to Sirmon, Gove, and Hitt (2008), owning or having access to a valuable resource is only a necessary but not a sufficient condition for superior performances in this economy. These resources must be properly managed by those professionally trained to do so. Invariably, university resources must be effectively bundled and deployed by its accounting function as professional group to exploit opportunities and/or mitigate threats in specific competitive engagements for a university to realize competitive advantages. Interestingly, competitive advantages which are also associated with KM are part of the strategic objectives of the research universities in Malaysia. Consequently, managerial related effectiveness is conceptualized as the capacity of an accounting function to provide relevant proactive information pertaining to strategic and managerial decision makings activities of the university management.

2.6.6 Overall university performance (UE)

Lindsey (2003) argued that KM success is dependent on the context in which it is assessed and likely more complex in terms of dimensions as stated in Gold *et al*. (2001). Besides, there is no one consensus definition to what should be final KM outcome in any context. In this study, overall university performance is the final outcome. UE as the final outcome is included as accounting functions of universities do not operate or act solely for themselves but on behalf of the universities in which they are instituted. However, not much is known on the link between specific accounting task KM strategies, FE and the overall university performance in this context needless of measuring such outcome.

Before now, studies have evaluated institutions performance based on financial indicators. However, it has been reported by many authors like Gonzalez-Padron,

Chabowski, Hult, and Ketchen (2010) that financial pointer analysis does not relate to important institutions KM strategies which non-financial aspects of performance, such as learning, innovation, internal business process, and customer value does. While the balance score card is one of the comprehensive and effective frameworks to conceptualizing overall performance, Ragab and Arisha (2013) argued that it still cannot provide explicit link to KM. Since there is no one particular way of conceptualizing KM outcome, a more combined perspective widely used in literatures to conceptualize and measure KM contribution relating to overall performance is employed in this study. UE is the extent to which FE and KM strategies contribute to the extent to which institutions can achieve its goals (financial and non-financial) and missions.

- **Financial and non-financial performance**

This financial and non-financial concepts/measures as proxies in the study, fits into the specificities of task characteristics of accounting functions of universities as culled from the various websites. Moreover, KM practice involve more of non-financial resources (knowledge) management as indicated in Mineau, Missaoui, and Godinx (2000) and Darroch (2005) which is synonymous to the reason (information) accounting functions of universities are indirectly instituted. In addition, the university accounting information emanating from the university accounting practice will likely include some non-financial information like institutional policies (Dumay, Frost, and Beck, 2015) which is crucial to the university success. So, it is expected that the outcome from the assessment of KM effectiveness in the university accounting practice should impacts the overall university in equivalent manner. It is worthy to mention that KM outcome in universities stemming from its effectiveness in accounting functions in this research cover these subjective dimensions modified from prior studies. Having elaborated on the HOCs and their respective LOCs, the research model is developed.

2.7 Proposed Research Model

Centred on past works evaluation, research questions, theoretical development and research hypotheses, a model of AKM capability-based on accounting function effectiveness and overall university performance is developed. There are four higher order constructs (HOCs) comprising AKM infrastructure capability (AKMI), AKM process capability (AKMP), accounting functional effectiveness (FE), and university

performance (UE) with their respective lower order constructs (LOCs). Their relationships are majorly based on the extension of input -process-outcome (IPO) logic pertaining to RBT and which state that process factors affect performance outcome directly while input factors affect performance outcomes through process. Furthermore, indicate that there exists a relationship between input and process factors. Intermediate outcome is FE while UE is the final outcome. Both AKMP and FE are serving as mediating variables. The proposed research model is presented in Figure 2.6 for further empirical testing. In the research model first order constructs connote lower order constructs (LOCs) and are used interchangeably throughout the study.

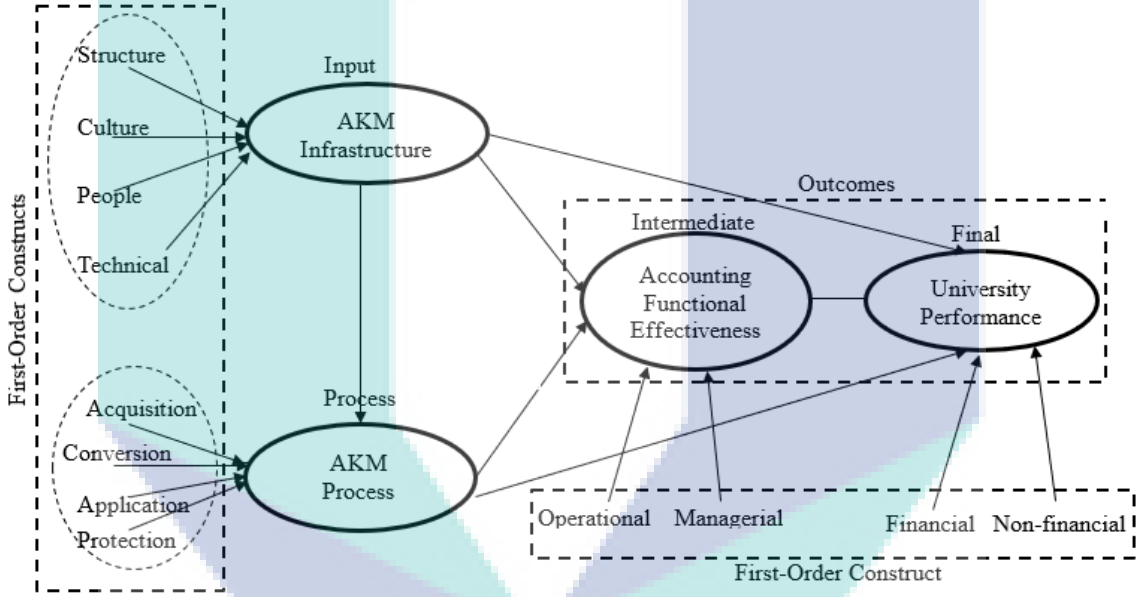

Figure 2. 6 Proposed Research model

Source: Hackman and Morris (1975), Gold *et al*. (2001), Lee and Choi (2003), Spathis and Ananiadis (2005), Tanriverdi (2005), Lee and Lee (2007), Pandey and Dutta (2013), Tseng and Lee (2014), Mao *et al*. (2016), Trembley (2017)

2.8 Summary

To obtain a better insight into the relevance of KM in accounting functions of universities, this review has examined a wide range of subject pertaining to the researched topic that will contribute in evaluating the effectiveness of KM practice in accounting function of a public university in Malaysia. This is because of the identified research problems and gaps in existing literature. Subsequently AKM capability components for an accounting function of the university were conceptualized based on

the identified similar practices and application of relevant theories. Then a conceptual framework containing the various underlying relationships were presented. The developed model is to test whether accounting functions of universities AKM capability components from the various perspectives are positively related and act as enablers to significantly improve accounting functions of universities performances. Consequently, the justification of implementing more KM practices to realize maximum benefits from it strategies in accounting functions of the universities will be reached. The next chapter discusses the research methodology employed for further empirical testing of the model developed in this study.

CHAPTER 3

METHODOLOGY

3.1 Introduction

The past section finished with a theoretical framework and research hypotheses proposed through a review of the literature. This chapter outlines the method employed in the study and further validate why this method was preferred. It details the research procedures and instruments used and their limitations. It also discusses validity and reliability, data analysis, and ethics. The chapter aims to depict a research methodology that would dependably amass data to substantiate, or otherwise, the theoretical framework developed in chapter two.

3.2 Research Paradigm

This part covers the selection and justification of the research paradigm employed in this study. Research is founded on philosophical assumptions, which are related to the researcher's view or perception of what reality is. Drawing from Creswell (2014), in this study, research approach involves the intersection of philosophical assumptions, research designs and methods. Research paradigm is embedded within the conceptual roots undergirding the quest for knowledge (Ponterotto, 2005). A paradigm is a construct that specifies a general set of philosophical assumptions covering ontology, epistemology, axiology, rhetorical and methodology (Mingers, 2003; Scotland, 2012). These five components can be used to assess the appropriateness of a research approach according to Ponterotto (2005).

3.2.1 Postpositivist Philosophical Assumption

Philosophical assumption or paradigm is a basic set of beliefs which are based on discipline orientations, mentor inclinations, and past research experiences that guides a research (Creswell, 2014). There are different philosophical assumptions that can be used to guide a study in literature even though they may be linked in one way or the other (Morgan, 2014). However, postpositivism represent the thinking in this research. Postpositivism is characterized by the belief that one cannot be absolutely accurate about claims from research as evidence established in research is always imperfect and fallible. In addition, identify and assess the causes that influence outcomes in terms of questions or hypotheses while examining methods and conclusions for bias (Morgan, 2014; Willis, 2007). The knowledge that develops through a postpositivist lens is based on careful observation and measurement of the objective reality that exist (Creswell, 2014). The primary goal is prediction and explanation of phenomena rather than in-depth interview. Also, the researcher remains separate from the research but may apply quantitative, qualitative, or both in gathering data while testing or refining theory (ies) (Tavakol and Sandars, 2014).

3.2.2 Postpositivism Philosophical Justification

In conjunction with Ponterotto (2005), Tavakol and Sandars (2014) indicated that ontology, epistemology, axiology, rhetorical and methodology are main components that can be used to judge the suitability of a philosophical thinking. **Ontology** is concerned with the form and nature of reality and what there is to be known about it (Jane, Lewis, Nicholis, and Ormston, 2014). **Epistemology** is the relationship between the knower and what can be known, that is, between the researcher and the researched(Jane *et al*., 2014). **Axiology** concerns the role of researcher values or feelings in the scientific process (Ponterotto, 2005). **Rhetorical** means the way the research is presented. **Methodology** refers to the process and procedure of the research (Ponterotto, 2005). The ontology of this research is the belief that what exist is empirical and critical analysis of what exist in literature should be done though absolute truth can never be found. The epistemology of the research acknowledges that the researcher may have some influence on that being researched, but objectivity and researcher subject independence remain important guidelines for the research process. Hence, the study acquire knowledge via deductive route following empirical procedures. The axiology of the research is empirical

observation and objectively arriving at findings probably true rather than feelings to reduce bias. Even the procedures and results of the study are presented in an objective manner. The study aimed to identify KM capabilities and assess their relationships with effectiveness in university accounting practices, and institutional performances in Malaysia based on empirical evidence. Thus, based on the research goal and positions on ontology, epistemology, and axiology, the postpositivsm research paradigm is suitable.

3.3 Research Method

Morgan (2014) argued that even though there may be deterministic association between the paradigms and methods but none that forces the use of a particular paradigm with a particular set of research methods. This research invokes the postpositivism worldview. The strategies of inquiry in this study is quantitative or quantitative design. The aspect of quantitative design employed is the non-experimental correlational and causal designs. This research form is correlational/causal because the study highlights the measurement and analysis of complex relationships among variables. This agrees with the works of Hair *et al.* (2006) and Morgan (2014) who opined that variables and connections amid variables (often articulated in hypotheses) are the fundamental thoughts in quantitative research. Besides, postpositivism serve as the primary foundation and anchor for quantitative research. But, it is important to note that in selecting the basic set of belief for this study, quantitative is considered as research methods supporting the postpositivist philosophical assumption chosen and not in their paradigmatic context. In this study, exploratory research was applied through a review of the literature to obtain background information, determine the research problem and generate research questions. Thereafter, the hypothesized relationships among the variables were examined. It is important to note that the quantitative method utilized to identify and gauge the relevance of cause-and-effect relationships in this research is survey. The reason is that surveys give an accurate method of collecting data about a population, and are more appropriate where there is a dearth of secondary information like this study context (Rossi, Wright, and Anderson, 2013). In addition, the type of survey utilized in this study is the survey questionnaire.

3.4 Data Collection Method

Among the survey techniques, questionnaire is the survey instrument chosen in this study to collect data to tackle the research questions and hypotheses. Besides, based on the assessment of prior studies on KM, the survey questionnaire has been the highest employed method in the literature (Sekaran and Roger, 2013). Moreover, survey questionnaire is feasible and less difficult in accessing the respondent according to existing literature. This section describes the processes involved in the development and design of the questionnaire, and related matters.

3.4.1 Questionnaire Design

The research design process in this study commence with the consideration of principles and guidelines pertaining to questionnaire design. In designing the questionnaire, MacKenzie and Podsakoff (2012) principles and guidelines of good questionnaire design were followed to avoid potential biases and improve the accuracy and validity of the collected data. As a former accounting officer in the accounting function of a university with quite number of years, the researcher is well acquainted with the terminology applied by people in such university function. Apart from helping in the questionnaire design, the researcher's supervisor also assisted with the clarity of the invitation letters wordings. Also, care was taken to ensure that the capabilities of the proposed respondents were not undermined by explicitly stating the criteria that qualify the respondent to fill out the questionnaire in the both the cover letter and the questionnaire itself.

In terms of the content and length of the questionnaire, lengthy scales were avoided to motivate the respondents to answer the questionnaire. Only a brief section of demographic information is involved aside questions necessary for measuring relevant variables in the theoretical model. Demographics are included in the section one of the designed questionnaire to understand the background characteristics of the participants and also help clarify those that have the capacity to fill each out. Here, respondents will be asked to provide details of their age group; gender; education level; function position held; years of service; and so on.

Sensitive questions such as income and revenue are avoided. With respect to the wording and language used, the questionnaire was designed in English. The structure of

the questionnaire was also made clear and concise as possible to avoid fatigue (Bourque and Fielder, 2003; MacKenzie and Podsakoff, 2012). The questionnaire commences by clearly indicating the two main sections of the survey and providing the definitions and explanation of the key terms used in the survey. In part A, respondents were asked about their personal details and information about the accounting function which they represented. Section two consists of all main questions in Likert-type scales. Questions that addressed the same subject are grouped together. All these items comprise the section two of the main questionnaire.

3.4.2 Measurement Development

The next stage in the research design process involves the development of measures for the survey to suits the stated research questions. There are number of measures of knowledge management capability components that are reported in literature. It is worthy to note that currently there is no commonly accepted manner of operationalization of these concepts measures. Most construct in this study are adapted from prior studies. The study comprises of fourteen first-order latent constructs and four higher order constructs. The first order dimensions were measured by multi-items to improve the reliability and validity of the measures with a five-point Likert-type scale anchored by 1 (strongly disagree) and 5 (strongly agree). The prior literatures from which the survey questions used in the study with sources, and relationships to the research measures are included in the Appendix 2.

AKM infrastructure capability as higher-order construct with first four order constructs of accounting structure, accounting culture, accountants (people), and accounting technology in use, was adapted from Hackman and Morris (1975), Lee and Choi (2003), Chuang (2004), Nguyen (2010), Lu and Ramamurthy (2011), Perez-Lopez and Alegre (2012), Zaid (2012) and Mao *et al*. (2016) items of measures. AKM process capability as another higher order construct with four first order constructs such as knowledge acquisition, knowledge conversion, knowledge application, and knowledge protection processes was adopted from Gold *et al*. (2001), Bhatt and Grover (2005), Smith (2006), Aujirapongpan (2010) and Lin (2014). Accounting functional effectiveness as higher order construct with two LOCs (operational, managerial) initially, was later modified to four LOCs (strategic, operational, managerial, informational) (See section 4.6.3) items of measure was adapted from Shang and Seddon (2000), Spathis and

Ananiadis (2005), Sirmon, Gove, and Hitt (2008). Lastly, overall university performance as higher order construct with two first order construct items of measure comprises financial and non-financial performance measures taken from past studies like Hitts (1988), Gold *et al*. (2001), Lee and Choi (2003), Chuan and Chuang (2004), Kaplan and Norton, (2005) and Lin (2014).

Given the exploratory nature of this study, constructs and measurements were established in two ways: first, for variables employed in previous KM studies, the measures were adopted as long as they could provide acceptable measurement quality with minor modifications in wording to increase their applicability to the Malaysian universities accounting practice context; second, for variables not employed in previous studies, this study developed operational measures based on previous conceptual studies whose authors have established their validity. In addition, this study also assessed content validity via pre-testing which is discussed later. All these measurement items were employed in the questionnaire designed for the study. As these measurement items were taken from prior studies in other context, the relationship between the constructs and the measurement items are modelled based on the outcome of the exploratory factor analysis (EFA) that will be conducted.

3.4.3 Measurement Scale

Measurement is defined as the assignment of numbers (a *measurement scale*) to aspects of objects, persons, states and events, with an objective of translating their characteristics and properties into a form that can be analyzed by a researcher (Davis, 2005) According to Hair *et al*. (2016), measurement scale is a tool that can be used to obtain an answer to a question. Measurement scales are classified under four major levels of measurement – nominal, ordinal, interval and ratio (Davis, 2005; Neuman, 2006; Hair *et al*., 2016).

In this study, nominal scales are employed in section one. Nominal scales, also referred to as categorical scales are used to identify and classify objects like age, years of service and so on. Likert scales are used in section two. Likert scales are form of ordinal scales which are commonly used to measure attitude or opinion, with a range of categories for responses to a question or statement. The categories typically constitute an ordinal level of measurement with, for example, five categories of response in rank order

already pre-coded as in this study: (1) strongly disagree; (2) disagree; (3) neither agree nor disagree; (4) agree; (5) strongly agree (Cohen, Manion and Morrison, 2005). Though ordinal scales provide information about the order of observations, there are controversies concerning the suitability in structural equation modelling (SEM) studies. The reason is that a researcher using this scale type cannot assume that the differences in the order is equally spaced (Hair et al 2017). It is important to mention that in using 5-point likert scale with the above categories in this study, consideration was given to the coding to fulfil the prerequisite of equidistance as indicated in Hair *et al.* (2017). Coding is the allocation of numbers to categories in a way that enables measurement. Thus, drawing from Hair *et al*. (2017), the 5-point likert scale adopted in this study is perceived as symmetric and equidistant, and therefore, approximate an interval level measurement necessitated in every structural equation modelling studies.

3.5 Questionnaire Administration

The questionnaire was administered through self and with the aid of a contact person. The questionnaire comprises combined and modified questions from prior studies in organizations and group effectiveness. Since the previous tools had been used in studies pertaining to diverse organisations and group effectiveness, the respondents of the pre-test group suggested that the word 'organisation' be replaced with 'university'. And that the word 'unit' or 'section' be replaced with the word 'function' or 'department', as appropriate. Also, the word 'effectiveness' was replaced with 'performance' also. Although the pre-test group considered the questionnaire to be too long, the researcher did not find it necessary to reduce the number of items in the questionnaire, since it was a combination of previously used instruments. A letter requesting permission to collect data from accounting function staff as respondents in this study was sent to the public research universities. As has already been stated, only four universities were prepared to have their employees participate in the study. A contact person was identified at each such institution, to whom the questionnaires were sent for distribution to, and collection from, the respondents concerned with the study. The contact person approached each potential respondent, giving out the questionnaire only to those who expressed willingness to participate in the study. Only accounting function staff members were requested to participate in the study.

3.5.1 Pre-test and Pilot-test

The final stage in the research design process is to pre-test the questionnaire, to revise it where necessary, and to conduct a pilot test of how the questionnaire will be used. Pilot study is a mini-version of a full-scale study or a trial run done in preparation of the complete study to ensure content validity. It can also be a specific pre-testing of research instruments, including questionnaires or interview schedules (Neuman, 2006). The main purpose of conducting pilot testing in this study is to detect and remedy any possible errors in questionnaire design and administration prior to administering the main survey and typically, to refine and revise the questionnaire to help ensure the validity and reliability of the measures, as well as making it more user-friendly (Flynn, Sakakibara, Schroeder, Bates, and Flynn, 1990). Besides it is widely recognized as an indispensable part of the development of survey instruments. At this stage, potential respondents comprising 52 accounting function staff were conveniently profiled and the instrument pre-tested to ensure that the respondents understood the questions and could provide informed responses. From the 52 respondents, 13 were from Universiti Sains Malaysia (USM), 10 from Universiti Malaya (UM), 15 from Universiti Putra Malaysia (UPM), 14 from Universiti Kebangsaan Malaysia (UKM), respectively.

The 52 participants used for pilot testing in this study agrees with Isaac and Michael (1995) suggested 10–30 participants in a pilot testing because of its practical advantages. In this study, pilot testing using the pre-test subjects was a form of procedural control to ensure that respondents respond accurately and avoid satisficing in the main survey and to ensure content validity.

3.5.2 Population and Sample

The unit of analysis in this study is the accountants in accounting functions of universities. A population is defined as including all people or items with the characteristics one wishes to understand (Dattalo, 2008). The target population of the study is accounting function staff and employee of public universities in Malaysia as they are those wholly and necessarily employed to carry out university accounting practice task as enshrined in university policies. Adequate knowledge in the university accounting practice by employed accounting function staff is the inclusion criteria (the characteristics that the prospective subject must have if they are to be included) in this

study. Hence, any prospective respondent not exhibiting these attributes are excluded. The accounting function staff of public research universities in Malaysia which is the sampling frame in this study. The public research universities are chosen as they represent other public universities in diverse stage of growth and development. The data for this study was drawn from a purposive sample of accounting functions staff and managers, from public research universities in Malaysia. It is purposive because this study involves a task context specific KM inquiry. Moreover, the list of the staff was not legally accessible to the researcher despite several attempts made by the researcher to get it. Even with the purposive sampling chosen, the data administration and collection were not hitch free as they initially declined to participate in the survey. Consequently, accounting functions staff of the public research universities are selected for the valuable information they can provide regarding the study that cannot be gotten as well from other function in the university setting. The result in this study therefore can be generalized to similar population. The final four research universities employed in this study was based on their willingness to participate in this research. The four-public research that were involved in the study are University Malaya (UM), University Sains Malaysia (USM), Universiti Kebangsaan Malaysia (UKM) and Universiti Putra Malaysia (UPM). Universiti Teknologi Malaysia (UTM) was not included because of the decline in participation.

