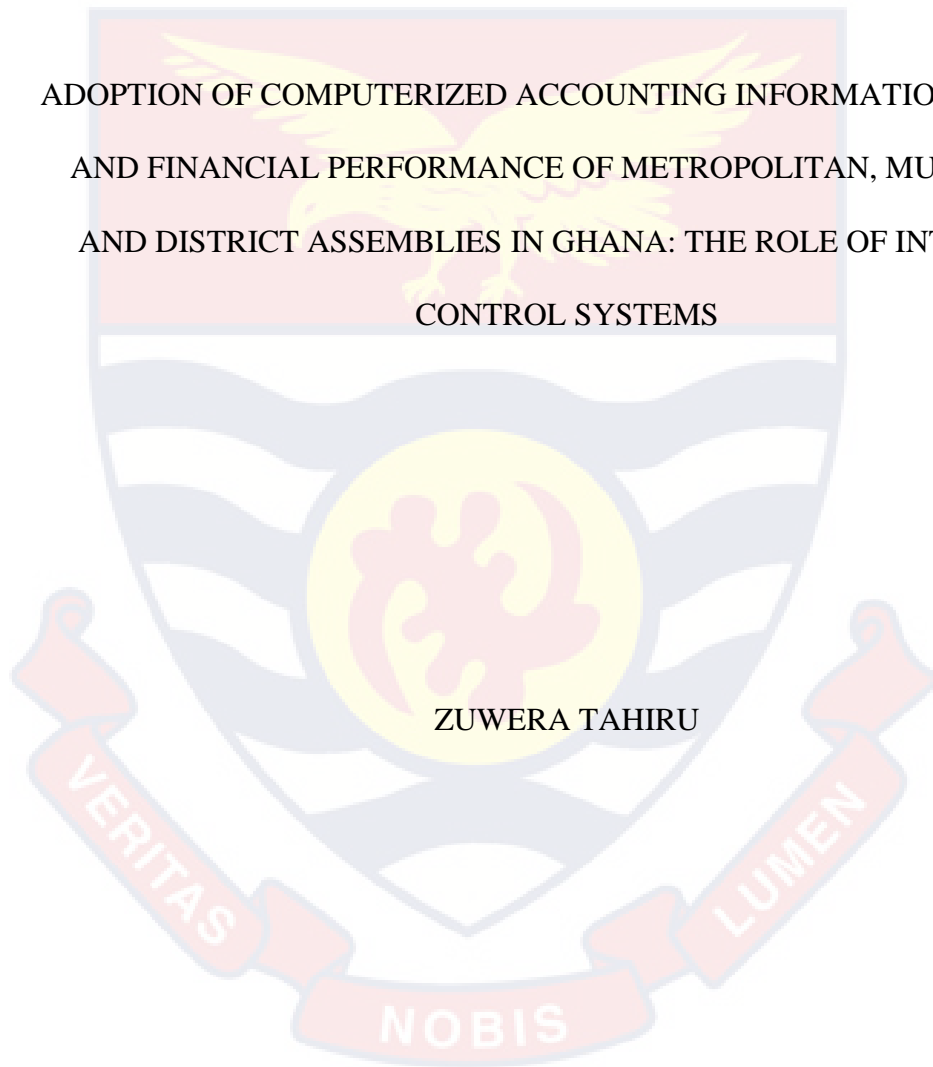UNIVERSITY OF CAPE COAST

ADOPTION OF COMPUTERIZED ACCOUNTING INFORMATION SYSTEM

AND FINANCIAL PERFORMANCE OF METROPOLITAN, MUNICIPAL

AND DISTRICT ASSEMBLIES IN GHANA: THE ROLE OF INTERNAL

CONTROL SYSTEMS

ZUWERA TAHIRU

2020

UNIVERSITY OF CAPE COAST

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AND DISTRICT ASSEMBLIES IN GHANA: THE ROLE OF INTERNAL

CONTROL SYSTEMS

BY

ZUWERA TAHIRU

Thesis submitted to the Department of Accounting, School of Business, College

of Humanities and Legal Studies, University of Cape Coast, in partial fulfillment

of the requirements for the award of Master of Commence degree in Accounting.

JANUARY 2020

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that

no part of it has been presented for another degree in this university or elsewhere

Candidate's Signature ....Date...

Name: Zuwera Tahiru

Supervisor's Declaration

I hereby declare that the preparation and presentation of the thesis were

supervised in accordance with the guidelines on supervision of thesis laid down

by the University of Cape Coast.

Supervisor's Signature..Date......................................

Name: Mr. Stephen Asante

ABSTRACT

The aim of this study is to explore the factors that influence the adoption of computerized accounting information system (CAIS) among MMDAs in Ghana. It also sought to examine how the identified factors influence the financial performance of the MMDAs and the mediating role of internal control system in the identified linkage. Relying on data collected from the operators and controllers of CAIS of 227 MMDAs across the sixteen regions of Ghana using questionnaire as the main instrument, factor analysis was applied to identify four factors that determine the adoption of CAIS among MMDAs. These include; Cost of adoption; CAIS complexity, Data security and cost and then Readiness to adopt CAIS. Using these factors as exogenous constructs and applying structural equation modelling, the study observed that, whiles cost of adopting CAIS and readiness to adopt CAIS significantly influence the financial performance of MMDAs, CAIS complexities and data security cost and threat have no significant influence on financial performance. It was again observed that whiles internal control system mediates the relationship between CAIS complexities and financial performance, and then data security threat and cost, internal control system does not mediate the relationship between cost of adopting CAIS and financial performance and then readiness to adopt CAIS and financial performance. It is recommended among others that Government interventions should aim at improving technology adoption among MMDAs. Also, Government should speed up the adoption and implementation of GIFMIS to cover all MMDAs. Again, MMDAs should consider CAIS technology on the basis of Software-as-a-service (SaaS).

KEY WORDS

Computerized accounting information system

Financial performance

Internal control system

Structural equation modeling

Factor analysis

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DEDICATION

To my husband, Derick Owusu-Ambrose, my mum, Meimuna Sumaila and my

children.

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CHAPTER ONE

INTRODUCTION

There has been emerging interest among industry players and scholars on the key factors that drive public entities to adopt a computerized system such as Computerised Accounting Information System (CAIS) and the potential linkage between the drivers of CAIS adoption and financial performance of these entities even though studies in these areas are geared towards the private sector. The interest seems to be driven by the amount of funds required to invest and manage CAIS, hence linking the CAIS adoption drivers to financial performance raised a fundamental issue as to whether or not adoption of CAIS directly improves financial performance, especially in the public sector, and if not directly, through what means? This chapter therefore provides an opener to the discussion in relation to the drivers of CAIS and its linkage with financial performance.

Background to the study

It is asserted that, Computerized Accounting Information System (CAIS) is essential for improving the effectiveness, efficiency and financial performance of government entities in terms of revenue mobilisation and expenditure management (Mergel & Bretschneider, 2013). Consequently, between the period of 2012 to 2019, the Government of Ghana have spent over $85 million in developing a comprehensive public financial management system necessary to manage the financial activities of the public sector in the area such as budgeting, procurement, accounting, financial reporting and auditing.

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Across the globe, there have been a general accord that, investment and implementation of proper CAIS in the processing and management of accounting data is essential in producing quality and reliable accounting information (that is, information possessing all the qualitative characteristics as required by the International Public Sector Accounting Conceptual Framework) and insisting on control procedures which intend increases transparency, accountability and improvement in the financial performance of the government in terms of revenue generation and expenditure management (Asamoah, 2019; Heeks, 2001). This drive has led to the coining into force, the term "e-government accounting" which is essentially explained as the involvement of CAIS in recording, processing and reporting of financial transactions in a public sector setting for better decision making and control (Rossel & Finger, 2007).

An area that appears to require CAIS in public financial management have been managing financial performance of the public sector which is judged in terms of efficient public revenue mobilization and expenditure management (Cho & Choi, 2004) which seems to be the heartbeat of public financial management. As put by Bekoe, Danquah and Senahey (2016), a modern state is mandated to raise revenue to facilitate the developmental agenda and use the funds mobilized efficiently and effectively in the provision of public services to its citizenry. This assertion connotes effective revenue mobilisation and efficient management of public resources. Thus, as the state depends on taxes, rates, fines, and other financial obligations from its citizenry to raise revenue, it has utmost obligation to ensure efficient management of these revenue. From the national perspective,

Ghana, since the 1970s, has embarked on several reforms seeking to improve its revenue generation capacity and enhance efficiency expenditure management. These reforms took different dimensions such as regulatory, information technology, financial infrastructure and human resource. These reforms aimed at expanding the tax base of the economy, enhancing revenue generation capacity, strengthening internal controls and the more recently and strengthening CAIS (Bekoe, Danquah, & Senahey, 2016), all these meant to improve the performance of the public sector.

As part of these reforms, decentralization of central government authority to lower-level governmental bodies became essential in the 1990s which led to the creation of sub-governance institutions known as local government which is made up of the Metropolitan, Municipal and District Assemblies (MMDAs). This reform was accompanied by fiscal decentralization where the MMDAs where granted power to raise revenue at the local level and manage their expenditure subject to the provisions of financial administration guidelines and laws. In terms of revenue mobilisation, MMDAs are expected to generate revenue for the overall development of their administrative areas (Ahwoi, 2010), through financial obligations imposed on residences in the catchment areas of the these assemblies in the form of property rates, business-operating permits, market tolls, lorry tolls among others. In terms of expenditure management, MMDAs are expected to apply meticulously, the provisions contain in the various financial regulations in applying the revenue they have mobilized as well as those ceded from the central government in order to avoid gratuitous expenditure. Thus, financial performance

of the MMDAs are accessed based on the extent to which they are able to generate revenue from the available resources in excess of the approved revenue budget and the extent to which these revenues were prudentially allocated and managed to ensure operations within the approved budget.

However, the unwillingness of citizens in developing countries to meet these financial obligations, the poor expenditure management and reporting system among others respectively stifles the attempts for local authorities to generate adequate revenue for their socioeconomic development and hence hinder improved financial performance (Bekoe *et al.,* 2016; Kumar & Misra, 2007). The situation does not present a different picture among MMDAs in Ghana as budget variance (measured as the percentage of approved budget) between approved budgeted internally generated revenue and the actual revenue generated for all the 216 MMDAs in Ghana (as at the end of 2017) tends to unfavorably and generally broadening over time as depicted by Figure 1.
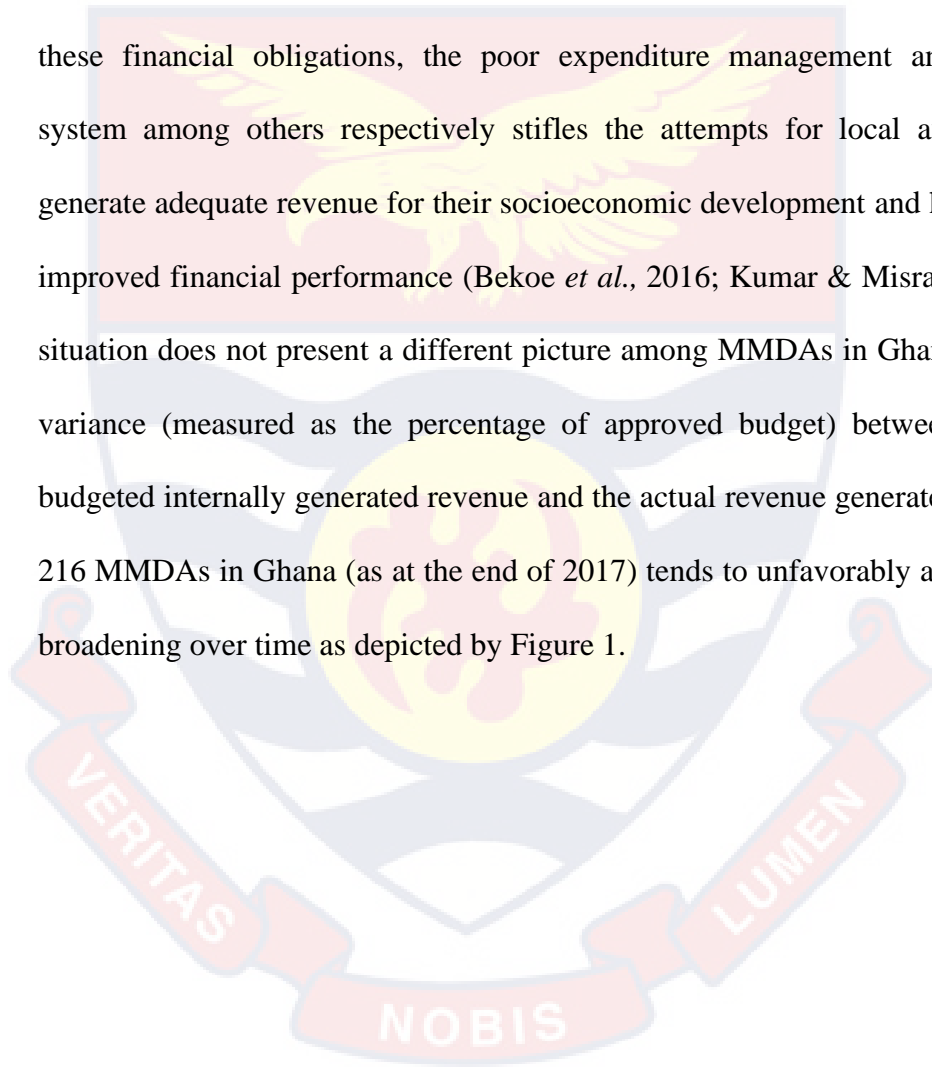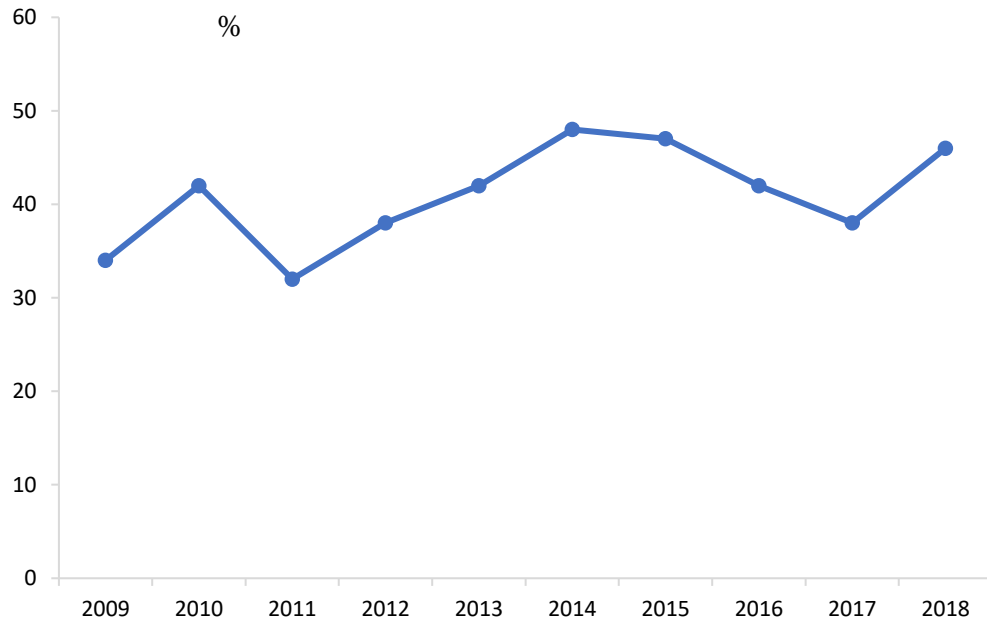
Figure 1: Variance as the percentage of approved budget between the aggregate approved budgeted internally generated revenue and the actual revenue generated MMDAs in Ghana from 2009 to 2018

Source: Ministry of Local Government and Rural Development Annual Report from 2009 to 2018

Consequently, most district assemblies are cash-strapped, and as such, depends on Government of Ghana funding and other statutory receipts from funds such as the District Assembly Common Fund (DACF), District Development Fund (DDF) and similar funds (Ohemeng & Ayee, 2016). Districts with low economic activity depend entirely on the DACF as the only source of revenue for local economic development and infrastructure provision (Ahwoi, 2010). The situation is, however, encouraging in MMDAs with relatively high economic activities, where some are able to raise passable revenue locally to fund some of their development activities. In addition to these bottlenecks, attempts to wean district assemblies from perpetual dependency on the central government funding

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have been smeared by issues like embezzlement and other vices committed by government officials placed in charge of revenue collecting activities and expenditure management with poor accountability reporting (Ministry of Local Government and Rural Development, 2016).