There are different rules of thumbs in sample size recommendations in PLS-SEM. However, in this study, the sample size was calculated using G-power statistical software version 3.1.9.2. Culled from Cohen (1992), the commonly used level of statistical power in management research is 80%. Effect size is grouped as small (0.02), medium (0.15), and large (0.35). The level of significance in this study is 5%. Thus, with an alpha level of 0.05, expected estimated effect size of 0.02, power of 80%, and three predictors based on the study model, the apriori minimum sample size requirement for this research is 311. Initially, the study estimated population size of 520 based on some preliminary investigations from each of the universities website. Later, it was reduced to 420 due to the total number of questionnaires collected by each contact person in the respective institutions. Consequently, 420 was used as the population for the study. Following the apriori sample size value of 311 calculated above, and estimated population of 420 based on the contact information, administration of 420 questionnaire was deemed appropriate in the main survey.

3.6 Questionnaire Administration

This section deals with how data analysis strategies were applied in the study to further analyze the data collected from the main survey. Resulting from the main survey, questionnaire returned were crosschecked first for accuracy of data entry and missing values. Next, factor analysis was conducted using SPSS version 23.0.

3.6.1 Exploratory Factor Analysis (EFA)

In literature, measurement theory is not well developed relating to KM in accounting practices. Using empirical research in other context as a guide, the study anticipates that there are a number of different variables with psychometrics properties that may be correlated (Lee and Lee, 2007). Exploratory factor analysis (EFA) that is data driven and can recover the correct factor model satisfactorily a majority of the time is conducted in the study (Yong and Pearce, 2013). Consequently, the study deemed it fit to understand if these measures reflects a single underlying construct or do different subsets represent a few distinct constructs using EFA. Besides, the importance of re-establishing validity and reliability have been emphasized as the original validity and reliability might not hold when instruments are modified from prior studies (Creswell, 2014).

The validity of a measure is "the extent to which it measures what it claims to measure" (Manning and Munro, 2007). It is the manner of inspecting the homogeneity of a scale. If a composite variable does reflect a single underlying property (or "concept") the component items will be homogenous (also referred to as internally consistent). Rules of thumb suggest that this measure of homogeneity called "the item-to-total correlations" should exceed 0.50 (Hair *et al*., 2016). It is also suggested that items with loadings greater than 0.50 (Hair et al. 2006) or 0.40 (Anderson and Gerbing, 1988) provide better measures of the underlying construct. In this study, all items with component loadings lower than 0.5 values should be deleted from the measurement instruments.

The reliability of a measure is the evenness of the results each time the same thing is measured using Coefficient (or Cronbach's) alpha (Hair *et al*., 2016). Coefficient alpha is "an index of the internal consistency of the items" and "a useful estimate of reliability" (Gregory, 2004). Reliability will be high if the scale items are highly

correlated. As a standard of reliability, values of coefficient alpha above 0.70 are considered to represent acceptable reliability, those above 0.80 to represent good reliability, and those above 0.90 to represent excellent reliability. However, in the early stages of a study or in exploratory research, a lower acceptable limit of 0.60 may be used (Hair *et al*., 2016). It is noteworthy that both the construct validity and coefficient alpha were calculated by using statistical package for social sciences (SPSS) version 23.0.

The eigenvalues greater than 1.00 rule, the variance explained criterion, sampling adequacy, and the Bartlett test of sphericity were used to obtain the number of factors extracted. Such use was complemented by the theoretical basis upon which the factors in each variable set were determined. After the number of the factors extracted was determined, the data analysis was undertaken, based on the factors re-established. After establishing the construct reliability and validity, possible threats to validity were examined.

3.6.2 Common Method Variance

A possible threat to internal validity in this study is the selection bias effect. Selection refers to the criteria based on which subjects are selected to participate and assigned in a study according to Donmoyer (2000). To mitigate this, self-selection is avoided during the selection step with inclusion criteria given. Also, randomization or matching will be done if improper or unmatched selection of subjects is noticed. This study is a mono-method study. Common method variance (CMV) can be a threat to the validity of results in a mono-method study and also threats to the validity of quantitative research findings upon which significant theory building relies (Reio, 2010).

CMV is the variance that is attributable to the measurement method rather than the constructs the measures represent as indicated in Podsakoff *et al*. (2003). Furthermore, refers to the amount of spurious covariance shared among variables because of the common method used in collecting data. Although researchers generally agree that CMV has the potential to affect the results of a single-method study, no consensus exists about the seriousness of such biases. For example, Crampton and Wagner (1994) found from their meta-analysis that although self-report methods caused biases in some cases, method effects do not have the serious and pervasive consequences that critics have alleged. As it cannot be ruled out in this study, a rival hypothesis to the

original causal inference hypothesis of the researcher is developed to mitigate the threat using Haman's single factor test. The Haman's single test was conducted using SPSS version 23.0. Moreover, it has been widely applied and recommended by Hair *et al*. (2013). Apart from SPSS version 23.0, another technique employed in the study is the partial least squares structural equation modeling (PLS-SEM).

3.6.3 Partial Least Square Analysis (PLS)-Structural Equation Modelling (SEM)

SEM is a multivariate analysis technique based on principles used in regression analysis, and overcomes substantial and statistical problems of more traditional methods (Hair, Ringle, and Sarstedt, 2013). For example, multiple regression analysis assumes that the independent variables have a direct effect on the dependent variables, whereas SEM recognizes that there may be indirect variables affecting the independent variables which, in turn, affect the dependent variable (Hair, Sarstedt, Pieper, and Ringle, 2012). Thus, SEM could answer a set of interrelated research questions simultaneously through both measurement and structural model. While other SEM tools exist, the choice to use PLS-SEM was driven by several issues. This study is exploratory. PLS-SEM is now an important and favourable technique in management researches even in accounting studies (Lee, Petter, Fayard, and Robinson, 2011; Nitzl, 2016). In addition, allows researchers to estimate very complex model at any level with many constructs and indicator variables, especially when prediction is the goal of the analysis (Sarstedt, Hair, Ringle, Thiele, and Gudergan, 2016; Sarstedt, Ringle, and Hair, 2017). Besides, PLS-SEM allows for much flexibility in terms of data requirements and the specification of relationships between constructs and indicator variables unlike other SEM tools. PLS method is suitable for research focussing on exploratory models and theory development even at higher levels of abstraction (Bulgurcu, Cavusoglu, and Benbasat, 2009; Becker *et al*., 2012; Hair *et al*., 2017).

`Based on the applications of PLS-SEM, it is important in this study as the research data may not be normally distributed. Besides, the research involves complicated predictive causal modeling with intervening variables between the independent and dependent variables including several latent constructs that are indirectly measured i.e. higher order constructs (HOCs). The lower order constructs (LOCs) are used to measure the HOCs in this study. Moreover, this study is exploratory building on the research objectives, research questions/hypotheses. In addition, PLS-

SEM can represent unobserved HOCs and observed LOCs, along with the hypothesized relationships and correct for measurement error in the estimation processes in the study (Hair *et al*., 2016). In literature, theory pertaining to KM capabilities investigation in university accounting practices is not well developed. PLS exploratory analysis method is therefore suitable in this research as this research explores and extend existing theory pertaining to KM in other institutional settings outside the context of study. Based on the above discussion, PLS-SEM is important as it will help this study to achieve research objective one, two, three and four respectively. To achieve the study aims, SmartPLS 3.0 is utilized as the analytical tool for testing the statistical assumptions beginning with the estimation of the measurement model, and lastly, structural model assessment.

3.6.3.1 Assessment of Measurement Models

Assessment of measurement model is defined as the extent to which an operationalization measures the concept it is supposed to measure (Bagozzi, Yi, and Phillips, 1991). The assessment of measurement is essential and necessary as it provides thorough testing for the reliability and validity of the scales employed to measure the latent constructs and their manifest variables (Loehlin, 1998). Diverse steps were used in the assessment of the measurement quality depending on whether it is a reflectively measurement model and/or formatively measurement model. This research involves complex variables which has been operationalized at higher levels of abstraction from previous studies. Besides, one of the goal of this research is to examine main effects, make the PLS path model more parsimonious and easier to grasp. Thus, second order constructs that contain two layers of constructs are involved. The higher order constructs (HOCs) and the lower order constructs (LOCs). The formative measurement theory is employed as there are sound theoretical reasons for thinking that formative modeling is more appropriate for measuring the relationship between the HOCs and their respective LOCs. The reflective measurement theory was employed for measuring the relationship between the LOCs and their measures.

The PLS algorithm was tested through assessment of validity and reliability of the construct measures in the model using the two-stage approach to hierarchical constructs recommended by Wetzels, Odekerken-Schröder, and Oppen (2009) and Ringle, Sarsted, and Straub (2012). In the first step, estimation of the LOCs for the four HOCs namely-AKMI, AKMP, FE, and UE were conducted. The LOCs are assessed

using evaluation criteria for reflective model since the study conceptualizes them as reflective factors. According to Hair *et al*. (2017), assessment of indicator reliability, internal consistency reliability, convergent validity and discriminant validity are the basic minimum requirements in evaluating reflective measurement models. The latent variable scores emanating from the LOCs estimation are reused for the HOCs assessment. Discriminant validity is expected for the LOCs making up each of the respective HOCs and for all the HOCs. Discriminant validity is also expected for all the LOCs. In the second step, the obtained latent variable scores are used as formative indicators for the HOCs. For the assessment of the relationship between the HOCs and LOCs in this study, the two-stage approach in which the LOCs for each HOCs are reused for the assessment of all HOCs is utilized. The reason is that the two-stage approach has the advantage of estimating a more parsimonious model on the higher-level analysis without needing the LOCs as indicated in Becker, Klein, and Wetzels (2012). Besides, the study involves formative HOC in an endogenous position. Drawing from Ringle, Sarsted, and Straub, (2012), utilizing the two-stage approach is appropriate whenever the PLS-SEM model involves a formative hierarchical latent variable model in an endogenous position. The reason is that compared to repeated indicator approach, the challenge associated with antecedent construct inability to explain variance of the HOC and their paths to it does not occur when the two-stage approach is used for formative HOCs like this study. in the study. In using the two-stage approach, the study uses the mode of measurement for the HOCs in the second stage that matches the construct's operationalization, i.e., Mode B for a formative and Mode A for a reflective construct (Becker *et al*., 2012). After the evaluation provides support for the measurement quality, the structural model is assessed.

3.6.3.2 Assessment of the Structural Model

Assessment of structural model is the second stage involved in estimation with PLS-SEM according to Hair *et al*. (2017). This covers the structural theory that involves testing the proposed hypotheses and addressing the relationships among the latent variables (HOCs) using observed variable scores as this study employ two-stage approach (Sarstedt, Ringle, and Hair, 2017). At this stage, collinearity, the relevance and significant of path coefficients, coefficient of determination, predictive relevance and

effect sizes are examined using bootstrapping as stated in Hair *et al*. (2016). Also, mediating effects at HOC levels are considered at this stage.

3.7 Ethical considerations

Ethics in research alludes to the correct direct of the research procedure through the upkeep of moral principles and rules (Davis, 2005; Johnson and Christensen, 2012). Ethics characterize the principles and rules under which research is led (Sparks and Pan, 2010). Researchers must treat individuals and associations taking an interest in the research with deference and researchers have an equal ideal to be dealt with genuinely and reasonably by respondents. A fundamental moral rule is the privilege of members to make an educated, intentional choice to participate in the research. Educated assent emerges from the arrangement of sufficient data about the research, its methods and the choices accessible to members. Classification and anonymity regard members' security, while the evasion of double dealing and mischief ensures members' confidence and wellbeing. All these moral concerns will be tended to suitably in this research.

3.8 Summary

This chapter gives an avocation of the exploration procedure and subtle elements of the examination configuration process proposed to be utilized to experimentally analyze the hypothetical knowledge management show for university accounting practice created in the past chapter. It concentrates on the underlying research philosophy, advancement and refinement of the questionnaire through two phases of questionnaire outline and pilot examine. Following a layout of the example determination and the strategies utilized for organization of the questionnaire in the literature review, information investigation procedures and moral contemplations were portrayed. AKM infrastructure capability is operationalized through four dimensions: accounting technology, accounting structure, accounting culture and people (T-shaped) skills. Accounting technology provides the network, structure provides the relationship, culture provides a shared context, and people (T-shaped) skills provides the expertise. Thus, the combination of these dimensions provides an excellent match between the construct and the concept.

CHAPTER 4

DATA ANALYSIS AND RESULTS

4.1 Introduction

The previous chapter outlined the research methodology used for testing the theoretical model and research hypotheses developed in Chapter 2. This chapter discusses the analysis and results of quantitative data derived in the study. It commences with data screening which entails missing data analysis, unengaged response, normality assessment, and response rate. Next is common method variance and the descriptive analysis of data according to the respective variables in the study. This is followed by exploratory factor analysis. The chapter ends with assessment of measurement and structural model using PLS-SEM technique.

4.2 Data Screening

After data are collected, it is important that data are screened to ensure that only individuals who meet the prescribed criteria complete the survey. Drawing from Hair, Hult, Ringle, and Sarstedt (2017), the primary issues that need to be examined when empirical data are collected utilizing questionnaires are missing data, suspicious response patterns, outliers, and data distribution.

4.2.1 Missing Data

According to Hair *et al.* (2016), missing data occur when a respondent either purposely or inadvertently fails to answer one or more questions. Originally, 420 questionnaires were administered to four research universities in Malaysia out of which 314 responses were returned. There were 12 cases of missing data for dependent

variables. They were deleted based on Kline (2016) suggestion to avoid any artificial increase in relationships with independent variables.

4.2.2 Suspicious Response Pattern

This entails respondents marking the same response for high proportion of the questions or inconsistency in answers. In this study, another data set of 20 responses was also excluded from the main study as some were clerical staffs, outside the study inclusion criteria (not in accounting practice). Also, there were 10 others that comprises of unengaged responses that were deleted from the data set. This represent a total of 30 suspicious response cases that were deleted.

4.2.3 Outlier

An outlier is an extreme response to a question, or extreme responses to all questions. The first step in dealing with outliers in this study was to identify them. This was detected with the aid of SPSS version 23 since it has an option called Explore that develops box plots and stem-and-leaf plots that facilitate the identification of outliers by respondent number (Mooi and Sarstedt, 2011). There were just ten cases of outlier identified. In the context of this study, the approach followed was not to simply remove them from the data set as there were not clear explanations for them. Thus, they were retained (Hair *et al*., 2017).

4.3 Response Rate

Following the sample selection procedures explained in the previous chapter, it was deemed appropriate to distribute a total of 420 questionnaires, of which 314 were returned, reflecting a response rate (usable and non-usable) of 75%. In the final analysis, after 42 cases were deleted (see section 4.2.1 and 4.2.2), 272 questionnaires were arrived at and was used in the main analysis. The final sample size of 272 derived portray a 65% rate of usable responses which is quite high. In SEM literature, data sets of 200 is usually considered as large with 250+ indicated as larger data sets in getting statistically meaningful results. Taking this rule into consideration as this study apply PLS-SEM, the sample of 272 obtained for this study is therefore adjudged adequate. Moreover, applying the post-hoc analysis in G-power statistics, the minimum effect size derived in the study is 0.03, alpha level of 0.05, together with the 272 usable data set utilized in the

main analysis, the power level attained approximate 89% (Faul, Erdfelde, Buchne, and Lan, 2009). The statistical power of 89% is more than the common level of 80%, this is an indication that the sample is enough.

4.4 Non-Response Bias

Nonresponse bias occurs when some respondents included in the sample do not respond due to the respondent absence and not from collection of erroneous data. It is a crucial issue to consider during data collection in survey research, especially in online surveys as it can affect the generalizability of the research findings (Hair *et al*., 2016). In this study, questionnaire was self-administered with the aid of a contact person and nonresponse bias was minimized by not limiting the data collection time to comply with a strict deadline. Moreover, there was no late and early response received from the respondent. Besides, the survey medium was thoroughly pretested before the main survey. In addition, the respondents were reassured that the data collected will be kept completely confidential with the information provided viewed as part of the whole sample and not individually scrutinized.

4.5 Response Profile

The respondent was classified according to gender, age, level of education, job position, and years in their current university (experience). As shown in Table 4.1, more than two-thirds of the respondents were females (71.7%) which reflects their dominance in non-academic accounting positions of universities in Malaysia compared to the male (28.3%) counterpart. A majority (88.2%) were under 50 years old, with 31–40 years old being the largest group (46%) followed by those younger than 30 years (26.5%). Only 11.4 % were between 51–60 and a very small percentage (0.4%) was aged over 60 years.

The demographic profile of the respondents for Universiti Sains Malaysia (USM), Universiti Malaya (UM), Universiti Putra Malaysia (UPM), Universiti Kebangsaan Malaysia (UKM) is depicted in Table 4.3. Out of the 272 returned valid responses, 67, 50, 83, and 72 valid responses were returned from USM, UM, UPM, and UKM representing 25%, 18%, 31%, and 27% of the total valid responses, respectively. USM had the highest response, followed by UKM. The least respondent is UM. The highest level of education achieved by most respondents was bachelor's degree, accounting for 36% of the sample, followed by Diploma (28.7%) and graduate diploma

(19.9%). The remaining respondents obtained either a high school or master's degree (10.3% and 5.1%, respectively).

The respondents' current job functions/positions are also summarized in Table 4.1. Given that the survey targeted accounting/finance officers as key informants, hence all of these informants were used as respondents in the study. Other administrative officers amounting to 40 respondents was excluded due to the study inclusion criteria. Finance officers position up to the position of bursar accounted for 74.6% of the population while finance assistant and assistant accountant summed up the remainder (25.4%). Finance officer was the largest, accounting for 39.7% of the total, followed by senior finance officers (19.1%), deputy/assistant bursar (14.7%), assistant accountant (14.3%), and finance assistant (11%). The working experience distributions shows that the respondents with < 3 years working experience accounted for 22.8% of the total of respondent while those with working experience > 3 years accounted for 77.2% of the total respondents. This portrays that the respondents had the capacity to answer the questions to a reasonable extent. Having established the characteristics of the respondents, normality was assessed next.

Table 4. 1 Respondents profile

Item	Sum Item	Frequency	Valid Percent	Cumulative Percent
Gender	Male	77	28.3	28.3
	Female	195	71.7	100
	Total	272	100	
Age	<30	72	26.4	26.4
	31-40	125	46.0	72.4
	41-50	43	15.8	88.2
	51-60	31	11.4	99.6
	>60	1	0.4	100
	Total	272	100	

Table 4.1 Continued

Item	Sum Item	Frequency	Valid Percent	Cumulative Percent
University	UM	50	18.4	18.4
	UKM	72	26.5	44.9
	USM	83	30.5	75.4
	UPM	67	24.6	100.0
	Total	272	100.0	
Education	High School	28	10.3	10.3
	Diploma	78	28.7	39.0
	Bachelor	98	36.0	75.0
	Graduate Diploma	54	19.9	94.9
	Masters	14	5.1	100.0
	Total	272	100.0	
Position	Bursar	3	1.1	1.1
	Deputy/Assistant Bursar	40	14.7	15.8
	Senior Finance Officer	52	19.1	34.9
	Finance Officer	108	39.7	74.6
	Finance Assistant	30	11.0	85.7
	Assistant Accountant	39	14.3	100.0
	Total	272	100	
Working experience	<1	12	4.4	4.4
	1-2	50	18.4	22.8
	3-5	105	38.6	61.4
	6-10	65	23.9	85.3
	11-20	32	11.8	97.1
	>20	8	2.9	100.0
	Total	272	100.0	

4.6 Construct Validation- Exploratory Factor Analysis (EFA)

EFA was conducted in this study to summarize data by grouping variables that are correlated together. This study extended existing literature to provide a research model to assess KM in university accounting practices as not much is known regarding this context. In Chapters 2 AKM capability components were conceptualized. In addition, an explanation of measurement items for each of the LOCs was elaborated on while providing the relevant literature used in the previous chapter. Validating the tools used in the study was deemed important, because there is scarcity of literature on their usage in this context. Besides, alternative relationship may emerge different from earlier anticipated. Principal axis factoring (PAF) with varimax was the extraction and rotation method employed in the study. The reason is that PAF do not rely on distributional assumptions and therefore provide more accurate results with non-normal data like this study data (Fabrigar and Wegener, 2011). In addition, less likely to yield improper solutions for instance, produce Heywood cases or fail to converge (Costello and Osborne, 2005). Compared to other rotation method, varimax rotation was employed to obtain a clearer pattern factor matrix results. The following criteria were applied:

The Bartlett test of sphericity. The test allows for the presence of correlations among the variables to be studied. Such a test gives evidence of the statistical probability that a correlation matrix has significant correlations among some of the variables concerned (Hair *et al*., 2016).

Measures of sampling adequacy. Such measures calculate the entire correlation matrix and each individual variable, to determine the appropriateness of applying factor analysis procedure to the study. The measures of sampling adequacy above 0.5 for the whole matrix or for an individual variable indicates appropriateness, with measures above 0.8 being taken to be meritorious (Hair *et al*., 2016).

Percentage of variance shows a cumulative percentage of total variance extracted in relation to successive factors. A high cumulative percentage is evidence of the practical significance of the factors derived.

Eigen value Application of the eigenvalue greater than 1 rule ensures that only those factors that have eigenvalues > 1 are extracted.

4.6.1 Factor Structure and Reliability for AKMI

Based on the above criteria, the factor analysis procedure was performed to determine the psychometric properties of the LOCs for AKMI as HOC. An analysis of 29 items identified four dimensions with eigenvalues > 1.00, consisting of 10.952, 2.052, 1.773, and 1.365 respectively. The measure of sampling adequacy was found to be 0.917 and significant at 0.000, which exceeded the meritorious value of 0.8 (Hair *et al*., 2016). Of the original 29 items, 2 items (TI1, CI1) were dropped, with the remaining 27 items loading satisfactorily on the four factors, with factor loading values ranging from the lowest of 0.503 to the highest of 0.767. The reliability (Cronbach's alpha) of the four factors of the LOCs for AKMI as HOC ranges from 0.858 to 0.889. The variance that the four LOCs can explain ranges from 11.289 to 14. 766 (See Table 4.2). It is important to note that LOCs were not renamed as alternative relationships and items did not emerged differently as to how they had appeared in the main questionnaire.

Table 4. 2 Factor structure and reliability for AKMI

	Factor			
	1	2	3	4
TI2				0.574
TI3				0.503
TI4				0.575
TI5				0.624
TI6				0.733
TI7				0.691
CI2		0.591		
CI3		0.594		
CI4		0.732		
CI5		0.707		
CI6		0.638		
CI7		0.542		
CI8		0.534		
CI9		0.519		
SI1	0.553			
SI2	0.601			
SI3	0.565			
SI4	0.620			
SI5	0.631			
SI6	0.617			
SI7	0.572			
SI8	0.588			
PI1			0.607	
PI2			0.715	
PI3			0.657	
PI4			0.767	
PI5			0.723	
Eigenvalues	10.952	2.050	1.773	1.365
Percentage variance explained	14.766	13.956	13.067	11.289
KMO measure of sampling adequacy:	0.917			
Level of significance:	0.000			
Cronbach's alpha	0.889	0.883	0.872	0.858

Based on the outcome of the EFA four distinct sub-set of measures which strongly reflect four different unrelated constructs emerged. Thus, it is reasonable to argue that measures comprising each sub-set to correlate very strongly with one another

and to be largely unrelated to measures from the other sub-set. Therefore, suggest that the four constructs can be reflectively measured.

4.6.2 Factor Structure and Reliability for AKMP

Based on the already specified criteria, the factor analysis procedure was performed to determine the psychometric properties of the LOCs for AKMP as HOC. An analysis of 26 items identified four dimensions with eigenvalues > 1.00, consisting of 10.948, 2.040, 1.441, and 1.125 respectively. The measure of sampling adequacy was found to be 0.930 and significant at 0.000, which exceeded the meritorious value of 0.8 (Hair *et al*., 2016). None of the original 26 items were dropped as they loaded satisfactorily on the four factors, ranging from 0.519 to 0.778. The reliability (Cronbach's alpha) of the four factors of the LOCs for AKMP as HOC ranges from 0.854 to 0.885. The variance that the four LOCs can explain ranges from 10.959% to 14. 886% (See Table 4.3). It is important to note that LOCs were not renamed as alternative relationships and items did not emerged differently as to how they had appeared in the initial alignment.

Table 4. 3 Factor structure and reliability for AKMP

	Factor			
	1	2	3	4
ACP1			0.649	
ACP2			0.588	
ACP3			0.621	
ACP4			0.676	
ACP5			0.570	
ACP6			0.547	
CP1	0.529			
CP2	0.563			
CP3	0.554			
CP4	0.519			
CP5	0.554			
CP6	0.559			
CP7	0.659			
CP8				
APP1				0.634
APP2				0.523
APP3				0.536
APP4				0.543
APP5				0.583
APP6				0.648
APP7				0.522
PP1		0.698		
PP2		0.753		
PP3		0.624		
PP4		0.778		
PP5		0.608		
Eigenvalues	10.948	2.040	1.441	1.125
Percentage variance explained	14.886	13.534	13.347	10.959
KMO measure of sampling adequacy:	0.930			
Level of significance:	0.000			
Cronbach's alpha	0.866	0.885	0.861	0.854

Based on the outcome of the EFA four distinct sub-set of measures which strongly reflect four different unrelated constructs emerged. Thus, it is reasonable to argue that measures comprising each sub-set to correlate very strongly with one another and to be largely unrelated to measures from the other sub-set. Therefore, suggest that the four constructs can be reflectively measured.

4.6.3 Factor Structure and Reliability for FE

Based on the already specified criteria, the factor analysis procedure was performed to determine the psychometric properties of the LOCs for FE as HOC. Originally, they were only two LOCs, *viz*., OE and ME. An analysis of the 20 items portrayed four dimensions with eigenvalues > 1.00, consisting of 10.107, 1.626, 1.200, and 1.033 respectively. The measure of sampling adequacy was found to be 0.922 and significant at 0.000, which exceeded the meritorious value of 0.8 (Hair *et al*., 2016). Two items (OE6, ME6) of the original 20 items were dropped. The remaining 18 items loaded satisfactorily on the four factors, ranging from 0.507 to 0.788. The reliability (Cronbach's alpha) of the four factors as LOCs for FE as HOC ranges from 0.838 to 0.890. The variance that the four LOCs can explain ranges from 13.229% to 19.400% (See Table 4.4). It is important to note that LOCs were renamed as alternative relationships and items did emerged differently from how they had appeared in the main questionnaire.

The first and third extracted factor retained the character of the initial items designed to measure operational related effectiveness and managerial related effectiveness. For the second extracted factor, the items loaded separately from the original anticipated scale, which meant that they represented a different dimension. As all five items seemed to focus on IT related matters, it was therefore deemed appropriate to call the dimension IT related effectiveness (IEE). For the fourth extracted factor, the items loaded separately from the original anticipated scale, which meant that they represented a different dimension. As all four items seemed to focus on strategic related matters, it was therefore deemed appropriate to call the dimension Strategic related effectiveness (SEE). OE1, OE2, OE3, OE4 are regrouped as operational related effectiveness (OEE), OE5, OE7, OE8, OE9, OE10 as informational related effectiveness (IEE), ME1, ME2, ME3, ME4, ME5 as managerial related effectiveness, and ME7, ME8, ME9, ME10 as strategic related effectiveness (SEE). The items for SEE are renamed SE1, SE2, SE3, SE4 while IEE items are renamed IE1, IE2, IE3, IE4, IE5. Please, note that item OE6 and ME6 were deleted based on the outcome of the EFA.

Table 4. 4 Factor structure and reliability for FE

	Factor			
	1	2	3	4
OE1		0.622		
OE2		0.678		
OE3		0.730		
OE4		0.606		
OE5	0.512			
OE6				
OE7	0.589			
OE8	0.754			
OE9	0.732			
OE10	0.773			
ME1				0.670
ME2				0.764
ME3				0.506
ME4				0.545
ME5				0.507
ME6				
ME7			0.677	
ME8			0.788	
ME9			0.595	
ME10			0.626	
Eigenvalues	10.107	1.626	1.200	1.033
Percentage variance explained	19.400	15.634	14.396	13.229
KMO measure of sampling adequacy:	0.922			
Level of significance:	0.000			
Cronbach's alpha	0.838	0.890	0.861	0.880

Based on the outcome of the EFA four distinct sub-set of measures which strongly reflect four different unrelated constructs emerged. Thus, it is reasonable to argue that measures comprising each sub-set to correlate very strongly with one another and to be largely unrelated to measures from the other sub-set. Therefore, suggest that the four constructs can be reflectively measured.

4.6.4 Factor Structure and Reliability for UE

Based on the already specified criteria, the factor analysis procedure was performed to determine the psychometric properties of the two LOCs for UE as HOC. An analysis of the 20 items portrayed two dimensions with eigenvalues > 1.00, consisting of 9.554, and 1.685 respectively. The measure of sampling adequacy was

found to be 0.940 and significant at 0.000, which exceeded the meritorious value of 0.8 (Hair *et al*., 2016). Two items (FP1, NP5) out of the original 20 items were dropped. The remaining 18 items loaded satisfactorily on the two factors, ranging from 0.525 to 0.803. The reliability (Cronbach's alpha) of the two factors as LOCs for UE as HOC 0.926 and 0.917. The variance that the two LOCs can explain ranges from 28.143% to 29.678% (See Table 4.5). It is important to note that LOCs were not renamed as alternative relationships and items did not emerged differently from how they had appeared in the main questionnaire.

Table 4. 5 Factor structure and reliability for UE

	Factor	
	1	2
FP2	0.525	
FP3	0.681	
FP4	0.693	
FP5	0.733	
FP6	0.735	
FP7	0.739	
FP8	0.607	
FP9	0.681	
FP10	0.803	
NP1		0.679
NP2		0.689
NP3		0.661
NP4		0.740
NP6		0.690
NP7		0.626
NP8		0.691
NP9		0.569
NP10		0.665
Eigenvalues	9.554	1.685
Percentage variance explained	29.678	28.143
KMO measure of sampling adequacy:	0.940	
Level of significance:	0.000	
Cronbach's alpha	0.926	0.917

Based on the outcome of the EFA two distinct sub-set of measures which strongly reflect two different unrelated constructs emerged. Thus, it is reasonable to

argue that measures comprising each sub-set to correlate very strongly with one another and to be largely unrelated to measures from the other sub-set. Therefore, suggest that the two constructs can be reflectively measured.

4.7 Summary of Variables (HOCs and LOCs)

Overall, the variables included in this study for further analysis based on the outcome of the EFA conducted are presented in the Table 4.6.

Table 4. 6 Summary of variables (HOCs and LOCs)

Variable label		Variable name
HOC	AKMI	Accounting Knowledge Management Infrastructure capability
LOC	TIE	Accounting Technology
	SIE	Accounting Structure
	CIE	Accounting Culture
	PIE	Accounting People
HOC	AKMP	Accounting Knowledge Management Process Capability
LOC	ACPE	Accounting Knowledge Acquisition Process
	APPE	Accounting Knowledge Application Process
	CPE	Accounting Knowledge Conversion Process
	PPE	Accounting Knowledge Protection Process
HOC	FE	Accounting Functional Effectiveness
LOC	SEE	Strategic Related Effectiveness
	IEE	Information Related Effectiveness
	OEE	Operational Related Effectiveness
	MEE	Managerial Related Effectiveness
HOC	UE	University Performance
LOC	FPE	Financial Performance
	NPE	Non-Financial Performance

4.8 Normality Assessment

In literature, there is a debate on whether normality should be assessed or not when using PLS-SEM as it is a nonparametric statistical method. The research stream that think that it should be assessed believe that extremely non-normal data inflate standard errors obtained from bootstrapping and thus decrease the likelihood of some significance relationships assessed (Hair, Ringle, and Sarstedt, 2011). The other research

stream believe that normality need not assessed as PLS-SEM provide good model estimations even with extremely non-normal data (Ringle, Göt, Wetzels, and Wilson, 2009). However, normality is assessed as it is important in emphasizing the estimation method in SEM chosen in this study. Consequently, skewness and kurtosis measures of distribution that help to detect the extent of deviation from normality are not examined in this study. Normality assessment may be conducted using either a graphical or numerical procedure. In this study, numerical procedures include inferential tests, such as the Kolmogorov-Smirnov (K-S) test and the Shapiro-Wilk (S-W) test are employed. The result of the test using SPSS version 23.0 is indicated below. According to the Kolmogorov-Smirnov (K-S) test and the Shapiro-Wilk (S-W) test, the null hypothesis (i.e. that a difference exists between the distribution of the data set and the normal distribution) was tested. In keeping with convention, the alpha level was set at 0.05. The null hypothesis is accepted if the p-values are below 0.05. If p-values are above 0.05, we reject the hypothesis. The Komologrov and Shapiro-wilk test in Table 4.7 indicated that the null hypothesis should be accepted as all values are significant (< 0.05). Thus, in terms of the shapiro-wilk test, we can assume that our data are approximately non-normally distributed.

Table 4. 7 Tests of Normality

	Kolmogorov-Smirnov[a]		Shapiro-Wilk	
	Statistic	Sig.	Statistic	Sig.
TIE	0.182	0.000	0.938	0.000
CIE	0.171	0.000	0.943	0.000
SIE	0.154	0.000	0.953	0.000
PIE	0.185	0.000	0.935	0.000
ACPE	0.176	0.000	0.949	0.000
CPE	0.142	0.000	0.964	0.000
APPE	0.172	0.000	0.950	0.000
PPE	0.190	0.000	0.927	0.000
OEE	0.197	0.000	0.926	0.000
IEE	0.172	0.000	0.937	0.000
MEE	0.185	0.000	0.929	0.000
FPE	0.182	0.000	0.936	0.000
NPE	0.155	0.000	0.945	0.000

a. Lilliefors Significance Correction

4.9 Descriptive Analysis

In this research, descriptive statistics were performed for the responses gotten to determine the means and standard deviations for the observed variables in the study. Moreover, this is necessary as to buttress the utilization of suitable non-parametric test in the latter analysis of the study.

4.9.1 Descriptive Analysis of AKMI LOCs

The highest mean score for AKMI LOCs was attained by CIE (4.171), with a standard deviation of 0.446, followed by TIE, with a mean score of 4.16, and a standard deviation of 0.454 (See Table 4.8). Next was PIE (4.140) with a standard deviation of 0.530. The lowest mean in terms of AKMI LOCs was recorded for SIE (4.09), and a standard deviation of 0.461. The range of standard deviations (0.530–0.446) for the different LOCs of AKMI indicates that the responses received in response to the questions asked were approximately dispersed. By implication, such responses were statistically dispersed from the normal distribution.

4.9.2 Descriptive Analysis of AKMP LOCs

For the AKMP LOCs (See Table 4.8), the highest mean score of 4.163 was attained by PPE, with a standard deviation of 0.501, followed by ACPE, with a mean score of 4.127, and a standard deviation of 0.484. Next was APPE (4.112) with a standard deviation of 0.451. The lowest mean in terms of AKMP LOCs was documented for CPE (4.109), and a standard deviation of 0.464. The range of standard deviations (0.501–0.451) for the diverse LOCs of AKMP indicates that the responses received in response to the questions asked were approximately dispersed. By implication, such responses were approximately dispersed from the normal distribution.

4.9.3 Descriptive Analysis of FE LOCs

Here (See Table 4.8), the highest average score of 4.161 was attained by IEE, with a standard deviation of 0.533. Next was OEE, with a mean score of 4.159, and a standard deviation of 0.524, followed by MEE (4.150) with a standard deviation of 0.505. The lowest mean was documented for SEE (4.087), and a standard deviation of 0.578. The range of standard deviations (0.505–0.578) for the diverse LOCs of FE

reveals that the responses received in relation to the questions asked were approximately dispersed. By implication, such responses were approximately dispersed from the normal distribution.

4.9.4 Descriptive Analysis of UE LOCs

Pertaining to UE, FPE and NPE are the only LOCs. Compared to FPE mean score (4.088), NPE had a higher mean score of 4.154 (See Table 4.8). The standard deviation for NPE is 0.500 while that of FPE is 0.512. The range of standard deviations (0.500–0.512) for the LOCs of UE reveals that the responses received in relation to the questions asked were not approximately dispersed. Overall, examining the 14 LOCs as a whole, standard deviations ranges from 0.446 to 0.578. This indicated that the responses were approximately dispersed from the normal distribution. Furthermore, justifies the non-parametric technique employed in the study.

Table 4. 8 Descriptive analysis of the study variables

Variable label	Mean	Std. Deviation
TIE	4.160	0.454
CIE	4.171	0.446
SIE	4.091	0.461
PIE	4.140	0.530
ACPE	4.127	0.484
CPE	4.109	0.464
APPE	4.112	0.451
PPE	4.163	0.501
OEE	4.159	0.524
IEE	4.161	0.533
MEE	4.150	0.505
SEE	4.087	0.578
FPE	4.088	0.512
NPE	4.154	0.500

4.10 Modified Research Framework

To the best of our knowledge, this study represents the first attempt to propose that accounting function performance can be modelled as HOC let alone using the four set of variables as its LOCs utilizing PLS path modelling. Resulting from the exploratory factor analysis procedure that was performed earlier in section 4.6, new variables emerged. Consequently, variables had to be renamed along with the original conceptual framework depicted in Figure 4.1 modified to fit the variables identified. Consequently, hypotheses 3 in section 2.6.2 which state that FE is a formative higher order construct comprising operational related effectiveness (OEE), and managerial related effectiveness (MEE) is re-hypothesized as follows:

H3: FE is a formative higher order construct comprising operational related effectiveness (OEE), managerial related effectiveness (MEE), strategic related effectiveness (SEE), and information related effectiveness (IEE).
The sub-hypotheses are:

H3a OEE is positively related to FE
H3b MEE is positively related to FE
H3c SEE is positively related to FE
H3d IEE is positively related to FE

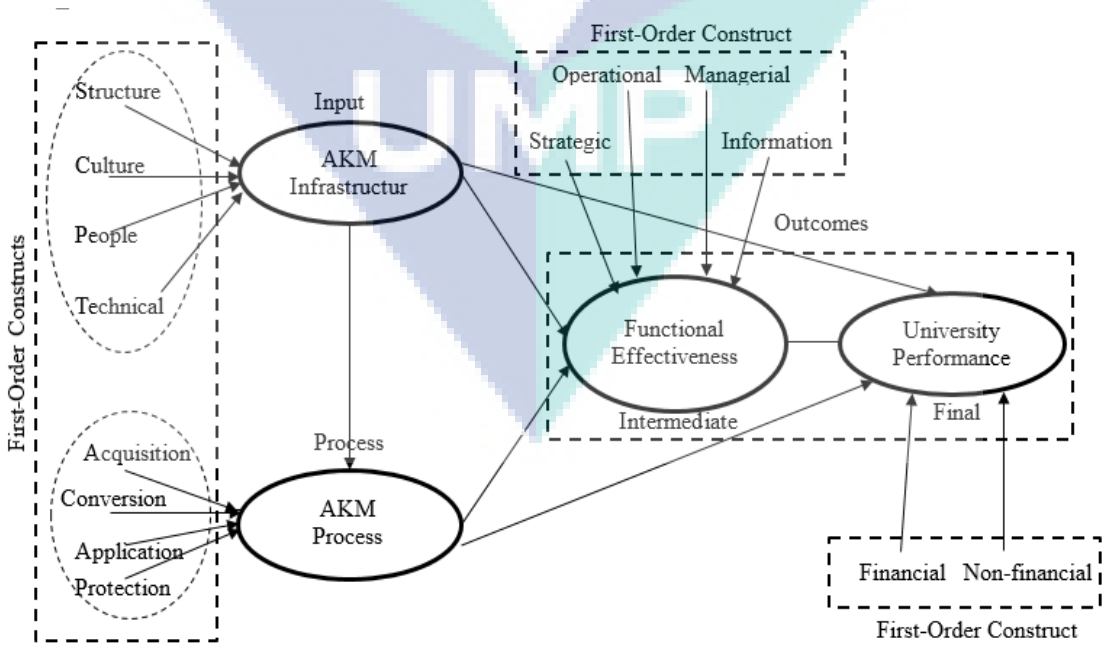

Figure 4. 1 Modified research framework

4.11 Common Method Bias

Common method variance (CMV) is the variance that is attributable to the measurement method rather than the constructs the measures represent as indicated in Podsakoff, Mackenzie, Lee, and Podsakoff (2003). Method variance can either inflate or deflate observed relationships between constructs, thus leading to both Type I and Type II errors (Podsakoff and Organ, 1986). One procedure for controlling CMV is getting measures from various sources like different sections of the university. The nature of this study does not warrant different respondent for different section of the questions. The reason is that the study focuses on specific task KM investigation requiring responses from only those that are knowledgeable and involved in the everyday practice. Hence, deem it not necessary to involve other sections of the university to minimise potential biases if any inherent in the research.