Most scholars have attributed this situation to inappropriate accounting practices (Alsaaty, 2012; Rogers, 2016) and non-adoption of appropriate information technology (Abor & Quartey, 2010; Moffitt *et al.*, 2016; Murthy, 2016; Ohemeng & Ayee, 2016) to capture and track revenues received by the Assemblies and monitor expenditure of these Assemblies and non-compliance with internal control systems. This situation has led to some interventions within the local government accounting information system to improve revenue mobilization in their jurisdictions and better manage expenditure. One such intervention has been the use of technology in facilitating revenue collection and management and also integration of public financial management system with clear and improved internal control systems to make it much more effective. As a result, some MMDAs have acquired various forms of hardware and software for facilitating revenue collection and manage their budget effectively in an effort to improve their performance in the area of revenue and expenditure management and to strengthen their internal control systems. Typical instances is the lunching of the National Public Sector Reform Strategy (NPSRS) and the Ghana Integrated Financial Management Information System (GIFMIS) which seeks to digitalize the activities of Ministries, Departments and Agencies (MDAs) and MMDAs in Ghana in terms of financial management by 2023 (Government of Ghana, 2017).

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This poses a basic question: that is, what drives the MMDAs (and public sector at large) to adopt CAIS? Does investment in CAIS necessarily improves financial performance (revenue generation and expenditure management) of MMDAs? Does internal control play any role is the linkage between CAIS drivers and financial performance of these entities? Seeking answers to these critical questions have been the source of motivation on which the current study is premised, that is, to explore the factors that drives the adoption of CAIS in the public sector using the MMDAs as a case and to explore the linkage between the drivers of CAIS adoption and financial performance of public sector entities in terms of revenue generation and expenditure management and finally seeks to investigate the mediating role of internal control system in such relationship.

Statement of the Problem

There have copious studies that have attempted to empirically explore drivers of CAIS adoption and attempt to link these drivers to financial performance, most of which have yielded an inconclusive result. For instance, authors such as Kim and Kim (2018), Rahayu and Day (2015), Rogers (2016) and Sam *et al.* (2012) identified cost of adoption as one of the major drivers of CAIS adoption and went ahead to identify a significant positive relationship between cost of adoption and financial performance.

Nevertheless, studies such as Murthy (2016), Nollet, Filis, and Mitrokostas (2016) and Woodside and Quaddus (2015) argued that cost of adopting CAIS is inversely linked to financial performance. They argue that, CAIS unnecessarily increases the firm's costs as setting up a comprehensive

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CAIS requires greater cost investment and the maintenance of the system which as a result warn out the surpluses of the firm. The situation is even worsen in the case of public sector entities, as they don't generate incomes directly from their activities but rather relies on the continues funding of the central government and non-exchange revenues from the public, the cost of investment and maintenance of CAIS put strain on their budget that limits them to carrying out other projects on which their performance indicators are based. The inconclusive results of these studies have been attributed ignoring the indirectly linkage between these constructs.

Tracing the studies on the linkage between CAIS adoption drivers and financial performance to the earlier work of Thong (1999) entitled *"An Integrated Model of Information Systems Adoption in Small Businesses",* Thong showed that adoption of CAIS directly influences firm's financial performance and find absence of strong linkage between the two construct, but failed to investigate the likelihood that CAIS adoption may influence financial performance through other variables such as effective internal control systems. Topical studies by Sam, Fazli, Hoshino, and Tahir (2012), and Quaddus and Woodside (2015) also failed to address this situation as they all focused on the direct relationship between CAIS adoption and financial performance. This has consequently created the need to investigate whether CAIS has any indirect influence on financial performance with internal control serving as the medium of transmission of CAIS adoption to financial performance. This is particularly important, considering the fact that

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previous studies which focused solely on the direct relationship have yielded mixed results as indicated earlier.

Secondly, the previous studies that has sought to investigate the CAIS-financial performance relationship has focused on the private sector operating in developed countries (Rahayu & Day, 2015; Rogers, 2016) with very sparse studies focusing on the public sector. Meanwhile, the public sector is structurally different from the private sector in terms of regulations, objectives and management. For instance, in public sector entities, government usually have a direct influence on the decision-making process especially concerning the adoption of a technology-based system such as CAIS, a situation which is completely different in the case of the private sector. Moreover, in terms of technology infrastructure, the World Banks' Information Technology Development Index has consistently ranked developing countries at the bottom, compared to developed countries, indicating that, the direction of linkage between CAIS adoption and performance in developed countries may not necessarily be the same as those in developing countries (Rogers, 2016). For example, Rahayu and Day (2015), and Thong (1999) posit that, the way and manner through which CAIS adoption influence financial performance among entities in the developing countries differ from those in developed countries, hence it might be wrong for one to assume that research findings (in relation to CAIS adoption) from developed countries are necessarily applicable to developing countries. This therefore justifies the need to study CAIS adoption from developing country's

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perspective, and in the context of public sector with emphasis on MMDAs in Ghana.

Finally, beyond the practical background of low-level technology adoption among MMDAs, the theoretical background of CAIS also sets the foundation for this study. From a global perspective, Murthy and Wiggins (1999); Poston, Grabski, and Lincoln (2000); and Murthy (2016) reviewed past trends of CAIS research publications since 1985 in the top 20 accounting journals. They all concluded that CAIS related research faces an "*identity crisis*"; that is to say that research related to CAIS is fast diminishing and losing its presence in academic literature, not even in graduate dissertations. For example, Stone (2002) found that out of the 1068 articles published by the top five accounting journals from 1992-2000, only five articles relate to CAIS. Murthy (2016) also followed up on his earlier work in 1999 to verify if there has been an improvement in the number of CAIS-related publications. He concluded that there is still relative dearth in CAIS research. This worrying trend in CAIS research was what led to the Association of Advance Collegiate Schools of Business (AACSB, 2013) to enact a new Standard, called "Standard A7" which required that all accredited universities redesign their accounting syllabus to include modules in CAIS such as data creation, data sharing, data analytics, data mining, data reporting and data storage (Murthy, 2016). In essence, to address the challenges of "*relative dearth in CAIS research"* and "*Identity Crisis*", there is the need for much more research at the intersection of *Information Technology* and *accounting* (Moffitt *et al.*,

2016; Murthy, 2016); and this study aims at fulfilling the demanding gap in the context of Ghanaian public sector.

Purpose of the Study

The purpose of the study is to investigate the factors that influence the adoption of CAIS among the MMDAs and to explore the linkage between CAIS adoption and financial performance as well as the mediating role of internal control systems.

Research Objectives

Specifically, the study seeks to achieve the following objectives:

a) to identify the factors that drives the adoption of CAIS among MMDAs in Ghana.

b) To determine the effect of CAIS adoption on financial performance of MMDAs in Ghana.

c) to analyse the mediating role of internal control system on the AIS - financial performance nexus in the context of Technology-Organization-Environment (TOE) Framework.

Research Questions

In order to achieve the objectives of the study, the following research questions were set to be answered by the findings of the study;

a) What are the main drivers that influence the adoption of CAIS among MMDAs in Ghana?

b) What is the nature and significance of relationship between CAIS adoption drivers and financial performance of MMDAs in Ghana?

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c) Does internal control system of MMDAs plays a mediating role between CAIS adoption drivers and their financial performance?

Significance of the Study

First, the findings of the study would contribute to improving the understanding of the linkage between computerised accounting information system and financial performance especially in the context of public sector. The empirical results of the study would also provide general indicators of CAIS and performance which is useful for making policies and decisions as well as rewarding or punishing MMDAs that have greater or little intention to improve adoption of CAIS.

Secondly, the study contributes to the development of a multi-theoretical approach of identifying the drivers of the adoption of CAIS, in this study, the review of different perspectives clarified that there is the need to adopt an integrated approach rather than a single perspective to understand and explain the effect of CAIS adoption and financial performance of the public sector.