While it was not reasonable in this research to separately collect and match measures of independent and dependent variables, opportunity was given for wide participation of all accountants in each of the accounting functions in the research universities investigated. Thus, the method effect that might result from a common rater assuming it was only administered to a subgroup in the accounting functions was mitigated. The anonymity of respondents made it unappealing to discuss viewpoints with accounting function managers and other accounting staff that may warrant biased responses. For instance, searching for similarities in the pattern of responses to the questions asked of them that would not otherwise exist in their functional accounting practice. Apart from methodological procedure inbuilt by the researcher to minimize CMV, there are statistical techniques that have been designed to assess and control for CMV in studies. An example of such is the Harman's single factor test conducted in the study (See Table 4.9). The unrotated principal axis factoring solution revealed that the single factor extracted accounted for only 35% variance which is below the CMV threshold of 50% stipulated in literature (See Table 4.9).

Meanwhile, these additional statistical techniques have been criticized as not effective in detecting CMV and unnecessary in research. Besides, Malhotra, Kim, and Patil (2006) and Meade, Watson, and Kroustalis (2007) through empirical validation have disproved that CMB does not necessarily jeopardize the validity of a study. In addition, the number of variances attributable to method biases varied considerably by

discipline, research context and by the type of construct being investigated (Podsakoff *et al*., 2003). This research is conducted in an accounting context in which one of the fundamental principles is integrity. Hence, respondents in this research context are expected to give honest and not just rational or bias answers. Besides, the participants were neither coaxed to respond nor asked to provide retrospective accounts of their attitudes in contrast with others which can result to bias response. Interestingly, Podsakoff *et al*. (2003) pointed out that procedural remedies can diminish, if not remove, the potential effects of CMV on the findings of a research. Drawing from these arguments, this study believed that CMV is not likely to be a fundamental problem in this context.

Table 4. 9 Harman's single factor test

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.479	35.561	35.561	9.479	35.561	35.561
2	0.800	17.150	52.711			
3	0.735	12.251	64.962			
4	0.603	9.308	74.271			
5	0.451	5.223	79.494			
6	0.402	3.872	83.365			
7	0.389	2.775	86.141			
8	0.369	2.637	88.778			
9	0.355	2.533	91.311			
10	0.317	2.264	93.575			
11	0.289	2.061	95.636			
12	0.231	1.652	97.288			
13	0.198	1.415	98.702			
14	0.182	1.298	100.000			

4.12 Assessment of Measurement Model

Model estimation delivers empirical measures of the relationships between the indicators and the constructs as well as between the constructs. The PLS algorithm was tested through assessment of validity and reliability of the construct measures in the model using the two-stage approach to hierarchical constructs recommended by Wetzels,

Odekerken-Schröder, and Oppen (2009) and Ringle, Sarsted, and Straub (2012). In the first step, estimation of the LOCs for the four HOCs namely-AKMI, AKMP, FE, and UE were conducted and followed by saving the latent variable scores. In the second step, the obtained latent variable scores are used as formative indicators for the HOCs. The research model has formative relationships going from the LOCs to the HOCs, representing each LOCs relative contribution to forming the construct. It is worthy to reiterate that the measurement fits for reflective model are considered first as the study LOCs are reflectively measured.

4.12.1 LOCs Measurement Model Assessment

The initial path model for stage one is depicted in Figure 4.2. Table 4.10 shows the results and evaluation criteria outcomes for all the fourteen LOCs reflective measurement models. As stipulated by Hair *et al*. (2016), the reflective measurement model should be evaluated for internal consistency using composite reliability, individual indicator reliability, average variance extracted (AVE) to evaluate convergent validity and discriminant validity to achieve the fitness of measurement model. Within this study, all factor loadings were greater than 0.50, with most loadings exceeding 0.60. Note that items with loadings greater than 0.60 but closely approximate 0.70 were not deleted from the study to enhance content validity. Besides, can still be considered significant (Hair *et al*., 2016). The factor loadings ranged from 0.655 to 0.902, indicating that all indicators exhibit a sufficient level of reliability. Also, the average variance extracted (AVE) for each of the construct surpasses the recommended threshold of 0.50 which provide support for the measures convergent validity. Composite reliability has values of high internal consistency reliability (> 0.70) ranging from 0.894 to 0.934 as demonstrated in Table 4.10. UE (not more than the unacceptable limit of (0.95) as stated in Hair *et al*. (2016). These results suggest that the fourteen reflective constructs measures exhibit sufficient levels of internal consistency reliability. Thus, reasonable to conclude that all values fall within the acceptable range to conclude good reliability. It is worthy to mention that composite reliability is considered instead of Cronbach's alpha as it is a preferred alternative as a test of construct reliability in a reflective model. Besides compared to Cronbach's alpha, composite reliability may lead to higher estimates of true reliability. All constructs passing these criteria give reason to conclude that the variables

measures have convergent validity and reliability. Having considered validity and reliability of construct, discriminant validity is subsequently examined.

Discriminant validity reflects the extent to which the construct is unique and not simply a reflection of other constructs by empirical standards (Hair *et al*. 2017). In assessing discriminant validity in this study, the Henseler, Ringle, and Sarstedt (2015) heterotrait-monotrait ratio (HTMT) of correlations is employed. The reason is that neither Fornell-Larcker criterion nor cross-loadings approach can reliably detects discriminant validity problems as indicated in Henseler *et al*. (2015). From Table 4.11, as there are constructs that are conceptually alike in the study, all the results are clearly below the suggested threshold value of 0.90. Also, the result after running the bootstrapping procedure with 5,000 samples according to established rule, no sign changes option, BCa bootstrap confidence intervals, and one-tailed testing at 0.05 significance level (which corresponds to a 95% confidence interval), reveal that none of the HTMT confidence intervals includes the value of 1. As all the HTMT values are significantly different from 1, therefore conclude that discriminant validity is established in the study. Having attained the reliability and validity of the LOCs construct measures, their latent variable scores were saved and reused as manifest variables in the HOCs measurement model assessment.

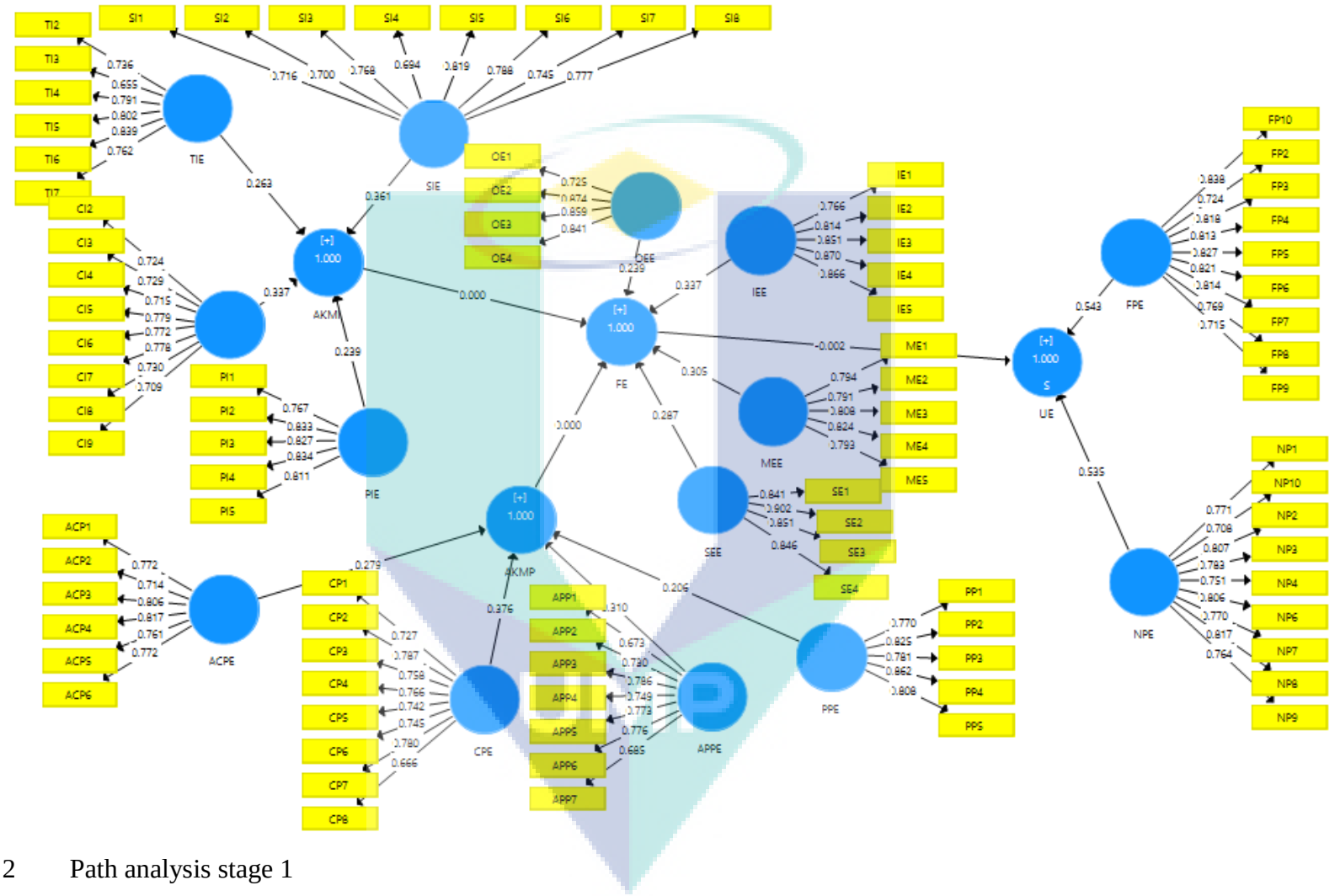

Figure 4. 2 Path analysis stage 1

Table 4. 10 Assessment of LOC reflective measurement model

			Convergent Validity		Internal consistency reliability		Discriminant validity
HOC	LOCs	Items	Loadings	AVE	Composite reliability	Cronbach's Alpha	
			> 0.60	**> 0.50**	**0.89-0.93**	**0.84-0.92**	**HTMT confidence interval does not include 1**
AKMI	TIE	TI2	0.736	0.587	0.895	0.858	Yes
		TI3	0.655				
		TI4	0.791				
		TI5	0.802				
		TI6	0.839				
		TI7	0.762				
	SIE	SI1	0.716	0.566	0.912	0.890	Yes
		SI2	0.700				
		SI3	0.768				
		SI4	0.694				
		SI5	0.819				
		SI6	0.788				
		SI7	0.745				
		SI8	0.777				

Table 4.10 Continued

			Convergent Validity		Internal consistency reliability		Discriminant validity
HOC	LOCs	Items	Loadings	AVE	Composite reliability	Cronbach's Alpha	
			> 0.60	**> 0.50**	**0.89-0.93**	**0.84-0.92**	**HTMT confidence interval does not include 1**
	CIE	CI2	0.724	0.551	0.908	0.884	Yes
		CI3	0.729				
		CI4	0.715				
		CI5	0.779				
		CI6	0.772				
		CI7	0.778				
		CI8	0.730				
		CI9	0.709				
	PIE	PI1	0.767	0.664	0.908	0.873	Yes
		PI2	0.833				
		PI3	0.827				
		PI4	0.834				
		PI5	0.811				
AKMP	ACPE	ACP1	0.772	0.599	0.900	0.866	Yes
		ACP2	0.714				
		ACP3	0.806				
		ACP4	0.817				
		ACP5	0.761				
		ACP6	0.772				

Table 4.10 Continued

			Convergent Validity		Internal consistency reliability		Discriminant validity
HOC	LOCs	Items	Loadings	AVE	Composite reliability	Cronbach's Alpha	
			> 0.60	**> 0.50**	**0.89-0.93**	**0.84-0.92**	**HTMT confidence interval does not include 1**
	CPE	CP1	0.727	0.558	0.910	0.886	Yes
		CP2	0.787				
		CP3	0.758				
		CP4	0.766				
		CP5	0.742				
		CP6	0.745				
		CP7	0.780				
		CP8	0.666				
	APPE	APP1	0.673	0.547	0.894	0.862	Yes
		APP2	0.730				
		APP3	0.786				
		APP4	0.749				
		APP5	0.773				
		APP6	0.776				
		APP7	0.685				
	PPE	PP1	0.770	0.656	0.905	0.868	Yes
		PP2	0.825				
		PP3	0.781				
		PP4	0.862				
		PP5	0.808				

Table 4.10 Continued

			Convergent Validity		Internal consistency reliability		Discriminant validity
HOC	LOCs	Items	Loadings	AVE	Composite reliability	Cronbach's Alpha	
			> 0.60	**> 0.50**	**0.89-0.93**	**0.84-0.92**	**HTMT confidence interval does not include 1**
FE	SEE	SE1	0.841	0.74	0.919	0.883	Yes
		SE2	0.902				
		SE3	0.851				
		SE4	0.846				
	IEE	IE1	0.766	0.696	0.919	0.890	Yes
		IE2	0.814				
		IE3	0.851				
		IE4	0.870				
		IE5	0.866				
	OEE	OE1	0.725	0.683	0.896	0.845	Yes
		OE2	0.874				
		OE3	0.859				
		OE4	0.841				
	MEE	ME1	0.794	0.644	0.900	0.862	Yes
		ME2	0.791				
		ME3	0.808				
		ME4	0.824				
		ME5	0.793				

Table 4.10 Continued

			Convergent Validity		Internal consistency reliability		Discriminant validity
HOC	LOCs	Items	Loadings	AVE	Composite reliability	Cronbach's Alpha	
			> 0.60	**> 0.50**	**0.89-0.93**	**0.84-0.92**	**HTMT confidence interval does not include 1**
UE	FPE	FP10	0.838	0.631	0.934	0.923	Yes
		FP2	0.724				
		FP3	0.818				
		FP4	0.813				
		FP5	0.827				
		FP6	0.821				
		FP7	0.814				
		FP8	0.769				
		FP9	0.715				
	NPE	NP1	0.771	0.602	0.931	0.917	Yes
		NP10	0.708				
		NP2	0.807				
		NP3	0.783				
		NP4	0.751				
		NP6	0.806				
		NP7	0.770				
		NP8	0.817				
		NP9	0.764				

Table 4. 11 LOC Discriminant validity HTMT

	ACPE	APPE	CIE	CPE	FPE	IEE	MEE	NPE	OEE	PIE	PPE	SEE	SIE	TIE
ACPE														
APPE	0.733 [0.658, 0.801]													
CIE	0.627 [0.582, 0.733]	0.659 [0.582, 0.733]												
CPE	0.797 [0.724, 0.861]	0.844 [0.790, 0.895]	0.665 [0.580, 0.740]											
FPE	0.696 [0.632, 0.761]	0.726 [0.631, 0.808]	0.582 [0.489, 0.662]	0.716 [0.638, 0.801]										
IEE	0.681 [0.607, 0.748]	0.726 [0.643, 0.792]	0.519 [0.428, 0.603]	0.696 [0.620, 0.767]	0.842 [0.789, 0.889]									
MEE	0.634 [0.550, 0.714]	0.697 [0.611, 0.771]	0.538 [0.430, 0.628]	0.748 [0.682 0.809]	0.736 [0.661, 0.804]	0.731 [0.647, 0.805]								
NPE	0.660 [0.581, 0.738]	0.713 [0.612, 0.805]	0.550 [0.444, 0.643]	0.665 [0.584, 0.748]	0.78 [0.713, 0.835]	0.678 [0.585, 0.756]	0.787 [0.724, 0.851]							
OEE	0.642 [0.564, 0.717]	0.676 [0.590, 0.753]	0.556 [0.453, 0.644]	0.619 [0.531, 0.710]	0.643 [0.545, 0.723]	0.692 [0.594, 0.778]	0.746 [0.660 0.819]	0.753 [0.662, 0.822]						
PIE	0.699 [0.609 0.781]	0.692 [0.610, 0.766]	0.604 [0.516, 0.679]	0.758 [0.690 0.822]	0.664 [0.591, 0.738]	0.647 [0.573, 0.725]	0.611 [0.534, 0.690]	0.597 [0.517, 0.679]	0.506 [0.423, 0.592]					
PPE	0.589 [0.489, 0.680]	0.604 [0.489, 0.680]	0.607 [0.513, 0.688]	0.636 [0.521, 0.732]	0.491 [0.513, 0.688]	0.413 [0.300, 0.518]	0.614 [0.503, 0.710]	0.595 [0.497, 0.692]	0.509 [0.403, 0.610]	0.568 [0.461, 0.657]				
SEE	0.694 [0.620, 0.763]	0.712 [0.634, 0.782]	0.602 [0.525, 0.672]	0.769 [0.708, 0.825]	0.835 [0.774, 0.891]	0.787 [0.707, 0.857]	0.745 [0.707, 0.857]	0.751 [0.690, 0.814]	0.655 [0.562, 0.737]	0.647 [0.559, 0.731]	0.485 [0.380, 0.584]			
SIE	0.661 [0.570, 0.734]	0.747 [0.671, 0.819]	0.726 [0.654, 0.794]	0.668 [0.574, 0.759]	0.628 [0.540, 0.706]	0.571 [0.483, 0.652]	0.603 [0.506, 0.692]	0.627 [0.524, 0.717]	0.573 [0.453, 0.669]	0.623 [0.544, 0.700]	0.604 [0.544, 0.700]	0.578 [0.474, 0.669]		
TIE	0.609 [0.505, 0.709]	0.644 [0.554, 0.736]	0.680 [0.602, 0.765]	0.618 [0.529, 0.700]	0.525 [0.430, 0.604]	0.486 [0.370, 0.597]	0.593 [0.481, 0.682]	0.614 [0.497, 0.706]	0.685 [0.584, 0.774]	0.532 [0.437, 0.615]	0.558 [0.437 0.615]	0.564 [0.460, 0.659]	0.767 [0.705, 0.828]	

Note: The values in the brackets represent the lower and the upper bounds of the 95% confidence interval

4.12.2 HOCs Measurement Model Assessment

Here, it is important to recall that the four HOCs involved in the study are AKMI, AKMP, FE, and UE. In the second stage while sticking to the two-stage approach, the inner model between the formative HOCs and LOCs represents HOCs indicator weights in this study (See Figure 4.3). Testing the significance of the HOCs indicator weights draws on the bootstrapping procedure (5,000 bootstrap samples, no sign changes option, bootstrap confidence interval (BCa), one tailed testing at the 0.05 significance level) as shown in Table 4.12. 5,000 bootstrap samples are employed in compliance with rule and to estimate the PLS path model. No sign changes option was chosen based on the recommendation that it result in the most conservative outcome compared to the other two options (Hair *et al*., 2017). The BCa confidence interval method because in the context of PLS-SEM, it has been proven to have reasonable computational requirements and produces comparably narrow confidence interval which should be relied on (Hair *et al*., 2017). As the study involves directional hypothesis, it is one tail testing. The study assumes 95% confidence level and 5% significance level because of their frequent usage in management field by researchers. Meanwhile, whether critical levels of collinearity substantially affect the indicators is assessed first. According to Hair *et al.* (2017), a variance inflation factor (VIF) of 5 or higher portrays a potential collinearity problem among the indicators. The highest VIF value of 2.871 in the study is clearly below the threshold value of 5, suggesting that collinearity is not at critical level. The result indicated that all the LOCs indicator weights are significant and confidence interval do not contain the value 0, indicating the stability of the coefficient estimates. For AKMI, the indicators relative contribution ranges from 0.210 to 0.485. For AKMP, it ranges from PPE (0.150) low to APPE (0.375) high. The highest contributor to FE is SEE (0.399) followed by MEE (0.285). The least dimension is OEE. For UE, both FPE and NPE are positively related it. Since, all the respective indicators of the four HOCs are positively associated with them, this suggest that the conceptualization of AKMI, AKMP, FE, and UE as formative HOCs with reflectively measured LOCs is duly supported by the data. In other words, hypotheses H1a-H1d, H2a-H2d, H3a-H3d, and H4a-H4b are supported in this study. Having established that both the HOCs and LOCs are reliable and valid via the assessment of the measurement models, the structural model is assessed.

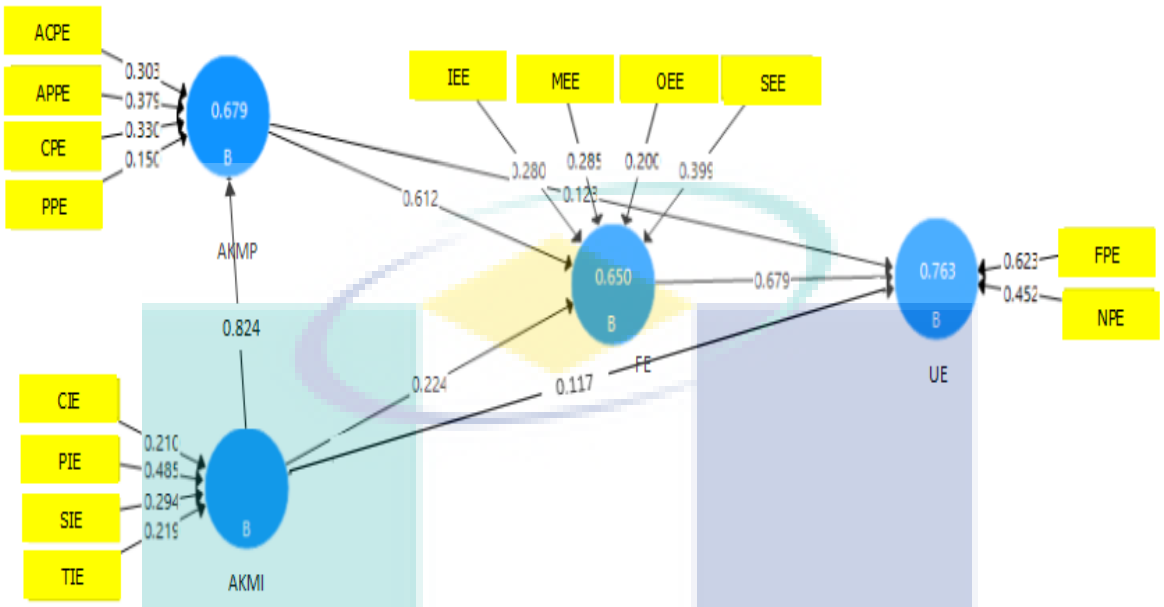

Figure 4. 3 Path analysis stage 2

Table 4. 12 Assessment of formative HOCs measurement model

HOCs	Indicators	Outer Weights (Outer Loadings)	t-Value	p-Value	95% BCa Confidence Interval	Significance (p<0.05) ?
AKMI	CIE-> AKMI	0.210 (0.791)	3.383	0.000	[0.100, 0.312]	Yes
	PIE -> AKMI	0.485 (0.861)	7.402	0.000	[0.375, 0.590]	Yes
	SIE -> AKMI	0.294 (0.845)	4.093	0.000	[0.175, 0.411]	Yes
	TIE -> AKMI	0.219 (0.767)	3.202	0.001	[0.108, 0.328]	Yes
AKMP	ACPE -> AKMP	0.303 (0.853)	5.576	0.000	[0.216, 0.399]	Yes
	APPE -> AKMP	0.379 (0.895)	6.474	0.000	[0.276, 0.470]	Yes
	CPE -> AKMP	0.330 (0.907)	4.633	0.000	[0.202, 0.449]	Yes
	PPE-> AKMP	0.150 (0.689)	2.591	0.005	[0.057, 0.251]	Yes
FE	IEE -> FE	0.280 (0.865)	4.811	0.000	[0.183, 0.371]	Yes
	MEE -> FE	0.285 (0.857)	5.832	0.000	[0.206, 0.368]	Yes
	OEE -> FE	0.200 (0.782)	4.048	0.000	[0.122, 0.285]	Yes
	SEE -> FE	0.399 (0.896)	7.316	0.000	[0.310, 0.486]	Yes
UE	FPE -> UE	0.623 (0.950)	9.322	0.000	[0.513, 0.738]	Yes
	NPE -> UE	0.452 (0.903)	6.304	0.000	[0.325, 0.567]	Yes

Table 4. 13 Collinearity among LOCs

	VIF (Outer)
ACPE	2.153
APPE	2.406
CPE	2.871
CIE	2.002
FPE	2.095
IEE	2.376
MEE	2.28
NPE	2.095
OEE	1.941
PIE	1.569
PPE	1.558
SEE	2.303
SIE	2.377
TIE	1.999

Table 4. 14 Collinearity among Exogenous constructs (Inner VIF)

	FE	UE
AKMI	3.113	3.256

4.13 Assessment of Measurement Model

Structural model relationships or path coefficients specifies the hypothesized relationships among the constructs (Hair *et al*., 2017) (See Figure 4.4). This involves examining the model's predictive capabilities and the relationships between the constructs as indicated in Hair *et al*. (2017). Drawing from the criterion put forward by Hair *et al.* (2016), this study will follow a systematic approach in the assessment of structural model beginning from collinearity assessment. According to them, if the estimation involves significance level of collinearity among the predictor constructs, and is not assessed, path coefficients may be biased. Examining the VIF values of the only exogenous predictor construct in the structural model for the study revealed that is below the threshold of 5.

Thus, suggest that multicollinearity is not a critical issue in the exogenous predictor constructs.

4.13.1 Hypotheses Testing

In estimating and analyzing the path coefficients between the constructs, the bootstrapping procedure same as in section 4.12.2 was employed. In interpreting the results of the structural model relationships (See Figure 4.4), t values, p values, and the bootstrap confidence interval are utilized (See Table 4.15). The critical t value for the one tailed test is 1.65 at 5% significance level. The 5% significance level chosen also implies that the p value must be smaller than 0.05 to render the relationships in the study significant. In addition, estimated path coefficient is significant if zero is not included in the bootstrap confidence interval.

Pertaining to all the hypothesized relationships between the HOCs and LOCs, Research H1 states that AKMI is a formative HOC that is made up of SIE, CIE, TIE, and TIE as LOCs. Research hypothesis 2 states that AKMP is a formative HOC comprised of ACPE, CPE, APPE, and PPE as LOCs. Research hypothesis H3 states that FE is a formative HOC consist of OEE, IEE, MEE, and SEE as LOCs. Research hypothesis H4 states that UE is a formative HOC comprised of FPE and NPE as LOCs. The bootstrapping results in section 4.12.1 demonstrate that all the LOCs as distinctive elements are associated with their respective HOCs as hypothesized. Invariably, research hypotheses H1, H2, H3, H4 above are supported by the data. This therefore means that the HOCs are constituted by its specific LOCs. Furthermore, implies that concretizing the effect of these LOCs via the HOCs in the study research model is duly supported.

In testing all the hypothesized relationships regarding the HOCs, the bootstrapping result indicated that AKMI (0.824) is statistically significant and has strong positive effect on AKMP at 5% probability of error level. This means that a one-unit change in AKMI changes AKMP by 0.824 when everything else remains constant. Furthermore, suggest that improvement in AKMI will lead to significant improvement in AKMP also. Thus, research hypotheses H5 which states that AKMI is positively related to AKMP is supported by the data.

In analysing the key target construct FE, the effects of AKMP (0.612) and AKMI (0.224) on FE are both positive and statistically significant. However, the construct AKMP (0.612) has the stronger effect on FE compared to AKMI (0.224). The implication of this is that while a unit change in AKMP changes FE by 0.612, a unit change in AKMI only result to 0.224 changes in FE all things being equal. Thus, research hypothesis H6 which states that AKMI is positively related to FE and H7 which state that AKMP is positively related to FE are supported by the data.

When analysing the key predictors of UE, FE (0.679) has positive and significant effect on UE; AKMI has positive and not too high statistically significant effect on UE; AKMP (0.123) has positive and not significant effect on UE. FE has the strongest significant effect (0.679) followed by AKMI (0.117) on it. On the contrary, the effect of AKMP on UE is not significant at 5% level. The implication is that a unit change in FE changes UE by 0.679 while that of AKMI changes UE by just 0.117 if all other constructs and their path coefficients remains constant. Thus, research hypotheses H9 which states that FE is positively related to UE and H10 which states that AKMI is positively related to UE are supported by the data. Research hypothesis H11 that states that AKMP is positively related to UE is not supported by the data.

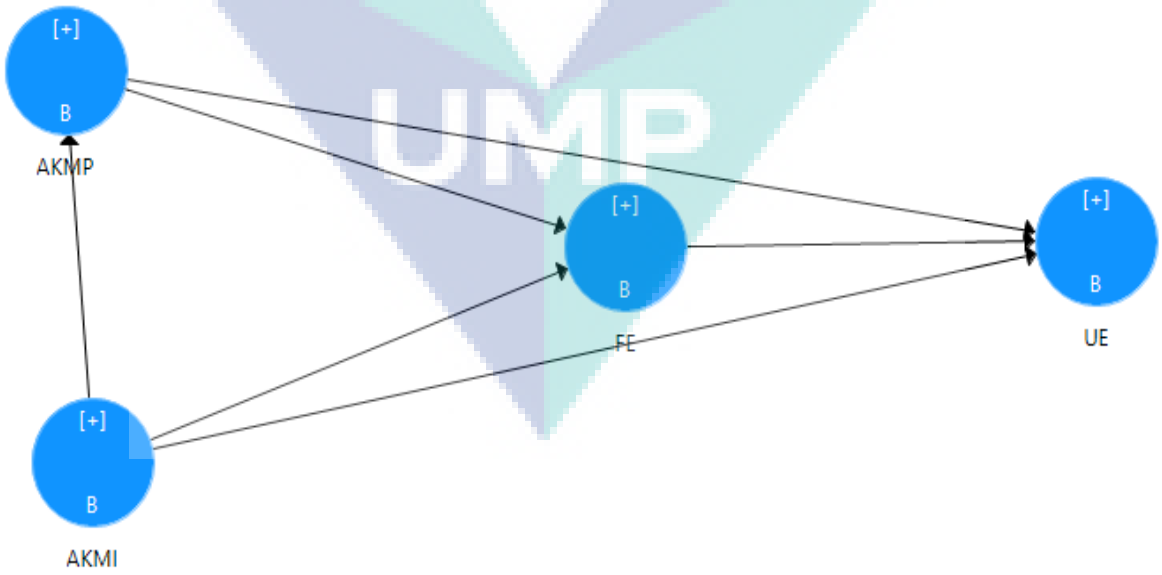

Figure 4. 4 Structural model

Table 4. 15 Path coefficients of the structural model and significance testing results

Relationship	Path Coefficient	t-Value	p-Value	95% BCa Confidence Interval	Significance (p<0.05)?	f^2 effect size
H5: AKMI -> AKMP	0.824	36.358	0.000	[0.778, 0.855]	Yes	0.813
H6: AKMI -> FE	0.224	3.029	0.001	[0.100, 0.343]	Yes	0.046
H7: AKMP -> FE	0.612	8.409	0.000	[0.488, 0.726]	Yes	0.344
H9: FE -> UE	0.679	9.152	0.000	[0.551, 0.792]	Yes	0.681
H10: AKMI -> UE	0.117	2.030	0.021	[0.025, 0.214]	Yes	0.028
H11: AKMP -> UE	0.123	1.441	0.075	[-0.014, 0.266]	No	0.025

4.14 Testing for Indirect and Mediation Effects

There are diverse approaches to mediation analysis that can be drawn upon in literature. But most of the approaches have been criticized for some obvious problems associated with them, for instance, Sobel test (Sobel, 1982), Baron and Kenny's approach (Baron and Kenny, 1986) and so on (Hayes, 2009). The one employed in this study is the bootstrapping approach recommended by Hair *et al.* (2017). According them, this approach makes no assumptions about the variable distribution or the sampling distributions compared to Sobel test. In addition, yields higher levels of statistical power. Thus, perfectly suitable for the studies like this utilizing PLS-SEM method. Moreover, it was built on (Zhao, Lynch, and Chen, 2010) procedure as indicated in Hair *et al*. (2017) because of its seeming advantage over the shortcomings of existing approaches. Therefore, in testing the mediating effects in this study, the sampling distribution of the significance of indirect effects were bootstrapped by considering all mediators simultaneously to avoid biased estimates. Furthermore, to gain a complete picture of the mechanisms through which an exogenous construct affects an endogenous construct (Hair *et al.,* 2017). Consequently, help to ascertain if the inclusion of AKMP and FE as mediators in this study is meaningful or provide support for the hypothesized mediating relationships in the study.

4.14.1 Assessing the Total and Specific Indirect Effect Significance

Interestingly, all the total (See Table 4.19) and indirect effects in the study are significant since neither of the 95% confidence intervals includes zero. Drawing from Hair *et al*. (2017), this study involves multiple mediation, hence the total indirect effect (Table 4.16) may consist of several specific indirect effects (See Table 4.18) whose significance need to be assessed along with testing the significance of the total indirect effect. This entails manual calculation either through Microsoft excel or calculator. The specific indirect effect for AKMI-> UE is AKMI-> FE (0.224) * FE->UE (0.679) = 0.152. T-value for the specific indirect effect is specific indirect effect divided the standard deviation (0.152/ 0.051) = 2.980 at $p<0.05$. Hence, significance going by one tail test employed in the study. Total effect for AKMI-> UE = specific indirect effect (0.152) + direct effect (0.117) = 0.269 is positive and significant. Total indirect effect is 0.596. As the specific indirect effect (0.152) for AKMI->UE varies from the total indirect effects (0.596), the study conclude that the initial total indirect effect did contain other specific indirect effects.

The specific indirect effect for AKMI-> FE is AKMI-> AKMP (0.824) * AKMP->FE (0.612) = 0.504 which is same with the total indirect effect of 0.504 derived from the SmartPLS output (See Table 4.16). T-value for the specific indirect effect is specific indirect effect divided the standard deviation (0.504/0.062) = 8.102 at $p<0.01$. Hence, significance going by one tail test employed in the study. Total effect for AKMI-> FE = specific indirect effect (0.504) + direct effect (0.224) = 0.728. As the specific indirect effect for AKMI->FE is not different from the total indirect effects, the study conclude that the total indirect effect does not contain any other specific indirect effects.

The specific indirect effect for AKMP-> UE is AKMP->FE (0.612) * FE-> UE (0.679) = 0.416. The specific indirect effect of 0.416 (See Table 4.18) is same with the total indirect effect derived from the PLS output (See Table 4.16) and significant. T-value for the specific indirect effect is specific indirect effect divided the standard deviation (0.416/ 0.063) = 6.605 at $p<0.05$. Hence, significance going by one tail test employed in the study. Total effect for AKMP-> UE = specific indirect effect (0.416) + direct effect (0.123) = 0.539 is positive and significant. As the specific indirect effect for AKMP->FE is not

different from the total indirect effects, the study conclude that the total indirect effect does not contain any other specific indirect effects.

4.14.2 AKMP as a Mediating Variable between AKMI and FE

The indirect effect of AKMI on FE via AKMP is significant (p=0.000, Beta = 0.504, t=8.102) at 5% significant level (See Table 4.18). Also, the direct effect of AKMI on FE is also significant with a p-value of 0.001, Beta = 0.224. Since the indirect effect and the direct effect are both significant and point in the same direction including the product of the direct and indirect effect, AKMP complementary (partially) mediates the relationship between AKMI and FE. This implies that higher levels of AKMI increase FE directly but also would increase AKMP, which in turn leads to FE. That is, some of AKMI's effect on FE is explained by AKMP. Consequently, H8 which state that AKMP mediates the relationship between AKMI and FE is supported by the data.

4.14.3 FE as a Mediating Variable between AKMI and UE

The direct effect of AKMI on UE is significant (p=0.021, Beta=0.117, t=2.030) at 5% significant level (See Table 4.17). The specific indirect effect of AKMI on UE via FE is significant (p=0.000, Beta=0.152, t= 2.980) also. Since the indirect effect and the direct effect are both significant and point in the same direction including the product of the direct and indirect effects, FE complementary (partially) mediates the relationship between AKMI and UE. The implication is that FE represents a medium that underlies the relationship between AKMI and UE. Higher levels of AKMI would increase UE directly but also increase FE, which in turn leads to UE. That is, some of AKMI's effect on UE is explained by FE. Consequently, H12 which states that FE mediates the relationship between AKMI and FE is supported by the data.

4.14.4 FE as a Mediating Variable between AKMP and UE

Pertaining to H13 which states that FE mediate the relationship between AKMP and UE, the direct effect of AKMP on UE is not significant (p=0.075, Beta=0.123, t=1.441) at 5% significant level (See Table 4.17). However, the indirect effect of AKMP on UE via FE is significant (p=0.000, Beta=0.416, t= 6.610). As the indirect effect is significant while the

direct is not, FE indirect only (fully) mediates the relationship between AKMP and UE. Consequently, FE represents a mechanism that underlies the relationship between AKMP and UE. AKMP leads to FE, and FE in turn leads to UE. That is, all AKMP's effect on UE is explained by FE. Thus, H13 which states that FE mediates the relationship between AKMP and FE is supported by the data.

Overall, the empirical findings in the study provide support for the mediating role of AKMP and FE in the research model. Having assessed the significance all total indirect effects, direct effects, and specific indirect effects, coefficient of determination is considered.

Table 4. 16 Significance Analysis of the Direct and Indirect Effects of the structural model

	Direct Effect	95% BCa Confidence Interval	t-Value	Significance (p<0.05)?	Indirect Effect	95% BCa Confidence Interval	t-Value	Significance (p<0.05)?
H6: AKMI -> FE	0.224	[0.100, 0.343]	3.029	Yes	0.504	[0.404, 0.607]	8.100	Yes
H10: AKMI -> UE	0.117	[0.025, 0.214]	2.030	Yes	0.596	[0.507, 0.673]	11.600	Yes
H11: AKMP -> UE	0.123	[-0.014, 0.266]	1.441	No	0.416	[0.316, 0.524]	6.610	Yes

Table 4. 17 Path coefficients of the structural model and significance testing results

Direct	Path Coefficient	t-Value	p-Value	95% BCa Confidence Interval	Significance (p<0.05)?
H5: AKMI -> AKMP	0.824[a]	36.358	0.000	[0.778, 0.855]	Yes
H6: AKMI -> FE	0.224[f]	3.029	0.001	[0.100, 0.343]	Yes
H7: AKMP -> FE	0.612[b]	8.409	0.000	[0.488, 0.726]	Yes
H9: FE -> UE	0.679[g]	9.152	0.000	[0.551, 0.792]	Yes
H10: AKMI -> UE	0.117[q]	2.030	0.021	[0.025, 0.214]	Yes
H11: AKMP -> UE	0.123[s]	1.441	0.075	[-0.014, 0.266]	No

Note: Superscripts a, f, b, g, q, and s are just denotations made to ease the calculation of specific direct effects in Table 4.18.

Table 4. 18 Specific Indirect and Total effect

	Specific indirect effect	t-Value	Total effect
H6: AKMI -> FE	0.504[c]	8.102[e]	0.728[p]
H10: AKMI -> UE	0.152[h]	2.98[k]	0.269[r]
H11: AKMP -> UE	0.416[l]	6.610[n]	0.539[t]

Note: c = a*b, e = c/d, h = f*g, k = h/i, l = b*g, n = l/m, p = f+c, r = h+q, t = s+l

Table 4. 19 Total effect of the structural model and significance testing results

Relationship	β	t-Value	p-Value	95% BCa Confidence Interval	Significance (p<0.05)?
H5: AKMI -> AKMP	0.824	36.358	0.000	[0.778, 0.855]	Yes
H6: AKMI -> FE	0.728	21.899	0.000	[0.660, 0.773]	Yes
H7: AKMP -> FE	0.612	8.409	0.000	[0.488, 0.726]	Yes
H9: FE -> UE	0.679	19.730	0.000	[0.551, 0.792]	Yes
H10: AKMI -> UE	0.713	6.750	0.000	[0.642, 0.763]	Yes
H11: AKMP -> UE	0.539	9.152	0.000	[0.402, 0.663]	Yes

4.15 R^2 Level Assessment

The R-squared (R^2) also called the coefficient of determination, is the overall effect size measure for the structural model as in a regression. This coefficient is a measure of the model's predictive accuracy and is calculated as the squared correlation between a specific endogenous construct's actual and predicted values. The R^2 values ranges from 0 to 1 with higher levels indicating higher levels of predictive accuracy. Though it is difficult to provide rules of thumb for acceptable R^2, Hock and Ringle (2006) describes results above the cutoffs 0.67, 0.33 and 0.19 to be "substantial", "moderate" and "weak" respectively. From Table 4.20, the research model explains

67.9% of AKMP's variance, 65% of FE's variance, and 76% of UE's variance. The implication of R^2 value of AKMP is that 67.9% of variance in AKMP is explained by AKMI. That of FE means that 65% of variance in FE is explained by AKMI and AKMP. Lastly, R^2 value for UE indicate that 76% of the variance in it are explained by AKMI, AKMP, and FE. Interestingly, all the R^2 in this study are relatively high as knowledge management is yet to occur in structured format in accounting practices. Besides, past studies suggest that R^2 value of a dependent variable should be at least 10 per cent to make any meaningful interpretation (Falk and Miller, 1992). Moreover, it is noteworthy that as stipulated by Hair *et al*. (2016), R-squared value interpretation is relative even though the minimum threshold of 50% is specified in social sciences. This is because a value of 0.25 can be considered "high" depending on the field or researcher expectation based on prior literatures. Based on these arguments, the model in this study can be adjudged to possess strong predictive accuracy using R^2 values. In addition to evaluating the R^2 values of all endogenous constructs, f^2 effect size is evaluated.

Table 4. 20 Summary of R^2 result

	R^2	R^2 Adjusted
AKMP	0.679	0.678
FE	0.65	0.647
UE	0.763	0.76

4.16 The f^2 Effect size

Here, the *f*2 effect sizes which measure the impact of the omission of a specific predictor construct on an endogenous latent construct are examined (See Table 4.21). The threshold for f^2 effect size is small for a level of 0.02, 0.15 is medium and 0.35 is large effect of an exogenous latent variable (Chin, 1998). Relatively high effect sizes occur for the relationships AKMI -> AKMP (0.81), AKMP -> FE (0.35), and FE -> UE (0.68). These relationships also have particularly strong path coefficients of 0.612 and higher. Furthermore, substantivizes their impacts on the respective endogenous constructs in this study. Surprisingly, all other effect sizes in the structural model have small effect sizes including the relationship between AKMI -> FE which has a relatively strong path coefficient of 0.224 but only small effect size of 0.05. Among the predictor constructs, AKMI has the highest impact (0.81) while AKMP is the weakest (0.03). In

summary, all the effect sizes in the study structural model can be classified as small to large according to the criterion proposed by Chin (1998).