Delimitations

The Ghanaian public sector presents an interesting environment to carry out this study as the economy has consistently been ranked among the most dynamic information technology markets in the developing world (World Bank's Measuring the Information Society Report, 2016). Again, focusing exclusively on MMDAs ensures that the study is precise, focus and is well controlled. It also ensures easily and accurate identification of the research population and sampling units.

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However, limitations of the study emanate from the fact that, the study employ a cross-sectional design, which may not accurately predict relationships where changes in population attributes over time affects respondent responses (Denscombe, 2010). Also, the geographic location of the study might mean that the study results may not necessarily be applicable to public sector in other jurisdictions.

Organisation of the Study

The study is organised into five chapters. Chapter one is the introduction, which consist of the background to the study, statement of the problem, objectives and the research questions on which the study is premised. Chapter two is literature review, which discusses the extant theoretical and empirical literature on CAIS adoption and financial performance and on that basis, the hypotheses of the study were developed. Chapter three explains the research philosophy and methodology adopted for the study. It includes selection of sample and data collection methods, discussion of the variables used to measure, conceptualize and operationalize the hypotheses and also a discussion of the statistical technique employed to analyze the data. Chapter four presents a summary of the descriptive statistics the variables used and main inferences which were drawn from the analyses. Chapter five presents the conclusions, research contributions and the recommendations of the thesis including limitations and directions for future research.

Definition of Terms

MMDAs refers to public sector entities declared as Metropolitan, Municipal and District Assemblies as defined by the Local Government Act 1993 (Act 462).

Management Information (MIS) systems refer to the processing of information through computers to manage and support managerial decisions within an organization (Monk, 2012)

Accounting information system (AIS) is a type of MIS. It is a system for collecting, storing and processing accounting data that are used by decision makers. (Amidu, Effah & Abor, 2011; Amaefule & Iheduru, 2014).

Computerized Accounting information systems (CAIS) is the use of computers in performing accounting functions. The use of the term *Accounting Information Systems*, *Electronic Accounting*, and *Computerised Accounting Systems* has the same bearing as *Computerised Accounting Information Systems* in this study.
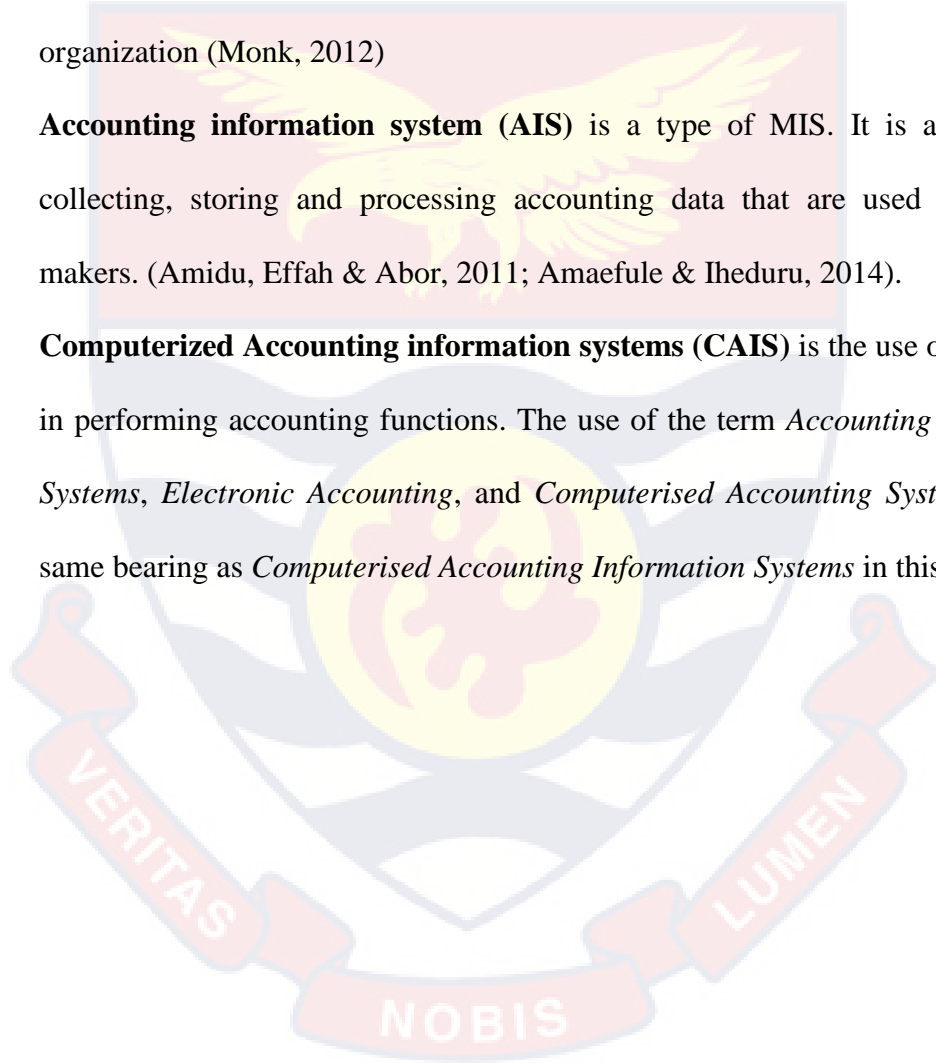
CHAPTER TWO

LITERATURE REVIEW

Introduction

This chapter reviews relevant extant theoretical and empirical studies that link computerized accounting information system (CAIS) to financial performance through internal control systems. This chapter is premised on two primary objectives. Firstly, to offer a comprehensive review of existing theoretical literature that link CAIS, internal control system and financial performance in an attempt to describe the theoretical blocks on which the current study is based. The secondly, to review of the empirical literature on the effect of CAIS adoption on financial performance in view of developing hypotheses among the variables examined in this study.

The chapter is organised as follows; the first section discusses the theoretical framework, where the theoretical blocks in relation to CAIS and financial performance and the role played by internal control in this relationship is discussed. The second section explore the empirical literature on CAIS, internal control system and financial performance. On the basis of the directional relationship between these variables in the literature, the hypotheses of the study are then developed. Finally, the chapter provides a review of the study area, where the structure of the local government system in Ghana, is described. The chapter ends with a summary and conclusion of the review. The hypothesized model for the study is illustrated in Figure 2.

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Theoretical Review

There have been several theories that seeks to explain the linkage between adoption of CAIS and financial performance. Poston *et al.* (2000) provided a review of the extant literature on theories used in CAIS research, particularly those that seeks to link AIS adoption to system performance over a 17 year period (that is, from 1982 to 1998) and concluded that, model building and firm-level theories remain a prevalent method used in accounting information system related studies. They also predicted a surge in the use of psychology-based theories and firm-level theories in explaining the accounting information system and financial performance nexus than computer science theories. Motivated by the work of Poston *et al.* (2000), Ferguson and Seow (2011) carried out a theoretical review on theories applied in accounting information system studies over a 10-year period (from 1999 to 2009) with the object of either confirming or refuting earlier findings of Poston *et al.* (2000). They concluded in the affirmative that, cognitive psychology and economics theories, as well as firm-level theories account for 48% of all theories used in AIS research, as opposed to 14% use of computer science theories.

Consequently, the current study, in explaining the linkage between CAIS and financial performance, is premised on four main psychology-based firm level theories. These include the Technology Acceptance (TA) theory by Davis (1989), Technology-Organization-Environment (TOE) Framework by Tornatzky and Fleischer (1990), Diffusion of Innovation Theory (DOI) by Rogers (1995) and the Institutional theory. The coherent objective of these theories is to explain the

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means through which adoption of CAIS would lead to improvement in the financial performance either directly or through operational guidelines of the entities.

Technology Acceptance Theory

Technology acceptance theory describes how a change in technological system of a firm is capable of being accepted by the people who are to operate the system in anticipation of improve performance (Molinillo & Japutra, 2017). The theory is of the assumption that, naturally, individual have some level of resistance to change and thus, without orienting the implementers of information technology-based system, its perceived benefit of improving performance of the firm would not be realized. The theory operates on the basis that, adoption of information technology based system translate into improved performance through perceived usefulness of the system, which is the degree to which users believes that using a particular system would enhance their performance and perceived ease-of-use, which is the degree to which a person believes that using a particular system would be free from effort (Davis, 1989). For instance, Ngadiman (2014) studied AIS adoption and system performance using the technology acceptance framework where AIS perceived usefulness (proxied by system quality, relevance, and system compatibility) and perceived ease-of-use (proxied by screen design, exploring power and system terminology). The study concluded that system quality and system relevance have a significant positive mediating influence on firm's performance.