Table 4.21 f^2 Effect Size

	Original Sample (O)	T Statistics (|O/STDEV|)	P Values
AKMI -> AKMP	0.813	5.501	0.000
AKMI -> FE	0.046	1.390	0.082
AKMI -> UE	0.028	0.918	0.179
AKMP -> FE	0.345	3.159	0.001
AKMP-> UE	0.025	0.584	0.280
FE -> UE	0.681	3.336	0.000

4.17 Blindfolding and Q^2 Predictive Relevance

In addition to evaluating the magnitude of the R^2 values as a criterion of predictive accuracy, Hair *et al*. (2016) opined that researchers should examine the Stone-Geisser's Q^2 value as an indicator of the model's predictive relevance. The blindfolding procedure is only applied to endogenous constructs that have a reflective measurement model specification as well as to endogenous single-item constructs. The rule of thumb specified in Hair *et al*. (2017) is that Q^2values larger than zero for a particular endogenous construct indicate that the path model's predictive accuracy is acceptable for this particular construct.

As a relative measure of predictive relevance, values of 0.02, 0.15, and 0.35 indicate that an exogenous construct has a small, medium, or large predictive relevance for a selected endogenous construct. Although, there are two ways of assessing Q^2 (cross-validated communality (H2) and cross- validated redundancy (F2), but the method employed in the study is the cross-validated redundancy approach. It is preferred because it includes the key element of the path model to predict eliminated data points. In running the blindfolding procedure, an omission distance of 7 was chosen as Hair *et al*. (2017) suggested values between 5 and 10 in each run. Table 4.22 indicated that all Q^2 values are considerably above zero stipulated threshold (0.453, 0.440 and 0.614) for all endogenous constructs. More precisely, UE has the highest Q^2 value (0.612), followed by AKMP (0.453), and finally FE (0.440). Thus, providing support for the study model's strong predictive relevance and accuracy.

4.18 The q^2 Effect Size

This indicate the change in the Q^2 value when a specified exogenous construct is omitted from the model (Sarstedt *et al*. 2017). As a relative measure of predictive relevance, q^2 values of 0.02, 0.15, and 0.35 indicate that an exogenous construct has a small, medium, or large predictive relevance, respectively for a certain exogenous construct. Analysis of the q^2 in Table 4.22 shows the resulting effect sizes when AKMI as an exogenous construct is omitted from the model in this study. AKMI->AKMP has medium predictive relevance of 0.17. Meanwhile, the other q^2 effect sizes are weak (0.02) for FE and negligible (0.003) for UE.

Table 4. 22 Summary of Q^2 and q^2 result (Total)

	SSO	SSE	Q^2 (=1-SSE/SSO)	q^2
AKMI	1,088.00	1,088.00		
AKMP	1,088.00	595.638	0.453	0.170
FE	1,088.00	609.301	0.440	0.020
UE	544	209.987	0.614	0.003

4.19 Summary

In summary, the chapter explored the results of the study. The analyses were obtained using both descriptive and inferential statistics. Prior to the descriptive statistic, factor analysis was performed mainly for understanding the psychometric properties of the data and validity of questionnaire measures. The descriptive statistics helped to provide a general overview of demographic profile of the respondents. The data collected were checked and analyzed by using the Statistical Package for Social Sciences (SPSS) version 23. This is followed by the relevant data analysis and assessment. PLS-SEM was adopted for data analysis. The validation of the structural model was achieved using SmartPLS 3.0. The research model was analyzed and interpreted into two stages sequentially using the two-stage approach to hierarchical modeling. Followed by the assessment and refinement of adequacy of the measurement model and then the assessment and evaluation of the structural model. The model was assessed using specified criteria path coefficients (β), variance explained (R^2), predictive relevance (Q^2) stated by relevant prior studies before arriving at the hypothesized conclusion.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1 Introduction

This study examined knowledge management capability dimensions in accounting functions of research universities in Malaysia. This chapter offers the final conclusions and implications of the study. It commences with an explanation of the three study questions and major findings derived from each hypothesis. Next, the theoretical contributions and practical implications are elaborated on, inclusive of how this research has successfully contributed to the current body of knowledge and to accounting practice along with knowledge management practice. Finally, opportunities for future research was proposed based on the research limitations. Table 5.1 is a summary of the research questions addressed and relationships tested in the study.

Table 5. 1 Summary of Hypotheses Testing Results and Research questions

Research Questions	Research Hypothesis/Statement	Result
Q1. What are the key drivers of AKM process and infrastructure capability in an accounting domain?	**H1** AKM infrastructure capability is a higher order construct made up of accounting structure (SIE), accounting culture (CIE), accounting technology in use (TIE), and accounting people (or T-shaped skills) (PIE).	Supported
	H2. Accounting knowledge management capability (AKMP) is a higher order construct consisting accounting acquisition process (ACPE), accounting conversion process (CPE), accounting application process (APPE), and accounting protection process (PPE).	Supported
Q2. Does AKM infrastructure capability relate to AKM process in an accounting domain?	**H5**. AKMI positively predicts AKMP in an accounting domain.	Supported
Q3. Does AKM infrastructure and AKM process capability predicts accounting functional effectiveness?	**H3.** Accounting functional effectiveness (FE) is a high order construct comprising strategic related effectiveness (SEE), operational related effectiveness (OEE), managerial related effectiveness (MEE) and information related effectiveness (IEE).	Supported
	H6. AKMI is positively related to accounting functional effectiveness (FE)	Supported
	H7. AKMI positively affects accounting functional effectiveness (FE)	Supported
	H8. AKMP partially mediates the relationship between AKMI and accounting functional effectiveness (FE).	Supported

Table 5.1 Continued

Research Questions	Research Hypothesis/Statement	Result
4. Does accounting functional effectiveness, AKM infrastructure and AKM process impacts university performance?	**H4.** University performance (UE) is a higher order construct comprise of financial related performance (FPE) and non-financial related performance (NPE).	Supported
	H9. FE positively and significantly influences university performance.	Supported
	H10. AKMI positively and significantly influences university performance.	Supported
	H11. AKMP predicts university performance positively.	Rejected
	H12 FE partially mediates the relationship between AKMI and university performance.	Supported
	H13. FE fully mediates the relationship between AKMP and UE.	Supported

5.2 Discussion of the Findings

This study explores knowledge management capability dimensions in accounting domain based on past empirical findings. As an overarching theory, the resource-based theory (RBT) was employed in the conceptualization of the key HOCs and their respective LOCs. Thus, the four HOCs (AKMP, AKMI, FE, and UE) as an overall resource are each differentiated at a higher level of abstraction while the LOCs, though heterogeneous, are differentiated at a lower level of abstraction (Becker *et al*., 2012). This finding agrees with RBT notion that embedded resources are heterogeneous and can be differentiated also (Barney, 1991). The outcome of the PLS-SEM analyses revealed that both measurement and structural models satisfy the stipulated conditions. Based on these results, the thirteen main research hypotheses were tested to address the four research questions. This section provides further discussion of the main findings from the data analysis and a comparison with previous studies and a discussion of the theoretical base related to the research questions.

5.2.1 The key drivers of AKM infrastructure and AKM process capability in an accounting domain

To address this research question, two main hypotheses were put forward using RBT and some relevant past empirical evidence as follows:

H1. AKM infrastructure capability (AKMI) is a higher order construct made up of accounting structure (SIE), accounting culture (CIE), accounting technology in use (TIE), and accounting people (T-shaped) skills (PIE).

The measurement model of AKMI comprises four major components, namely accounting structure, accounting culture, accounting technology in use, and accounting people (or T-shaped skills). Accounting structure was assessed in terms of flexibility in encouraging vital accounting knowledge interactions and adaptiveness to an ever-changing environment. Accounting culture was examined to see the extent to which it is encouraging accounting knowledge-related activities. Accounting technology in use was assessed in terms of how it fosters collaborations and dissemination of knowledge in accounting related tasks. Accounting people (T-shaped) skills were investigated to assess their level of current expertise in the domain. The outcome from the measurement model assessment revealed that all the dimensions are positively related to the overall AKMI as

a formative HOC with accounting people (T-shaped skills) having the highest relative contribution and importance 0.49(0.86). Next was accounting structure with 0.29 (0.85), followed by accounting technology in use having 0.219 (0.77). Accounting knowledge related culture was the least significant contributor 0.21 but not least perspective in terms of importance (0.79). The empirical finding made sense because the amount of knowledge that can be leveraged is dependent on the amount of embedded skills in the accountants and not just accountants with no requisite task solving skills. Besides, the effectiveness of desired interactions that leads to accounting domain performance is dependent on knowledgeable accountants. Also, accounting culture, structure, and technology in use are instituted to facilitate accounting staff knowledge exchange and needed understanding pertaining to their accounting domain task. The implication is that all the four AKMI sub-components are important in KM accounting context issues and their effects can be concretized via AKMI. It is important to note that the manner in which the effects of the four LOCs for AKMI is concretized in this context is novel and different from prior studies. Thus, not consistently in line with prior studies like Lee and Lee, (2007) who concretize their KM infrastructure with three components, which makes it insightful to accounting domain approaches to KM. Nevertheless, better attention should be given to accountant skill related issues as the most important and significant determinant of effective accounting function knowledge exchange and development. This result is consistent with prior works which suggest that knowledge based structures, cultures, technology and people (T-Shaped) skill as KM infrastructure capabilities. Also, RBT indicates that capabilities can be bundled and differentiated at various levels. As all the four individual capabilities teamed to form AKM infrastructure capabilities at higher level, the study agrees with RBT.

H2. AKM process capability (AKMP) is a higher order construct comprising accounting acquisition process (ACPE), accounting conversion process (CPE), accounting application process (APPE), and accounting protection process (PPE).

The formative measurement model of AKM process capability comprises four LOCs that are reflectively measured. They are accounting knowledge acquisition, conversion, application and protection processes. Adapted from Gold *et al*. (2001), accounting knowledge acquisition process covers the various means through which

accountants acquire or get accounting knowledge through interactions. Accounting knowledge conversion process has to do with transforming diverse sources and types of accounting data knowledge into more useful accounting information while accounting knowledge application process is likened to the actual utilization or application of accounting knowledge to solve accounting task problems. The accounting knowledge protection process is related to keeping confidential or protecting accounting knowledge from unauthorized usage or access and disclosure. The result of the formative AKMP HOC measurement model suggests the existence of the associated indicators assessed. Thus, the AKMP as an overall resource is differentiated at a higher level of abstraction while the LOCs, though heterogeneous, are differentiated at a lower level of abstraction (Becker *et al*. 2012). This finding agrees with RBT notion that embedded resources are heterogeneous and can be differentiated also (Daroch 2005).

Based on the sub hypothesized relationships with the overall AKMP, accounting knowledge application process is the most significance perspective having 0.38 relative contribution and 0.90 relative importance. Next, in terms of relative contribution and importance is accounting conversion process followed by accounting acquisition process. The least is accounting protection process having only 0.15 relative contribution and 0.69. Interestingly, both APPE and CPE relative importance approximates each other. Thus, can be argued that all the four indicators are distinct from one another and their effect can be demonstrated though AKMP in a university accounting practice context. Furthermore, it can be deduced that all the four knowledge processes approximately contribute in leveraging variant sources of accounting knowledge in the same manner and are just slightly more significant than the other in an accounting domain. Pertaining to the aggregated AKMP and its LOCs relevancy, the findings concur with Gold *et al.* (2001) and Zaied *et al*. (2012) works which opined that these four knowledge processes are relevant to overall KM process capabilities. However, disagrees with existing literatures (Wills and Smith 2011) in terms of equality in importance and individual capability approach to the conceptual reasoning behind the constructs. In addition, the findings regarding AKMP contradict existing studies that suggest that KM process as HOC, can be modeled reflectively in any context (Daroch 2005). The implication of this result is that each of the accounting knowledge processes should be emphasized while taken cognizance of their importance and contribution in KM integration policy matters pertaining to accounting domain. Overall, as H1 and H2 are supported, the current study,

therefore proves that KM capabilities are obtainable in university accounting practices and also substantiate the relevance of the unique similarity perspective taken in the study.

5.2.2 AKM infrastructure capability relate to AKM process in an accounting domain

The theoretical reasoning underlining this relationship is the RBT which indicated that input factors should predict process factors. Based on this logic, it is expected that AKMI as input factor would predict AKMP in this study. Thus, based on the existing theorized nature of the relationship, research question 2 assesses the predictive relationship between AKM infrastructure and AKM process capability.

H6. AKM infrastructure (AKMI) predicts AKM process capability (AKMP) in an accounting domain.

The examination of the structural model revealed that AKM infrastructure capability positively predicts AKM process in an accounting domain. This is not surprising as most of the variations (more than 68%) in AKMP can be explained by the AKMI LOCs with accounting (people) T-shaped skills having the most noteworthy influence. Invariably, compared to the effect of other LOCs would better determine the extent to which accounting knowledge that can be acquired, converted, applied and protected in an accounting domain. This corroborates the assertion that people's expertise is the most strategic asset or resource available to an organization for various competitive advantages. This correlational evidence between AKMI and AKMP is unique with existing findings in terms of conceptual reasoning, conceptual reasoning approach, and context. Consequently, people (T-shaped) skills having the most important effect via AKMI is not consistent with literatures as this is a novel context. RBT viewpoint suggests that firms can and do differentiate themselves based on their resources and that these resources relate to one another (Mao et al 2016). Thus, the nature of the relationship between AKMI and AKMP is supported by the RBT. Also, the positive relationship between AKMI and AKMP is consistent with other literature with similar theoretical reasoning in KM literature especially those arguing that improvement in KM infrastructure enhances KM process capability positively (Lee and Lee 2007; Zheng *et al*., 2010; Zaied *et al*., 2012; Shajera and Ahmed, 2015).

5.2.3 AKM infrastructure and AKM process capability predicts accounting functional effectiveness

To analyze the predictors of accounting functional effectiveness (FE), the RBT pertaining to KM was utilized. The logic behind RBT is that input factors and process factors can impact outcome: process factors can also be interchanged to mediate the relationship between input factors and outcome. More so, prior literatures in other contexts indicated that KM capabilities are predictors of effectiveness. In this context, it is expected that university accounting knowledge related processes of acquisition, application, conversion, and protection would concretize their effect on FE via AKMP. Similarly, university accounting knowledge management related infrastructure of accounting structure, accounting culture, accounting technology in use, and people (T-shaped) skills would demonstrate their effect on FE via AKMI. Using RBT also, FE is an intermediate outcome portrayed as a formative HOC with four LOCs which are positively related it. These connections are depicted by the following hypotheses:

H3. Accounting functional effectiveness (FE) is a formative high order construct comprising strategic related effectiveness (SEE), operational related effectiveness (OEE), managerial related effectiveness (MEE) and information related effectiveness (IEE).

Shang and Seddon (2002) and Spathis and Ananiadis (2005) opined that strategic, managerial, operational and IT related dimensions can be summed up to measure institutional accounting functions. In line with their works, the result of the formative FE HOC measurement model suggests the existence of the associated dimensions evaluated. Based on RBT, FE is differentiated as an overall resource at a higher level of abstraction while the LOCs, are differentiated at a lower level of abstraction in the study (Becker *et al*. 2012). This finding agrees with RBT notion that embedded resources are heterogeneous and can be differentiated also (Barney, 1991). Based on the sub hypothesized relationships with the overall FE, strategic related effectiveness (SEE) is the most significance perspective having 0.40 relative contribution and 0.90 relative importance. Next, in terms of relative contribution and importance is the managerial related effectiveness (MEE) followed by information related effectiveness (IEE). The least is operational related effectiveness (OEE) having only 0.20 relative contribution and 0.78. These results indicate that a change in the respondent assessment of the trait

being captured by the respective LOCs changes the value of FE by the amount of their respective relative contribution. The four lower dimensions for FE is consistent with Shang and Seddon (2002) and Spathis and Ananiandis (2005) works that opined that the dimensions can be used to measure institution accounting function system benefits. The findings pertaining to FE by employing RBT in this study is novel as there is a dearth of studies on how accounting functional effectiveness can be measured. Therefore, significance for theory building in this respect using RBT.

H6. AKMI positively predict accounting functional effectiveness (FE)
H7. AKMI positively affects accounting functional effectiveness (FE)
H8. AKMP partially mediates the relationship between AKMI and accounting functional effectiveness (FE).

RBT indicates that there is a positive relationship between capabilities and outcome (Mao et al 2016). Pertaining to the predictors of FE based on RBT, the construct AKMP (0.612) has the stronger effect on FE compared to AKMI (0.224). The implication of this is that while a unit change in AKMP changes FE by 0.612, a unit change in AKMI only result in 0.224 changes in FE all things being equal. Furthermore, indicates that the findings regarding the predictors of FE are duly supported by the RBT perspective to KM and agrees with studies that argued that KM capabilities influence effectiveness (Gold *et al*., 2001; Andreeva and Kianto, 2012). More so, it can be inferred that substantial differences in FE, approximately 65%, are explained by both AKMI and AKMP as general concepts constituted by their respective LOCs. Also, the indirect effect of AKMI on FE via AKMP is supported. This implies that higher levels of AKMI increase FE directly but also would increase AKMP, which in turn leads to FE. Therefore, support the notion that KM is within the scope of university accounting practice utilizing RBT. These findings neither contradicts nor corroborates existing studies as this study pioneer this notion as at the time of writing the research. Moreover, it is not well established in the literature and evidence in practice prior now that AKMI and AKMP lead to accounting functional effectiveness. Therefore, makes these findings significant for theory building. These, result suggest that university management team should focus on both AKMP and AKMI with more emphasis on the AKMP especially its specific accounting knowledge application process. Also, university management team can use these findings as an argument for KM initiative from infrastructure and process

perspective in university accounting practices in Malaysia. It is noteworthy that though the influence of AKMI and AKMP on accounting functional effectiveness is understudied, the study is consistent with existing studies like Aujirapongpan, et al (2010) that argued that KM capabilities impact effectiveness.

5.2.4 Accounting functional effectiveness, AKM infrastructure and AKM process capabilities impact overall university performance

The study further attempts to assess the impact of accounting domain effectiveness, AKM process capability and AKM infrastructure capability on the overall university performance. It is worthy to note that how KM capability from infrastructure and process perspective predicts organization effectiveness have been substantiated in other context in literature (Gold *et al.*, 2001; Lee and Choi, 2003; Nieves and Haller, 2014). However, whether specific AKM process and infrastructure capabilities impact university performance is not well known in literature. In addition, as accounting domain operates on behalf of the institutions, the study further proposed that the combined effectiveness of KM in an accounting domain will affect overall university effectiveness. Thereafter, hypotheses were proposed based on the underlying logic of RBT (See section 2.6.2) to answer research question 4 as follows:

H4. University performance (UE) is a formative higher order construct comprising financial related performance (FPE) and non-financial related performance (NPE)

H9 FE is positively related to UE
H10 AKMI is positively related to UE
H11 AKMP is positively related to UE
H12 FE mediates the relationship between AKMI and UE
H13 FE mediates the relationship between AKMP and UE

The result of the formative UE HOC measurement model for H4 suggests the existence of the associated dimensions evaluated. Specifically, both FPE (0.62) and NPE (0.45) as LOCs are positively related to UE. This implies that while a unit change in FPE changes UE by 0.62, a unit change in NPE changes UE by 0.45, all things being equal. Thus, support the differentiation of FE as an overall resource at a higher level of abstraction while the LOCs, are differentiated at a lower level of abstraction in this study (Becker *et al.*, 2012). This finding agrees with RBT notion that embedded resources are

heterogeneous and can be differentiated also. Consequently, the concretizing intention of the effect of FPE and NPE on other constructs via UE as a HOC in this study is supported.

In evaluating the predictors for university overall performance (UE), it can be observed that both FE (0.68) and AKMI (0.12) impacts UE positively and significantly. However, the impact of AKMP on UE though positive but was not significant. Also, 76% of the variation in UE is adduced to KM related practices and accounting functional effectiveness. This provides robust evidence for the stewardship and agency role of accounting profession in institutional practices. Although there is no consensus in literature on how KM infrastructure capability impacts organization effectiveness. The structural model result revealed that hypotheses 9 and 10 are supported using RBT while H11 is rejected. This implies that AKM infrastructure positively contributes to overall university performance and has a chain effect in organizations. Pertaining to H12 and H13, based on RBT (See section 2.2.3.2), FE is portrayed as a mediating variable. Resulting from the mediation analysis, FE can be inferred to partially mediate the relationship between AKMI and UE. The implication is that higher levels of AKMI would increase UE directly but also increase FE, which in turn leads to UE. That is, some of AKMI's effect on UE is explained by FE. Thus, H12 is supported.