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The relevancy of this theory to the current study lies in the fact that, adoption of CAIS and financial performance is mediated *internal control system* as a measure of implementer orientation and training (perceived ease-of-use).

Technology-Organization-Environment (TOE) Framework

The Technology–Organization–Environment (TOE) framework was first presented in Tornatzky and Fleischer's "*The Processes of Technological Innovation*" in 1990, where the entire process of innovation adoption and implementation, spanning from the initial stages of technology development to their eventual adoption and implementation by users within the context of a firm and its effect on the firm's performance are described. The framework posits that, adoption of a technology-based system such as CAIS is driven by three major factors, that is; technological, organizational and environmental factors.

The technological context includes all technologies that are relevant to a firm's operations whether such technologies are already existing in the said firms or are available in the marketplace but not currently in use. The existing technologies as Tornazky describes, plays a crucial role in technology adoption among firms as it dictates the scope and limit of change that a firm can accommodate at a point in time. In the original framework, Tornazky identified *technology availability* and inherent *technology characteristics* as constructs within the technological dimension of the TOE framework that may mediate the information system adoption and system performance. However, Dincer and Dincer (2016), and Oliveira and Martins (2011) proved that, researchers rarely use the original constructs under the technological dimension of the TOE

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framework due to the generic nature of the contracts and that, they lack precision. For instance, the framework posits that *technology characteristics* influence the adoption of a particular information technology system which intend have effect on performance, it however does not provide a detailed guideline as to what constitutes technology characteristics. This have led most researchers, in an attempt to measure the technological dimension of the TOE framework, to resort to borrowing constructs from different theoretical frameworks and integrating them into the technological dimension of the TOE framework which led to the development of the Diffusion of Innovation theory (DOI).

The Organizational context of the TOE framework captures attributes of a firm that may influence the linkage between technology adoption and performance of the firm. Within the organizational context, formal and informal structures, communication processes, size, and slack resources was proposed by Tornatzky as inherent organizational attributes that influence technology adoption and organisational performance nexus. However, in applying this construct in empirical studies, most studies tend to include constructs that suit their research objectives. For instance, in Ghana, Senyo, Effah, and Addae (2016) found that *firm size*, *scope* and *technology compatibility* are organizational factors that significantly influence the linkage between information technology adoption and organisational performance. Accordingly, Wang *et al.* (2010) join Gibbs and Kraemer (2004) in centering the point that factors encompassing *firm size, technology competence*, *perceived benefits*, *compatibility*, and *financial resource availability* are organizational factors that influence technology adoption and

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financial performance relationship. To this extent and for the current study, the organizational dimension of the TOE framework was Redundancy, Readiness to adopt and unclear policy to apply CAIS following the recommendation by Wang *et al.* (2010).

Tornazky's TOE framework posits that, environmental context of business influences the effect of adoption of information technology on firm performance. Specifically, Tornazky and Fleicher posit that the structure of the industry, the presence or absence of technology service providers, and the regulatory environment can exert pressure on a firm to adopt a particular technology. Prior to the development of the TOE framework, none of the popular theoretical frameworks inculcated the need to measure the influence of environmental pressures on technology adoption and it effect on firm performance. According to Rahayu and Day (2015), environmental pressures that can influence technology adoption emanate from direct competition, government regulation, and government support. For instance, Hsiu-FenLin and Szu-Mei (2008) studied 163 Taiwanese firms' diffusion of E-business technology and concluded that competitive pressure significantly influences technology adoption at the firm level. This finding corroborates with earlier findings by Thong (1999), Premkumar (2003), and Al-Qirim (2007).

Diffusion of Innovation Theory (DOI)

Another theory in which the current study is grounded is the diffusion of innovation theory which explains the mechanism and the rate at which new ideas and technology translate to economic benefit through organisational culture,

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operating at the individual and firm levels (Oliviera & Martins, 2011). The DOI theory view innovation as an economic drive which is being communicated through certain channels over time, hence expected to translate into financial returns in the long run (Rogers, 1995). Consequently, Rogers outlined the phases through which technology-based system adoption translate into economic gain; innovation, early adaptation, early majority, late majority and laggards.

Rogers further explains that, adoption of an innovation technology-based system have the tendency of translating into economic benefit depending on technology characteristics of the firm which encompassed *relative advantage*, *compatibility, complexity, trialability, and observability*. Many studies that investigated technology adoption and it relation with economic gain used constructs of the DOI theory as a sub-component to measure the Technological dimension of the TOE framework (typical instances are Kendall *et al.*, 2001; Pease & Rowe, 2005; Tan *et al.*,2009; Oni & Papazafeiropoulou, 2014). At the firm level, Hsu *et al.* (2006) investigated determinants of E-business usage and how it leads to economic returns by means of the DOI theory and concluded that *organizational readiness, external pressure*, *compatibility, trialability*, *pressure from trading partners,* and *government regulations* influence E-Business adoption and also play significant role in translating accounting information system into economic returns. Accordingly, Tan *et al.* (2009) expanded the DOI theory to include *security* and *ICT cost*. Their results demonstrated that *relative advantage, compatibility, complexity, observability, and security concerns* determine information systems adoption; neither *trialability* (Tan *et al.* (2009) nor *costs*

were found to be significant. This agrees with Sin-Tan *et al.* (2009) who argued that *trialability* is irrelevant due to the availability of pirated software. At the individual level, Wan (2013) joins thong (1999) in centering the point that top management commitment and owner innovativeness are key factors influencing information systems adoption and it effect on economic performance

Institutional Theory

The institutional theory emphasizes that external institutional pressures can influence organizational structure and actions in the adoption of technology-based system (Scott & Christensen, 1995). DiMaggio and Powell (1983) introduced three types of environmental pressures that exert influence on organizations in order to reach institutional isomorphism; they encompassed coercive (i.e. political influence and legitimacy problem), mimetic (i.e. standard responses to uncertainty) and normative pressures (i.e. associated with professionalization). According to Molinillo and Japutra (2017), several studies have used the Institutional theory to explain firms' technology adoption and it relationship with firm's performance (e.g. Teo *et al.,* 2003, Cater-Steel, 2009). For example, Teo *et al.* (2003) conducted a study on information technology adoption and firm performance using the institutional theory and concluded that, pressures from competitors lead to mimetic isomorphism as firms adopt information technology in order to imitate industry leaders; whereas coercive pressures emanate from suppliers, customers and government; with normative pressures emanating from industry associations. Within the South African context, Cater-Steel (2009) in a study on accounting information systems

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adoption found that, Coercive Pressures to adopt computerized accounting information system emanates from customers, Governments, IT service providers, hardware suppliers, and head office; Normative pressures emanate from industry network and regulations; whereas and Mimetic pressures are also evident as organizations imitate the industry leaders.

In conclusion, the theories reviewed in the above theoretical perspectives focus on how CAIS adoption affect firm performance. Technology acceptance theory focused on how a change in technological system of a firm is capable of being accepted by the people who are to operate the system in anticipation of improve performance. Therefore, Technology acceptance theory considers the role of the people, as implementers, in enhancing financial performance through accounting information system adoption. The Technology–Organization–Environment framework posited that accounting information system translate to firm's performance through technology, organizational and environmental factors while diffusion explains the mechanism and the rate at which new ideas and technology translate to economic benefit through organisational culture, operating at the individual and firm levels. Institutional theory also place emphasizes on the role of external institutional pressures and organizational structure in the adoption of technology-based system. Even though the four theories explain a different mechanism through which the adoption of accounting information system leads to firm's performance, the seems to be a sense of overlapping and congruence among them positing that, adoption of accounting information system translate into improved financial performance.

Empirical Review and Hypothesis Development

This section provides an empirical review of CAIS adoption and how it translates into financial performance. on the basis of these review, the hypotheses on which the study is premised are developed. This section is organised as follows; a review of empirical literature relating CAIS in the public sector, review of literature in relation to CAIS adoption and financial performance and the mediating role of effectiveness of internal control system. It is on this basis that the study hypotheses were developed.

Accounting Information Systems in the Public Sector

Over time, technological innovations and digitization have led to changes in the manner in which businesses manage and process accounting data, but very few can be said in the case of governmental entities especially, the MMDAs. The extant literature has shown that, CAIS adoption have been one of the major tools to gain operational efficiency in processing and management of accounting data, in terms of timely information processing, accurate and reliable information generation which eventually leads to improvement in financial performance of these businesses (Mancini, Lamboglia, Castellano, & Corsi, 2017) but these same benefits, whether or not could be realized in the case government organisations given their non-commercial interest and unique focused merit investigation. Nevertheless, a recent trend in CAIS technologies is a movement towards business process integration. As shown in the work of Mancini *et al.* (2017) who argue that, the recent CAIS technology represents a different philosophical lens by which one can observe organizational processes and performance through

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information technology. According to Mancini *et al.* (2017), current CAIS practices is premised on Ubiquity and data *Sharing* where there have been increase in the demand for accounting data and information flow among firms, groups of people, and even across several functional areas of business. Thus, accounting data and information emanate from collaboration and co-creation through a wider stakeholder engagement process which collectively leads to improvement in organisational performance in terms of revenue mobilisation and expenditure management in the case of MMDAs.

The increasingly competitive and technological dynamism has triggered a growth in managements' accounting informational needs such that, stakeholders does not only consider financial information in making useful economic decisions but also, they consider socially responsible businesses practices through proper AIS management (Mancini *et al.*, 2017). Thus, the modern-day accounting information systems are increasingly incorporating ways and means through which businesses can report on their environmental, social and governance practices to stakeholders (Kerr, Rouse & De Villiers, 2015). This current trend in accounting reporting is what is termed as integrated reporting, which aims at producing non-financial information necessary to operationalize organisational objectives, accountability and transparency, intensified interactions with stakeholders, formalization of organizational beliefs among others which have been the focused of local government organisations.

A recent trend in management of large volume of accounting data has led to introduction to concepts such as *"Big Data"* and *"Data Analytics"*. These concepts refer to the management and analysis of extremely voluminous data sets in order to reveal patterns, trends, and associations in order to get valuable insights that can lead to *Efficiency and cost focus, Growth of existing revenue streams, better decision making among others* (Lainey, 2001). Mancini *et al.* (2017) note that, CAIS technologies that incorporate big data analytics can assist management accountants in undertaking cost reduction strategies such as streamlining the supply chain to eliminate inefficient processes, as well as through risk management and fraud detection. Accordingly, Mancini *et al.* (2017) note that Big data can help companies increase their revenue stream, for example, by employing data analytic techniques to gain knowledge about customer preferences (e.g. through social media) in order develop suitable value propositions that maximize the possibilities of patronage. In relation to this current trend is the incorporation of web 2.0, popularly known as social media in business operations. Social network tools encompassing blogs, wikis, social messaging (e.g. Twitter, Facebook etc.) are currently opening up new avenues for disclosure of accounting information in the public sector, as well as improving stakeholder dialogue and participation. For example, most modern public sector entities have Twitter handles and Facebook pages where they can report their financial backgrounds, annual financial performance as well as make disclosures on corporate social responsibility activities (Mancini *et al.,* 2017) which, in a similar vein could be applied in the case of local government.

Finally, accounting information system practitioners are gradually embracing the concept of cloud accounting on the basis of software-as-a-service (SaaS) as an alternative means to access a software via a centrally hosted server on the internet, as against the more traditional methods of purchasing CAIS software and hosting it locally. In the developed world, most firms who cannot afford to build their own CAIS and Big data centres increasingly resort to the use of AIS on the basis of SaaS (KPMG, 2013; Brandasa, Megana, & Didragaa, 2015). However, in the case of government organisation such as the MMDAs, these could be procured and host by a dedicated government agency. According to Brandasa *et al.* (2015), the use of CAIS cloud technologies significantly reduces costs associated with CAIS acquisition, maintenance, management of hardware and software among others.

It is noteworthy that although all these current trends in CAIS opens new opportunities for government institutions to remain relevant, competitive and sustainable in the future. Mancini *et al.* (2017) note that, most of these benefits are enjoyed by large private firms who are profit oriented. A demanding question requiring response in this direction is whether or not these technologies, when adopted in government institutions such as MMDAs would lead to the benefits as enjoyed by the private sector such as improving their financial performance? This therefore, has heightens the need to investigate the linkage between adoption of CAIS and how this would translate into improved financial performance, given that, government entities are not profit oriented.

Computerized accounting information system and financial performance

Literature on the linkage between adoption of computerized accounting information system (CAIS) and financial performance has been vast, even though very few studies have focused on local government, with researchers reporting a mixed result. Some studies have reported positive relationship, even though, the reported relationship appears to be weak, whereas some have reported an inverse relationship with couples of studies reporting no significant relationship between the two concepts. For instance, Al-Shaefee (2007) examined the impact of accounting information systems adoption on the performance of 216 companies in Yemen an observed a weak positive relationship. The study found that, most of the companies in Yemen have not applied modern accounting information system due to lack of internal controls and operating guideline that would be required by the employees to operate the system, hence the system exist but the organisations are yet to realized it benefit. As a result, the study observed a weak association between adoption of accounting information system and financial performance and hence concluded that, adoption of accounting information system may not directly influence performance except adequate controls and training are put in place to stimulate performance. The author suggested that continuous training should be provided to the accountants in these companies to make them familiar with advanced accounting information systems.

Sambasivam and Assefa (2013) evaluated the effectiveness of accounting information system on the performance of Ethiopian manufacturing industries in terms of financial transaction processing efficiency and information provisions.

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The results revealed that accounting information design and implementation enhances the quality of financial reports and financial transaction processes which leads to better decision making by managers and bring efficiency in internal control systems. The study suggested that policy makers should pay attention towards the current actual performance and future improvement of accounting information system of manufacturing firms. In a similar study, Samuel (2013) in an empirical study assessing the impact of AIS on the organizational effectiveness in selected Automobile Companies in Kenya finds that, there exists a relationship between AIS and organizational performance. However, the author highlighted challenges faced by automobile organizations lack of proper training, high staff turnover, and lack of proper system documentation.

In the banking sector, Ahmad and Alrjoub (2014), examined the relationship between accounting information systems and the performance and found that accounting information systems has a significant impact on administrative decisions taken by managers in selected banks. Therefore, there is need for continuous improvement in accounting information systems because of its positive role in the decision-making and investment. Taiwo (2016) investigates empirically the impact of information technology on accounting systems and organizational performance. This study utilized both primary and secondary data. The study sources its primary data from questionnaires administered to 20 staff in financial services and other related accounting departments in Covenant University Nigeria. Pearson's correlation was used for analysing the data. Findings showed that there is a significant positive relationship between ICT

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systems and accounting systems and also, a significant positive relationship between ICT and organizational performance.

Mehdi, Mahmoud, Mostafa and Ebadollah (2015) examines the effect of implementation of accounting information system on efficiency, profitability and productivity of small and medium scale enterprises in Iran. The study employed a descriptive-survey research design with data obtained from 118 small and medium scale enterprises listed on Tehran Stock Exchange from 2007-2013. Data on implementation of CAIS were obtained using questionnaires where data on efficiency, profitability and productivity were computed based on information from the financial statement with profitability measured using indexes such as measured by P/E ratio and Tobin's Q. The study analysed the collected using the ordinary least squares regression. Findings from the study revealed that effective implementation of AIS in small and medium scale enterprises listed on the Tehran Stock Exchange is positively associated with performance, productivity, and profitability. Alnajjar (2017) investigates the impact of accounting information systems on management and organizational performance. The study employed a survey research design and analyses the data collected from 74 SMEs. Data obtained for the study were analysed using regression analysis. Findings from the study revealed that accounting managers' knowledge and top management support significantly impact on the accounting information systems in an organization and, accounting information systems also significantly impact the performance management and organizational performance of that organization.