Regarding H13 which states that FE mediates the relationship between AKMP and UE, the findings suggest that all AKMP's effect on UE is explained by FE. Invariably, FE is fully mediating the relationship between AKMP and UE. Thus, H13 is supported. It is noteworthy that none of the theoretical evidence, correlational evidence, and causal evidence have been substantiated by past studies this context of the study. Hence, suggest the novelty of this research even though similar concepts have been used by past empirical findings. The result further suggests accounting domain related knowledge practices are significant predictors of university enhanced performances in terms of making proactive strategic decisions; adapt quickly to anticipated changes in funding policies, streamline its internal processes and so on. The mediating role of accounting functions suggests that the influence of accounting systems on the continuous functioning of institutions is immense and cannot be separated from its infrastructures and processes. Thus, help to reiterate the importance of accounting domain in the actualization of university goals.

5.3 Contributions of the Research

The contribution to the body of knowledge in this research cover theoretical, methodological and practical aspects. In presenting the contributions, the study began with theoretical contributions (conceptual and empirical), followed by methodological and lastly, practical contributions.

5.3.1 Theoretical Contributions

This research explored knowledge management in an accounting domain specifically university accounting practice from the existing theoretically proven infrastructure and process perspectives for the first time. Employing a systematic novel approach, the study identified for the first time similar knowledge related infrastructure and process dimensions that are obtainable in accounting practice. Building upon prior research, KM infrastructure and process capabilities diverse concepts in literature, along with their respective components were aligned and synthesized as AKM infrastructure and process capabilities. This is because KM needs to be assessed with due consideration to the context and nature of practice to ensure its success as indicated in Mciver (2013). RBT indicates that culture, structure, processes are individual resources or capabilities. The current study portrays that accounting culture, structure, processes and so on are crucial individual AKM capabilities. This study, therefore, contributes directly to RBT and KM literature at individual capability level. Besides, the re-conceptualization of the original constructs as AKM related elements based on the derived link is a significant conceptual contribution of this study.

The hierarchical model in this study synthesizes the divergent conceptualizations of the aggregated KM capability dimensions in the KM literature. Unlike prior studies, this study AKM infrastructure capability LOCs comprises of four constructs instead of three elements propounded by other authors like Gold *et al*. (2001) and Ahmed and Shajera (2015). According to RBT viewpoint, individual capabilities can be combined at higher levels to achieve theoretical parsimony (Grant, 1991). Based on insight from RBT, all the four elements of infrastructure comprising accounting people (T-shaped) skills, culture, structure, technology can be grouped as a team of resources working together. The conceptualization of AKM process capability as higher order construct (HOC) of four lower order constructs: acquisition, conversion, application, and

protection is also founded on RBT. This unique re-grouping stemming from the synthesis of the diverse research streams helps to bring into limelight possible ways in which existing model can be extended or re-estimated using RBT. The study contributes to RBT by synthesizing the divergent conceptualization of existing KM concepts at higher levels which help to achieve theoretical parsimony. As theoretical parsimony is attained in the study at higher levels, the study, therefore contributes theoretically.

Drawing from resource-based theory (RBT), a resource can be characterized as valuable, rare, inimitable and non-substitutable (Wu and Chiu, 2015). Generally, strategic institutional functions like the university accounting function serves as important mechanisms through which overall institutional goals are attained. Thus, as resources to the university can render services (expertise) that are valuable, rare, inimitable and non- substitutable easily. Furthermore, assume to exist a linkage between university accounting functions and overall university performance. But whether university accounting functions can be termed as resource is not well substantiated in literature. Based on RBT, another important theoretical contribution of this study is the identification of accounting functional effectiveness (FE) as new dependent and mediating variable that can be added to existing conceptual frameworks on KM in literature.

Also, based on the underlying logic behind RBT that states that there exists a relationship between input resource and outcome, the linkage between university accounting function (as input factor) and overall university performance (UE, as final outcome) was conceptualized for the foremost time. Accounting knowledge infrastructure capability (AKMI), accounting knowledge management process capability (AKMP), accounting functional effectiveness (FE), and overall university performance (UE) are all operationalized as higher-order constructs (HOCs) constituted by their specific lower-order constructs (LOCs) utilizing RBT. Though the terms used may be similar to other prior works, however, this study pioneered the additional conceptual reasoning for all the HOCs and theoretical rationale for the hypothesized relationships among the HOCs in this context using RBT. All these conceptual contributions serve as the bases for the empirical and theoretical contributions in the study.

Interestingly, the result from testing all the theoretical linkages between the HOCs and their LOCs proved that all the fourteen LOCs are actionable drivers for each

of the associated HOCs in this context. In fact, add up to sufficiently constitute the HOCs as hypothesized based on RBT in this context for the first time. This implies that the effect of the LOCs can be concretized via the HOCs in this study. As this study tested these theoretical linkages between AKMI, AKMP, FE, and UE as formative HOCs and their reflectively measured LOCs respectively which have not been previously tested by prior literatures in this context, hence, contribute empirically to the body of knowledge. Another important empirical contribution of the study pertains to the higher-level estimates. Utilizing RBT, all the path coefficients to and from the HOCs behaved as hypothesized apart from AKMP -> UE that was positive but not significant. The results proved for the foremost time that both AKM infrastructure and process capability specifically play a significant role in enhancing accounting functional effectiveness.

Also, among the three predictors of overall university performance, the impact of accounting functional effectiveness on university performance positive and significant. As this study pioneered the direct theoretical relationships among the HOCs, the research contributes empirically to providing precise relationship definitional insight in an accounting domain. In addition, this study extends prior research on the effects of knowledge management capabilities through mediating factors to advance our understanding of how they mediate such relationships. Our findings suggest that functional effectiveness plays a partial role in mediating the relationship between AKM infrastructure and university performance. Likewise, accounting functional effectiveness also mediates fully the relationship between AKM process capability and university performance. Even the result concerning AKMP as a mediating variable portrayed that AKMP partially mediates the relationship between AKMI and FE as initially theoretically linked based on RBT. As this study provides foremost empirical evidence on the extent to which AKMP and FE mediate the relationships between the hypothesized constructs, it, therefore, contributes theoretically to existing literature. Also, investigating the psychometric properties of all the constructs to understand the underlying dimensions by conducting EFA is another significant empirical contribution made by the study.

Overall, theory is not well developed in this context of study in literature. Meanwhile, it is noteworthy to recall that it was based on systematic identification together with improved reconceptualization and operationalization of all the constructs

via RBT that the study proposed the research framework that was empirically validated. All the novel conceptual and empirical contributions including the proposed research framework in this study suggest that RBT perspective to KM capability can provide a rich resource for developing empirically based studies in university accounting practices. Hence, reasonable to argue that this study contributes to the advancement of concepts, measurements and theory development in KM literature based on RBT.

5.3.2 Methodological Contributions

This study represents the foremost attempt to examine whether accounting functional effectiveness (FE) can be interpreted as higher-order constructs employing PLS-SEM as the modelling approach. The research contributes methodologically as it can guide researchers who are keen on modelling accounting functional related performance with more number of LOCs on which aspect of the path relations to focus on. The study birthed the systematic approach employed in identifying similar knowledge infrastructure and process components in accounting practices that were re-conceptualized. Going by the similar capability approach and synthesis, this study contributes methodologically. This novel approach in this context can assist future works interested in examining the interdependence between KM and other disciplines even in this context.

5.3.3 Practical Contributions

It has been reported that organizations that exhibit expertise along perspectives of infrastructure and process are conducive for knowledge management implementation (Gold et al 2001, Shajera and Ahmed 2015). The result of the study analysis revealed that there is a possibility of infrastructure and process expertise in a university practice specifically, accounting practice. This suggests that accounting domain practice might be predisposed to successful transformation through knowledge management agenda. The practical implication is that these findings provide useful insight to managers on the condition in which the general KM perspective can be utilized in accounting practice. Invariably, more attention should be bestowed on the underlying AKM capabilities dimension in their KM design for transformations in universities to ensure KM success.

AKM infrastructure and process capabilities at composed level were found to be positive predictors of accounting functional effectiveness for the foremost time. This

result provides new insight for practice on what institutional managers should aim to enhance accounting function performance beyond the narrow scope of mere infrastructure and process. While good KM infrastructure and process capabilities are important (Mao *et al*. (2016), it is equally critical for institutions to align KM with their accounting practices and ensure that accounting systems are effective. Hence, university management team along with stakeholders can utilize these findings as an argument for KM practices in university accounting practices. Another practical implication of this study is that managers should not over-emphasized one aspect of AKM capability and under-emphasized the other as doing this could lead to undesired KM initiative in such domain. Managers should also remember to harness the indirect link that AKM infrastructure has with accounting function effectiveness through AKM process, for more impressive KM benefits. Thus, institutions seeking to establish effective KM strategy in university accounting practice must balance both driver capabilities roles to leverage accounting knowledge in creating enabling environment for sustained competitive advantages.

In addition, AKM infrastructure was found to facilitate process capability in the study. The practical contribution of this is that accounting knowledge related culture, structure, people (T-shaped) skills can be coordinated via AKM infrastructure capabilities to facilitate acquisition, application, conversion and protection of accounting knowledge via AKM process capability. The implication is that at composite levels, managers that want to facilitate the capacity for accounting staff to acquire, apply, convert and protect relevant knowledge should combine knowledge-based accounting cultures, structures, technology and staff skills. This result pertaining to these strategic key components contribute to practice as it informs practice on how they can be differentiated at higher levels to yield better impact on the long run based on their order of relative contribution. Specifically, they need to keep in mind that people attributes drive accounting domain infrastructure capability the most compared to its counterpart at individual capability level. Likewise, among the AKM processes, accounting application process exert the most substantial influence on the composite AKM process capabilities. Therefore, accounting staff skill should receive better attention regarding KM infrastructural while accounting application process in AKM process capability matters in accounting practice.

In practice generally, institutional functions serve as mediums through which overall institutional goals are attained. The importance of institutional functions or units and related effectiveness have been emphasized (Hackman and Morris 1975: Trembley 2017). Another practical contribution is the foremost proof from the study that accounting functional effectiveness not only positively impacts overall university performance but also help to explain KM capability influence on the university performance. That is, the link between KM and overall university performance can be mediated by accounting function effectiveness as a mediating factor. This study points to the importance of accounting functional effectiveness in the link. Higher levels of institutional performance, which imply higher levels of dissemination of accounting related information, based on the workings of higher levels infrastructure and process capabilities. Thus, management should adopt AKM infrastructure and process capabilities practices that support accounting functional effectiveness within the institutions as this will, in turn, help them make better financial and non-financial decisions and respond more quickly to ever-changing competitive conditions. The implication of the dual role being played by accounting functions in this context provides new insight to practice on the importance of leveraging accounting functions to achieve KM goals in institutions. More so, all the measures in this study especially that of accounting functional effectiveness as this is the first time in their usage in KM context, gives fresh acumen to practitioners on the way that KM outcome can be measured and evaluated in accounting practice.

Overall, this research is significant as it raises awareness about the consequences of knowledge management decision making at higher and lower levels of abstraction in institutional accounting settings. The result contributes to the understanding of why and how composed KM infrastructure and process capabilities that aligned with institutional accounting traditions translate into effectiveness and overall institutional performance. More so, highlights how critical knowledge management practices affect accounting domain goal effectiveness pertaining to strategy, managerial, operational and timely informational related effectiveness. This research, therefore, contributes to practice by emphasizing what aspect of an AKM infrastructure, institutions should give adequate attention to facilitate accounting knowledge processes, which will in turn, improves the effectiveness of the accounting function. More so, the study provides a relevant benchmark for managing accounting knowledge and highlight the disposition of an

accounting domain towards knowledge management within research institutional practices.

5.4 Limitation of the Study

This study has some limitations despite the evidences regarding the impact of accounting domain knowledge management (AKM) infrastructure and process capabilities on the domain effectiveness. Thus, should be interpreted with some caution.

First, the sample was obtained from only public research universities in Malaysia. In this sense, findings may be generalized to other public universities in Malaysia and Asian region since similar university accounting practices might be obtainable in them. Consequently, the result cannot be directly compared to private universities in Malaysia and universities outside Asia. The examination may experience the ill effects of potential response bias related to none usage of multiple method strategies of information gathering utilized. In addition, the complex theoretical model proposed in this examination has influenced a solitary technique employed and non-solitary hard to actualize. Accordingly, future investigations may utilize alternate strategies to pick up more profound bits of knowledge to look into issues of intrigue.

In addition, this study used responses of all accountant covering a variety of accounting related tasks, supposing their verdicts regarding AKM capabilities and effectiveness are objective. However, there are possibilities that some of the respondents may not answer objectively on knowledge related activities in an accounting domain as this study originated in this context. Hence, an over-reporting or under-reporting of some phenomena which cannot be ruled out may happen to result from it. Also, it is important to mention that a complete random sample is difficult to achieve.

Another methodological contribution of this research is the insightful use of more than one common rater while avoiding sentimental questions in the accounting functions investigated to reduce shared method variance potential problems. Also, the examination of accounting functional effectiveness as mediating variable in this context for the foremost time, offer valuable insight into the feasibility of 'third' or more variable explanations for the results of previous empirical findings. This represents another methodological contribution of the research. In addition, the tool for measuring accounting functional effectiveness lower order constructs though derived from past

literature (Shang and Seddon 2002: Spathis and Ananiadis 2005) have not been used to measure accounting related effectiveness in literature. The way this study validated the FE LOCs dimensions as multi-items measures for the respective LOCs is significance, and insightful for future research. Since these measures have not been tested in university KM literature, this study contributes methodologically. The study also contributes indirectly to all other measurement theory (ies) underlying the adapted measures employed.

5.5 Recommendations for Future Research

A direct implication for future research is that the study offers useful insight not only in terms of theory but also in terms of operationalizing and empirically testing salient aspects of key accounting knowledge related practices. Also, the items measures developed in this research pertaining to accounting domain effectiveness exhibited good fits of reliability and validity. Thus, should provide a relevant tool for further inquiry into accounting related knowledge management policy matters.

In this research, model development for the all the HOCs and their LOCs were approached from reflective-formative perspective. That is, AKMI knowledge related elements (accounting structure, accounting culture, accounting people (T-shaped) skills), AKMP components (accounting acquisition process, accounting conversion process, accounting protection process), FE components (strategic related effectiveness, operational related effectiveness, information related effectiveness, managerial related effectiveness), and UE elements (financial related performance, non-financial related effectiveness) as HOCs were conceptualized to be in a constituted relationships with the LOCs. The study highlights that future research should be conducted to empirically validate the model in other accounting contexts not considered in the study.

Also, future research could investigate each of the individual accounting knowledge capabilities included in the model by combining both quantitative and qualitative research methods to develop a deeper insight into each factor and provide richer and more accurate data in a specific context. For example, while accounting people (T-shaped) skill is confirmed as the most important dimension of AKM infrastructure capability in this study, future research could use case study methodology

to explain in detail how and why accounting people affects AKM process capability and accounting domain performance.

Furthermore, the study sample was obtained from just accounting functions of research universities in Malaysia. Thus, in future, a sampling frame that combines accounting functions from private and public universities including different countries outside Asia could be employed to provide a more inter-intra country perspective into the matter. Also, this research employed subjective financial related performance indicators. Future works should use objective measures especially if the respondents are legally obliged to disclose actual financial indicators as opined by Arshad et al. (2014). In addition, in modelling and assessing the HOCs, the two-stage approach was employed. However, in future, the repeated indicator approach can be utilized based on the conditions specified for its usage in literature. Also, future studies may consider a complementary method like the importance performance map analysis (IPMA) to facilitate richer outcome discussion.

5.6 Conclusion

Accounting practices are critical to the realization of both short-term and long-term objectives of any institution. The study focused on the investigation of KM activities in university accounting practices. As the context is currently under-researched, government and university management team are not sure if KM is within the scope of university accounting practices in Malaysia. The empirical results of PLS-SEM analysis of data collected from 272 usable responses proved that the model is workable in the context of Malaysian university accounting practices. In addition, revealed that AKM infrastructure capability, AKM process capability, accounting functional effectiveness and overall university performance are multifaceted constructs constituted by vital actionable drivers which managers can influence for beneficial KM outcomes. Conceptual, empirical, theoretical and practical evidences are provided about the consequences of embedded AKM infrastructure and process capability on accounting functional effectiveness and overall university performance. This investigation has added to the present group of learning in KM and accounting practice based on the resource-based theory.

Thus, future research can further investigate the HOCs to advance a deeper insight into significant factors of interest, especially people (T-Shaped) skill matters, strategic related effectiveness, accounting knowledge application processes and financial related performance being the most significant drivers for their respective HOCs. In addition, researchers can rummage other core accounting factors to give a better all-inclusive view of the relationship effects highlighted in the study. Based on the findings, this study concludes that adopting KM activities that are aligned with the task and the results that universities intend to achieve with their accounting practices will be beneficial to the institution, all things being equal.

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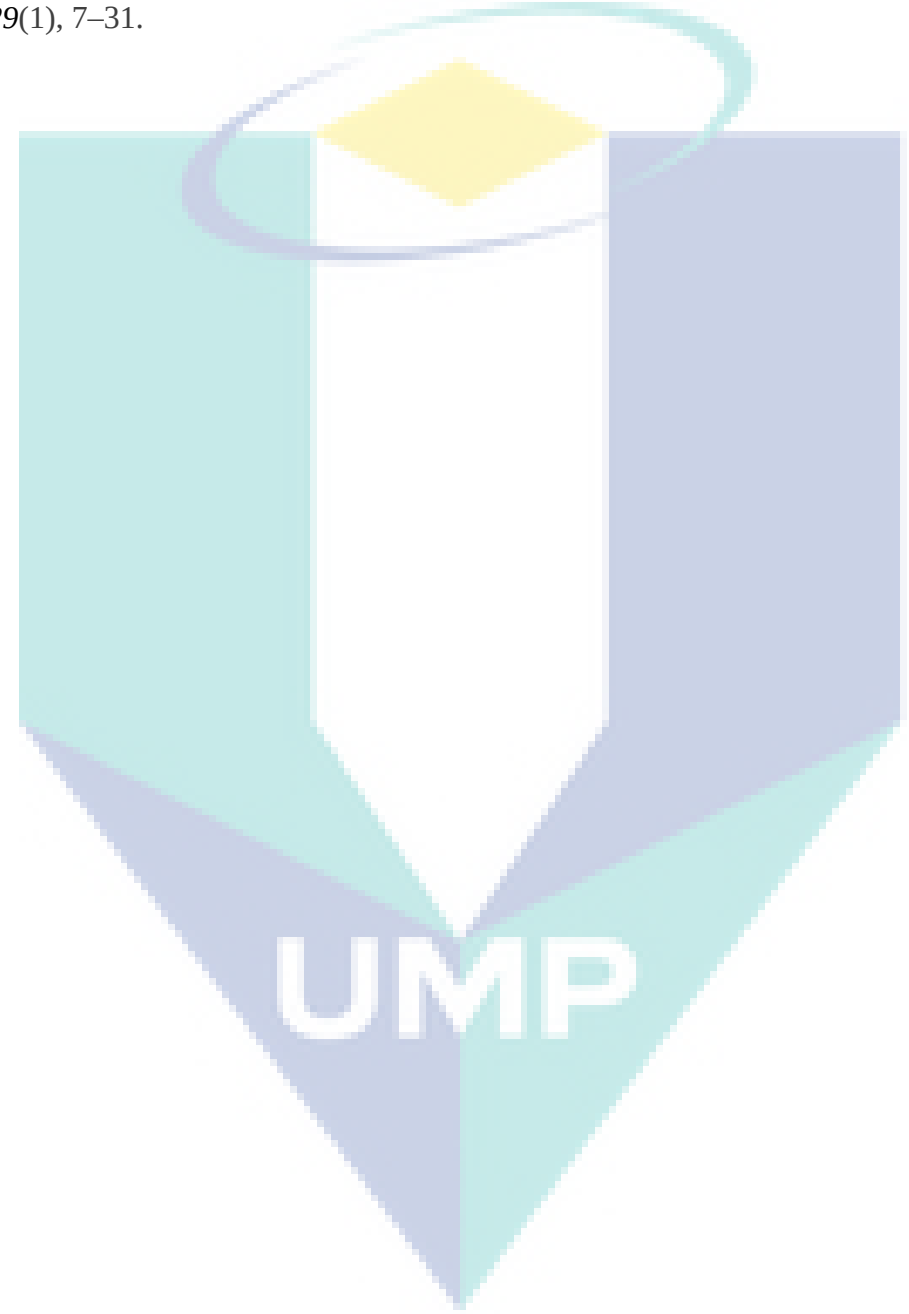

APPENDIX 1
LIST OF PUBLICATIONS

1. **Ayodele, F. O**., Yao, L., Haron, H. B., & Juan, S. H (2016). Review on Knowledge Sharing: Barriers and Motivations. Proceedings of the UMP-National Conference
2. **Ayodele, F. O**., Yao, L. & Haron, H. B. (2017). A Novel Accounting Knowledge Sharing System: Conceptual Framework. *International Journal of Information and Management System*, 28, 277-298 (Scopus Index)
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Award