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Al-Dalaien and Khan (2018) investigates the impact of AIS adoption on the financial performance of selected real estate companies in Jordan using linear regression statistics. CAIS was measured using several indicators covering the various components of CAIS and financial performance was measured using the traditional accounting performance indicators such as return on investment and profit margin ratio. The study finds that, Jordan investment companies has benefitted the most with CAIS adoptions as indicator by significant positive relationship between the various indicators of CAIS and financial performance.

Ironkwe and Nwaiwu (2018) examines the effect of accounting information system on financial and non-financial performance measures of companies in Nigeria. Qualitative and quantitative data of 16 companies were obtained from researchers. Data were obtained through questionnaires designed for companies listed on the Nigerian stock exchange (NSE) to assess their cost of setting up and implementing AIS and also financial and non-financial performance measures from 2011 to 2014. Data collected are analysed using multiple linear regression techniques and findings revealed that accounting information system exert significant positive effect on non-financial measures indicators of companies in Nigeria but weak positive relationship with financial measures.

Akanbi and Adewoye (2018) examines the effects of accounting information system adoption on the financial performance of commercial bank in Nigeria. The study employed a descriptive survey research design where data were obtained from questionnaires administered to 80 respondents randomly of 16

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commercial banks. The study also employed secondary data from the financial statements of the sampled banks. Data were collected on return on capital equity (ROCE), return on total asset (ROTA), net operating profit (NOP) and gross profit margin (GPM) within the recent 10 years post AIS adoption years (2007-2017). Linear Regression was employed to test the significant effect of AIS adoption on bank performance. Findings revealed that commercial banks in Nigeria adopted and use AIS in providing their services to their customers and the level of usage is relatively high. The study concluded that CAIS adoption has a positive significant with all the performance indicators (ROCE, ROTA, GPM and NOP).

On the other hand, Saeidi (2014) found a negative relationship between CAIS adoption and firm performance of small and medium scale enterprises in Ghana. They argued that controlling the amount invested in setting up and managing AIS helps in reserving funds to finance other activities of the entity which generate additional returns which intend improves financial performance. As the cost of investing in AIS increases, problems of management and its implementation results as additional higher cost cannot be incurred to finance such activities, leading to decreased in the tendency of realizing the benefit associated with the system. Akesinro and Adetoso (2016) examines the effects of computerized accounting systems on bank performance in Nigerian banking sector. The study adopts a survey design and adopts a convenience sampling method to arrive at a sample size of 50 depositary taken institutions in Nigeria. Using correlation and regression analysis, the study showed that computerized accounting system has a positive effect on bank's profitability in the long run but

in the short term, the cost of setting up the system and the eventual management of the system may be expensive. Nizar, Ahmad and Mohamad (2016) evaluates accounting information systems in meeting the requirements of financial and managerial Performance. The study employed a survey research design and obtains its data from questionnaire administered to 38 sampled employees in various private hospitals in United Arab Emirates. The study's hypotheses were tested using the one samples t-test statistics. Findings from the study revealed that accounting information systems in the United Arab Emirates private hospitals provide information to meet the requirements of the financial performance function.

Borhan and Nafees (2018) also examines the impact of accounting information system adoption on the financial performance of selected real estate companies in Jordan and observed an inverse relationship lending support to the early finding of Saeidi (2014). The study employed a survey research design and collects its data through questionnaires from 175 employees pooled from 5 companies in Jordan. The study employs the linear regression to analyse the collected data. The findings revealed that there is a significant negative impact of investment in accounting information system on the financial performance of the companies under study. The contradicting findings from the observed relationship in the literature was attributed to the huge investment these companies make in setting up the CAIS and maintaining these systems. Kashif (2018), in a similar vein, evaluated the impact of accounting information system on the financial performance of selected companies in India. The study adopted a survey research

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design with a sample size of 400 respondent and analysed the collected data using the linear regression analysis. Findings from the study revealed that that there is a significant inverse impact of investment in accounting information system on the financial performance of selected the companies in India.

The studies reviewed so far tends to focus on the private sector. Few studies focus on the impact of CAIS adoption on public sector financial performance. Notable among them is a study by Isa (2017) who examined the impact of computerized accounting information system on management performance in public sector of Nigeria. The study adopted an exploratory research method. Data were obtained from secondary sources. The impacts of CAIS on the executives' officers of government's ministries, departments or agencies were considered in terms of accounting framework and operating procedure in the public sectors in Nigeria. The study pinpoints some of the problems associated with the implementation of CAIS such as high costs of implementations of hardware and software, costs of maintaining the system and it require special skills. Others are reduction of employee, inadequate security and having quality of backup and print accessories. The study further revealed the prospects of implementing CAIS such as to lower operating costs, improve efficiency, increased functionality, better external reporting, improved accuracy and faster processing of data in the system. The study concluded that the impacts of computerized accounting information system on the executives' officers of government's ministries, departments or agencies considered only accounting framework and operating procedure in the public sectors in Nigeria.

Turning attention to specific areas of financial performance, Shagari, Abdullah, & Saat (2017) examines the extent to which electronic accounting information systems in the public and private universities in Jordan can provide quantitative indicators of financial performance in terms of revenue generation. The study employed a survey research design and obtains its data from questionnaire administration and personal interview of 20 chief finance officers of public and private universities accredited to the Ministry of Higher Education and Scientific Research of Jordan. Data were analysed using mean and standard deviation statistics while the hypotheses are tested using the pre- and post t-test statistics. Findings from the study revealed that revenue generation have improved after the adoption of the accounting information system in these universities even though, some universities did not exhibit any significant change in revenue generation over the pre-and post- period. Rehab (2018) also investigated the impact of accounting information systems on organizational performance in terms of turnover. The study collected data through 137 questionnaires from small and medium enterprises in Saudi Arabia to measure the adoption of accounting information system and net turnover generated by the entities as a measure of performance. Using the partial least squares method to analyse the data and to test the study hypotheses, the study finding revealed that using an CAIS has a significant impact on organizational performance in terms of revenue generally.

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Despite these observations, some studies have reported that, generation of revenue is independent of accounting information system adopted but rather the efficiency of its revenue generation mechanisms. Ali, Bakar and Omar (2016) investigates the effect of accounting information system success factors on organizational performance using four types of CAIS success factors namely service quality, information quality, data quality and system quality to be the indicators of CAIS. Organisation performance was viewed in terms of revenue generation. Data were collected with a structured questionnaire survey from 273 respondents in Jordanian banking sector. The collected data were analysed using the partial least square technique. The findings revealed that service quality, information quality and system quality are not significant CAIS success factors for increasing organizational revenue rather, other control factors such as staff competency, firm publicity and competition level of the market. The study concluded that organizations involved in banking sectors can increase their performance in terms of revenue by adopting and combining implementation AIS success factors and other control variables.

Assessing the impact of AIS adoption on expenditure management, CAIS adoption has favorably impacted expenditure management if the adoption of CAIS has led to reduction in expenditure reported, hence improvement in profitability. Patel (2015) investigates the impact of CAIS on the performance of public institutions in terms of cost savings and expenditure management. The study employed exploratory research methodology making use of secondary data where AIS adoption was assess in terms of cost of investment in CAIS and

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performance was measured in terms of differences in actual and budgeted expenditure. The study reported a positive relationship between CAIS investment and expenditure savings. The study concluded that the adoption of accounting information systems plays a significant role in the enhancement of performance in terms of expenditure management.

On the basis of the mixed result observed in the literature, the study hypothesized a no relationship between CAIS adoption and financial performance. the hypothesis of the study is stated as follows;

Hypothesis 1

H_0: There is no significant relationship between adoption of computerised accounting information system drivers and financial performance of metropolitan, municipal and district assemblies in Ghana.

Role of internal control in accounting information system-financial performance nexus

The mixed reported relationship between AIS adoption and financial performance is due to the fact that, most studies in these areas tend to omit the mediating role of key variables in such relationship. One of such variables is internal control guidelines in the use of the AIS as suggested by the Technology Acceptance theory. Nevertheless, some studies have mediated other variables in the AIS-financial performance nexus. Notable among them are as follows;

Neogy (2014) investigated the efficiency of AIS in selected mobile telecommunication companies in Bangladesh. It has been revealed that existence of internal audit effectiveness through safeguarding of assets, reliability and

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accuracy of accounting information, prevention of frauds increases the efficiency of CAIS. Teru, Idoku and Ndeyati (2017) studied the impact of accounting information system for effective internal control on firm performance. The study employed a qualitative research design. Findings from the study revealed that when controls are operated efficiently and effectively, there will be improved performance, better accounting information reliability for better decision making for both the internal and external users.