1. Best Paper Award- FGIC Conference on Governance and Integrity 2017 at Kolej Yayasan Pahang, Kuantan, Malaysia.

APPENDIX 2
CONSTRUCT MEASUREMENT AND SOURCES

Table A1 Questionnaire Construct

Construct	Item	Measurement	References
Accounting Technology in use (TIE)		***My accounting function uses technology that allows…***	
	TI 1	staffs to collaborate with other persons inside and outside the function	Gold *et al*. (2001), Lee and Choi (2003), Chuang (2004), Lu and Ramamurthy (2011)
	TI 2	staff to learn	
	TI 3	staffs to map the locations (e.g. an individual, specific system, or database) of specific types of knowledge	
	TI 4	accounting knowledge to be recorded in the database for use by all accounting staffs	
	TI 5	staffs to perform their task adequately	
	TI 6	relevant accounting data, information and knowledge to be shared	
	TI 7	efficiency of accounting task processes	
Accounting Culture (CIE)		***In my accounting function…***	
	CI 1	employees understand the importance of accounting knowledge to university success	Gold *et al*. (2001), Lee and Choi (2003), Chuang (2004), Lu and Ramamurthy (2011) Smith (2006)
	CI 2	high-levels of participation are expected in capturing and transferring accounting knowledge	
	CI 3	on-the-job training and learning are valued	
	CI 4	integrity is valued	
	CI 5	overall function's objectives are clearly stated	

Table A1 Continued

Construct	Item	Measurement	References
Accounting Culture (CIE)		***In my accounting function…***	
	CI 6	senior management clearly supports the role of accounting knowledge towards university's success	
	CI 7	culture facilitates the transfer of new accounting knowledge across division boundaries	
	CI 8	staffs are encouraged to interact and ask others for assistance in their tasks	
	CI 9	accounting information are communicated as deemed appropriate by law	
Accounting Structure (SIE)		***My accounting function (s') …***	
	SI 1	tructure facilitates the discovery of new accounting knowledge	Gold *et al*. (2001), Perez-Lopez and Alegro (2012), Aujirapongpan *et al*. (2010)
	SI 2	tructure facilitates the creation of new accounting knowledge	
	SI 3	tructure foster individual and group learning	
	SI 4	as a standardized reward system for sharing knowledge	
	SI 5	esigns processes to facilitate accounting knowledge exchange across unctional boundaries	
	SI 6	taffs frequently examine accounting knowledge for errors/mistakes	
	SI 7	tructure facilitates the transfer of new accounting knowledge across ivisions	
	SI 8	tructure facilitates the conversion of accounting data into useful nformation for decision making purposes	

Table A1 Continued

Construct	Item	Measurement	References
Accounting People (T-shaped) skills (PIE)		***In my accounting function member …***	
	PI 1	can understand not only their own tasks but also others' tasks	Lee and Choi (2003), Bhatt and Grover (2005)
	PI 2	can make suggestions about others' tasks	
	PI 3	can communicate well not only with their division members but also with other department members	
	PI 4	are specialists in their own field of expertise	
	PI 5	can perform their own task effectively without regard to environmental changes	
Accounting Acquisition process (ACPE)		***My accounting function …***	
	ACP 1	has processes for acquiring accounting knowledge about students and staffs	Gold *et al*. (2001), Smith (2006), Perez-Lopez and Alegro (2012), Lin (2014), Bhatt and Gover (2005), Aujirapongpan *et al*. (2010), Zaied (2012)
	ACP 2	has processes for generating new accounting knowledge from existing accounting knowledge (data, information)	
	ACP 3	has processes for acquiring knowledge about external donors/ university partners	
	ACP 4	has processes for distributing accounting knowledge throughout the university	
	ACP 5	has processes for acquiring knowledge about new accounting practices/ services within universities	
	ACP 6	has processes for exchanging accounting knowledge between individuals	

Table A1 Continued

Construct	Item	Measurement	References
Accounting Conversion Process (CPE)		***My accounting function …***	
	CP 1	has processes for communicating accounting knowledge for decision making purposes	Gold *et al*. (2001), Smith (2006), Perez-Lopez and Alegro (2012), Lin (2014), Bhatt and Gover (2005), Aujirapongpan *et al*. (2010), Zaied (2012)
	CP 2	has processes for transferring accounting knowledge to members	
	CP 3	has processes for absorbing accounting knowledge from individuals into the university	
	CP 4	has processes for integrating different sources and types of accounting data, information	
	CP 5	has processes for organizing (storing/filing) accounting knowledge	
	CP 6	has processes for updating accounting knowledge	
	CP 7	has processes for identifying and analyzing accounting knowledge into relevant form for users	
	CP 8	has processes for transforming ideas into business opportunity for the university	
Accounting Application Process (APPE)		***My accounting function …***	
	APP 1	has processes for using accounting knowledge in development of new products/services	Gold *et al*. (2001), Smith (2006), Perez-Lopez and Alegro (2012), Lin (2014), Bhatt and Gover (2005), Zaied (2012)
	APP 2	has processes for using accounting knowledge to solve new functional task problems and budgeting	
	APP 3	has processes that encourages the application of relevant acquired task knowledge	

Table A1 Continued

Construct	Item	Measurement	References
Accounting Application Process (APPE)		***My accounting function …***	
	APP 4	uses accounting knowledge to improve efficiency	
	APP 5	uses accounting knowledge to provide strategic direction	
	APP 6	locate and quickly apply accounting knowledge to critical competitive conditions	
	APP 7	takes advantage of new mandatory accounting knowledge	
Accounting Protection Process (PPE)		***My accounting function …***	
	PP 1	has processes to protect accounting knowledge from inappropriate use both inside and outside the function	Gold *et al*. (2001), Smith (2006), Perez-Lopez and Alegro (2012), Lin (2014), Bhatt and Gover (2005), Zaied (2012)
	PP 2	has processes for internal control purposes	
	PP 3	accounting knowledge that is restricted is clearly identified	
	PP 4	has extensive policies and procedures for protecting financial resources from wastage	
	PP 5	values and protects accounting knowledge embedded in individuals	
	PP 6	clearly communicates the importance of organizing accounting knowledge	

Table A1 Continued

Construct	Item	Measurement	References
Operational Effectiveness (OEE)		***Over the past years, my accounting function has …….***	
	OE1	reduced cost of operation	Shang and Seddon (2000)
	OE2	improved follow up of university assets	Spathis and Ananiadis (2005)
	OE3	improve time for annual closing of account	
	OE4	fewer errors on data entry	
	QE5	increased flexibility in provision of useful accounting information	
	QE6	improved maintenance of functional database	
	QE7	better expenditure tracking system	
	QE8	enhanced process automation	
	QE9	improved service delivery	
	QE10	improved accounting information documentation	
Managerial Effectiveness (MEE)		***Over the past years, my accounting function has…***	
	ME1	improved in university resource structuring	Shang and Seddon (2000)
	ME2	improved managerial efficiency	Spathis and Ananiadis (2005)
	ME3	promotes peer to peer mentoring	
	ME4	facilitates more effective collaboration	
	ME5	improved effectiveness of financial internal control	
	ME7	anticipated financial risk better	
	ME8	improved mechanism for resource acquisition	
	ME9	improved mechanism for resource monitoring	
	ME10	improved ideas for own income generation	

Table A1 Continued

Construct	Item	Measurement	References
University Performance (Financial) (FP)		***Over the past years, because of my accounting function the university has improved its ability to…***	
	FP 1	monitor expenditure against budget	Hitts (1988), Gold *et al*. (2001), Lee and Choi (2003), Chuan and Chuang (2004), Kaplan and Norton, (2005) and Lin (2014).
	FP 2	better structure its financial resources	
	FP 3	integrate financial resources to create capabilities	
	FP 4	anticipates potential business opportunities	
	FP 5	drastically reduce operational cost	
	FP 6	adapt quickly to anticipated changes in funding policies	
	FP 7	make proactive strategic financial decisions	
	FP 8	better allocates its financial resources	
	FP 9	lower its investment risk	
	FP 10	account for all university resource	
University Performance (Non-Financial) (NP)		***Over the past years, because of my accounting function the university has improved its ability to…***	
	NP 1	integrative research and planning	Hitts (1988), Gold *et al*. (2001), Lee and Choi (2003), Chuan and Chuang (2004), Kaplan and Norton, (2005) and Lin (2014).
	NP 2	achieve sound university administration	
	NP 3	be responsive to new competitive demands	
	NP 4	manage the university resources	
	NP 5	enhance student academic development	
	NP 6	staff learning and development	
	NP 7	achieved targeted medium and long-term plan	
	NP 8	streamline its internal processes	
	NP 9	get more new students	
	NP 10	comply with relevant stator regulations	

APPENDIX 3A
COVER LETTER

DEAR SURVEY PARTICIPANTS,

I am a Doctoral student at the Faculty of Industrial Management, Universiti Malaysia Pahang in Malaysia. As a requirement for the award of the PhD degree, it is expected that a research be conducted by the student in a relevant field. Therefore, I am presently investigating the relationship between accounting knowledge management capability and functional effectiveness in universities. Thus, to achieve the objective of the study, a questionnaire has been developed for the survey.

The questionnaire survey should be filled out by all accountant in the accounting function of the university and those knowledgeable in accounting processes and infrastructures. Completion of the survey is voluntary, and you may withdraw at any time without any consequence. Data collected is anonymous, strictly confidential and will be kept in a secured place.

If you are willing to participate, please read the questionnaire carefully and answer all questions to the best of your knowledge. It would be much appreciated if you could fill out the questionnaire **within 7-30 days from the day the questionnaire is received**. If you would like to receive a summary of the research results when it is available, please send me a request to the address given below.

The ethical aspects of this study have been approved by the University Research Ethics Committee. If you have any complaints or reservations about any ethical aspect of your participation in this research, you may contact Dr. Liu Yao and Prof. Dato' Dr. Hasnah Haron in the address below. Any complaint you make will be treated in confidence and you will be informed of the outcome. Should you have any queries about the survey please do not hesitate to contact me through the address stated below. Thank you very much for your time and efforts and your contribution is highly appreciated.

Kind regards,

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APPENDIX 3B
QUESTIONNAIRE

A SURVEY ON ACCOUNTING KNOWLEDGE MANAGEMENT

The questionnaire consists of two main sections:

(1) PARTICIPANT & BUSINESS BACKGROUND INFORMATION

(2) ACCOUNTING KNOWLEDGE MANAGEMENT

Please note that your responses are anonymous and confidential and will be used by the researcher only for the purposes of research.
There are no right or wrong answers. Please answer all questions to the best of your knowledge.

DEFINITIONS OF KEY TERMS

- ACCOUNTING KNOWLEDGE' include both financial (quantifiable in monetary terms) and non-financial (non-quantifiable in monetary terms) which are interwoven in nature. *Examples are* resources held by people (intelligence, expertise, judgement, know-how, information, insight, experience, accumulated leaning and knowledge, ability to innovate, ability to learn) and the resources owned by the function pertaining to the university (culture, formal accounting structure. network, etc)

- 'ACCOUNTING KNOWLEDGE MANAGEMENT' is defined as the functional capability which identifies, locates (creates or acquires), transfers, converts, and distributes accounting knowledge (data, information) for improved performances.

SECTION 1: PARTICIPANT & BUSINESS BACKGROUND INFORMATION

(This information is used for sample descriptive)

1. What is your gender?

☐ Male ☐ Female

2. What is your age?

☐ Under 30 years ☐ 31-40 years ☐ 41-50 years ☐ 51-60 years ☐ Over 60 years

3. Please indicate the highest level of education you have achieved

☐ High school ☐ Diploma ☐ Bachelor's degree ☐ Graduate Diploma

☐ Master's degree ☐ Doctorate ☐ Others

Specify_____

4. What is your current position?

☐ Bursar/Chief Finance Office ☐ Deputy/Assistant Bursar ☐ Senior Finance Office

☐ Finance Officer ☐ Finance Assistant ☐ Assistant Accountant

☐ Senior Administrative Assistant Finance ☐ Administrative Assistant Finance ☐ Others

Specify_____

5. How many years have you worked in the university?

☐ Less than 1 years ☐ 1-2 years ☐ 3-5 years ☐ 6-10 years ☐ 11-20 years

☐ More than 20 years

6. Account division (Specify)_____

SECTION 2: ACCOUNTING KNOWLEDGE MANAGEMENT

Please indicate (by circling the appropriate box) the extent to which you agree or disagree with each of the statements from captions 'Information Technology' through 'University Performance'. The following scale is applied for all statements:

1	2	3	4	5
Strongly Disagree (SD)	Disagree (D)	Neither Agree or Disagree (ND)	Agree (A)	Strongly Agree (SA)

7. Accounting Technology In Use

	My accounting function uses technology that allows…		SD	D	ND	A	SA
TI 1	staffs to collaborate with other persons inside and outside the function		1	2	3	4	5
TI 2	staff to learn		1	2	3	4	5
TI 3	staffs to map the locations (e.g. an individual, specific system, or database) of specific types of knowledge		1	2	3	4	5
TI 4	sccounting knowledge to be recorded in the database for use by all accounting staffs		1	2	3	4	5
TI 5	staffs to perform their task adequately		1	2	3	4	5
TI 6	relevant accounting data, information and knowledge to be shared		1	2	3	4	5
TI 7	efficiency of accounting task processes		1	2	3	4	5

8. Accounting Culture

	In my accounting function…		SD	D	ND	A	SA
CI 1	employees understand the importance of accounting knowledge to university success		1	2	3	4	5
CI 2	high-levels of participation are expected in capturing and transferring accounting knowledge		1	2	3	4	5
CI 3	on-the-job training and learning are valued		1	2	3	4	5
CI 4	integrity is valued		1	2	3	4	5
CI 5	overall function's objectives are clearly stated		1	2	3	4	5
CI 6	senior management clearly supports the role of accounting knowledge towards university's success		1	2	3	4	5
CI 7	culture facilitates the transfer of new accounting knowledge across division boundaries		1	2	3	4	5
CI 8	staffs are encouraged to interact and ask others for assistance in their tasks		1	2	3	4	5
CI 9	accounting information are communicated as deemed appropriate by law		1	2	3	4	5

9. Accounting Structure

	My accounting function (s') …		SD	D	ND	A	SA
SI 1	structure facilitates the discovery of new accounting knowledge		1	2	3	4	5
SI 2	structure facilitates the creation of new accounting knowledge		1	2	3	4	5
SI 3	structure foster individual and group learning		1	2	3	4	5
SI 4	has a standardized reward system for sharing knowledge		1	2	3	4	5
SI 5	designs processes to facilitate accounting knowledge exchange across functional boundaries		1	2	3	4	5
SI 6	staffs frequently examine accounting knowledge for errors/mistakes		1	2	3	4	5
SI 7	structure facilitates the transfer of new accounting knowledge across divisions		1	2	3	4	5
SI 8	structure facilitates the conversion of accounting data into useful information for decision making purposes		1	2	3	4	5

10. Accounting People (T-shaped) skills

	In my accounting function member …		SD	D	ND	A	SA
PI 1	can understand not only their own tasks but also others' tasks		1	2	3	4	5
PI 2	can make suggestions about others' tasks		1	2	3	4	5
PI 3	can communicate well not only with their division members but also with other department members		1	2	3	4	5
PI 4	are specialists in their own field of expertise		1	2	3	4	5
PI 5	can perform their own task effectively without regard to environmental changes		1	2	3	4	5

11. Accounting Acquisition process

	My accounting function …		SD	D	ND	A	SA
ACP 1	has processes for acquiring accounting knowledge about students and staffs		1	2	3	4	5
ACP 2	has processes for generating new accounting knowledge from existing accounting knowledge (data, information)		1	2	3	4	5
ACP 3	has processes for acquiring knowledge about external donors/ university partners		1	2	3	4	5
ACP 4	has processes for distributing accounting knowledge throughout the university		1	2	3	4	5
ACP 5	has processes for acquiring knowledge about new accounting practices/ services within universities		1	2	3	4	5
ACP 6	has processes for exchanging accounting knowledge between individuals		1	2	3	4	5

12. Accounting Conversion Process

	My accounting function …		SD	D	ND	A	SA
CP 1	has processes for communicating accounting knowledge for decision making purposes		1	2	3	4	5
CP 2	has processes for transferring accounting knowledge to members		1	2	3	4	5
CP 3	has processes for absorbing accounting knowledge from individuals into the university		1	2	3	4	5
CP 4	has processes for integrating different sources and types of accounting data, information		1	2	3	4	5
CP 5	has processes for organizing (storing/filing)		1	2	3	4	5

	accounting knowledge						
CP 6	has processes for updating accounting knowledge		1	2	3	4	5
CP 7	has processes for identifying and analyzing accounting knowledge into relevant form for users		1	2	3	4	5
CP 8	has processes for transforming ideas into business opportunity for the university		1	2	3	4	5

13. Accounting Application Process

	My accounting function …		SD	D	ND	A	SA
APP 1	has processes for using accounting knowledge in development of new products/services		1	2	3	4	5
APP 2	has processes for using accounting knowledge to solve new functional task problems and budgeting		1	2	3	4	5
APP 3	has processes that encourages the application of relevant acquired task knowledge		1	2	3	4	5
APP 4	uses accounting knowledge to improve efficiency		1	2	3	4	5
APP 5	uses accounting knowledge to provide strategic direction		1	2	3	4	5
APP 6	locate and quickly apply accounting knowledge to critical competitive conditions		1	2	3	4	5
APP 7	takes advantage of new mandatory accounting knowledge		1	2	3	4	5

14. Accounting Protection Process

	My accounting function …		SD	D	ND	A	SA
PP 1	has processes to protect accounting knowledge from inappropriate use both inside and outside the function		1	2	3	4	5
PP 2	has processes for internal control purposes		1	2	3	4	5
PP 3	accounting knowledge that is restricted is clearly identified		1	2	3	4	5
PP 4	has extensive policies and procedures for protecting financial resources from wastage		1	2	3	4	5

PP 5	values and protects accounting knowledge embedded in individuals		1	2	3	4	5
PP 6	clearly communicates the importance of organizing accounting knowledge		1	2	3	4	5

15. Operational Effectiveness

	Over the past years, my accounting function has improved in…		SD	D	ND	A	SA
OE 1	reduced cost of operations		1	2	3	4	5
OE 2	improved follow up of university assets		1	2	3	4	5
OE 3	improve time for annual closure of account		1	2	3	4	5
OE 4	fewer errors on data entry		1	2	3	4	5
OE 5	increased flexibility in provision of useful accounting information		1	2	3	4	5
OE 6	improved maintenance of functional database		1	2	3	4	5
OE 7	better expenditure tracking system		1	2	3	4	5
OE 8	enhance process automation		1	2	3	4	5
OE 9	improved service delivery		1	2	3	4	5
OE 10	improved accounting information documentation		1	2	3	4	5

16. Managerial Effectiveness

	Over the past years, my accounting function has…		SD	D	ND	A	SA
ME 1	improved in university resources structure		1	2	3	4	5
ME 2	improved managerial efficiency		1	2	3	4	5
ME 3	promote peer to peer mentoring		1	2	3	4	5
ME 4	facilitate more effective collaboration		1	2	3	4	5
ME 5	Improved effectiveness of financial internal control		1	2	3	4	5
ME 6	Improved provision of information for strategic planning and control		1	2	3	4	5
ME 7	Anticipated financial risk better		1	2	3	4	5
ME 8	improved mechanism for resource acquisition		1	2	3	4	5
ME 9	Improved mechanism for resource monitory		1	2	3	4	5
ME 10	Improved ides for own income		1	2	3	4	5

17. University Performance (Financial)

	Over the past years, because of my accounting function the university has improved its ability to…		SD	D	ND	A	SA
FP 1	monitor expenditure budget		1	2	3	4	5
FP 2	better structure its financial resources		1	2	3	4	5

FP 3	Integrate financial resources to create capability		1	2	3	4	5
FP 4	anticipate potential business opportunity		1	2	3	4	5
FP 5	drastically reduce operational cost		1	2	3	4	5
FP 6	adapt quickly to anticipate changes in funding policies		1	2	3	4	5
FP 7	make proactive strategic financial resources		1	2	3	4	5
FP 8	better allocates its financial resources		1	2	3	4	5
FP 9	lower its investment risk		1	2	3	4	5
FP 10	account for all university resources		1	2	3	4	5

18. University Performance (Non-financial)

	Over the past years, because of my accounting function the university has improved its ability to…		SD	D	ND	A	SA
NP 1	integrative research and planning		1	2	3	4	5
NP 2	achieve sound university administration		1	2	3	4	5
NP 3	be responsive to new competitive demands		1	2	3	4	5
NP 4	manage the university resources		1	2	3	4	5
NP 5	enhance student academic development		1	2	3	4	5
NP 6	staff learning and development		1	2	3	4	5
NP 7	achieve targeted medium and long-term plan		1	2	3	4	5
NP 8	streamline its internal processes		1	2	3	4	5
NP 9	get more new student		1	2	3	4	5
NP 10	comply with relevant statutory regulations		1	2	3	4	5

If you would like to receive a copy of the research results, please indicate your mailing or email address below:

_____

THANK YOU VERY MUCH FOR YOUR TIME AND EFFORTS TO COMPLETE THIS SURVEY!