Dekeng and Prabowo (2015) also explored the empirical research investigating the relationship between accounting information systems (AIS) alignment and small and medium enterprises performance using organisational, individual and environmental factors are mediators. The study employs secondary data obtained from journals and publications. Results from the review revealed that AIS alignment is influenced by organizational characteristics, individual characteristics and situational factors which affect firm's performance.

Esmeray (2016) examines the impact of accounting information systems on firm performance using education level of respondent as a moderating variable. The study adopted a descriptive survey research design with data being obtained from interviews with 60 firms. Data were analysed using generalized least squares. The findings of the study suggest that there is a positive and statistically significant relation between the use of AIS with educational status of managers playing a significant mediating role. Samer (2016) examines the effectiveness of CAIS and its impact on the operational performance of the industrial public-listed companies in Jordan using corporate governance

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characteristics as the mediating variable. The sample of the study consisted of 42 Jordanian companies from different sectors listed in Amman Stock Exchange (ASE) at the end of 2012. The findings indicated that AISs employed in industrial companies were effective, particularly, in meeting planning requirements. The results also revealed that most of companies' decisions were taken based on executives' personal opinions supported by the board of directors who affected by those opinions.

It can be observed from the review that, even though some authors have mediated some variables such as organisational characteristics, internal audit effectiveness, corporate governance, and the like, studies mediating internal control system seems rear. On this basis, the current study hypothesized as follows;

Hypothesis 2

H_0: Internal control systems does not significantly mediate the relationship between adoption of accounting information system adoption drivers and financial performance of metropolitan, municipal and district assemblies in Ghana

Conceptual Review

Overview of local governance in Ghana

Local Government is an aspect of the government administration that deals with matters which relates directly with the inhabitants of particular locality. It serves as the medium through which the populace has their aspirations and grievances attended to by the central government. They also perform some other

functions on behalf of the central government which is considered as desirable to be undertaken at the local levels. The local government system is created under Article 240 (1) of the 1992 constitution of Ghana, which provides that, Ghana shall have a system of local government and administration which shall, as far as practicable, be decentralized. Decentralization creates a framework for citizens' participation in decision-making and local governance, thereby, devolving power, functions and responsibility as well as human and financial resources from the Central Government to the local government. Apart from the 1992 Constitution, the main law that regulates the local government system in Ghana is the Local Government Act 1993 (Act 462).

Structure of the Local Government System

The local government system in Ghana is characterized by a four-tier structure which operate at the regional, district and sub-district levels. It consists of Regional Coordinating Councils on the first tier, Metropolitan or Municipal or District Assemblies on the second tier, and Urban or Town or Zonal or Area Councils on the third tier and Unit Committees on the four-tier. In total, as at December 2019 there are 16 Regional Coordinating Councils, 216 Metropolitan or Municipal or District Assemblies, over 1,300 Urban, Zonal or Town or Area Councils and more than 16,000 Unit Committees. Figure 3 illustrates the basic Local Government structure.

This is the apex organisation on the local government structure is the Regional Coordinating Council. It is established in each of the sixteen regions of Ghana and performs administrative and coordinating functions rather than a

political and policy-making body. The RCC consists of the Regional Minister as chairman and his deputies, the presiding member of each District Assembly within the region and the District Chief Executive of each district in the region, two chiefs from the regional house of chiefs and the head of decentralized ministries without voting rights. The pictorial structure of the local government in Ghana is shown in Figure 3.
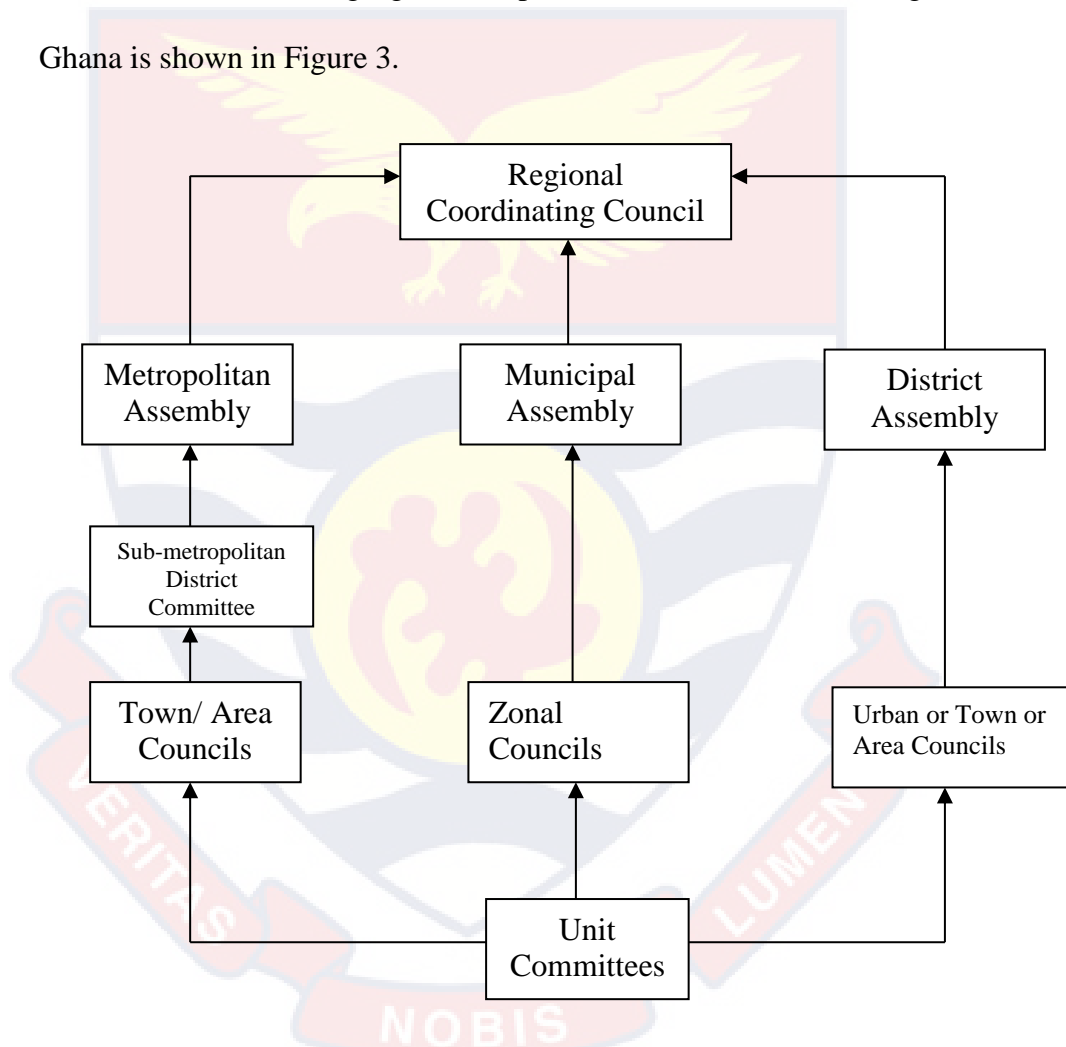
Figure 2: Local Government structure in Ghana

Source: Ministry of Local Government and Rural Development (2019)

Below the Regional Coordinating Council is the District Assembly. District Assembly is used to refer to all types of local government assemblies, i.e., Metropolitan Assemblies, municipal Assemblies and District Assemblies

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(MMDAs). In accordance with the Local Government Act of 1993, Act 462, the district assemblies are empowered to be the pivot of local governance. District Assemblies are distinguished between Metropolitan or Municipal or District Assemblies on the basis of demographic (population) conditions and settlement characteristics. On that basis, the district assemblies are classified as follows; a Metropolitan Assembly is a Local Government unit or areas with population over 250,000, a Municipal Assembly is a one town assembly with population over 95,000 and a District Assembly is a group settlement with a minimum population of 75,000 and a maximum of 95,000. As at 2019, there are 216 local authorities comprising 6 Metropolitan, 38 Municipal and 172 District Assemblies. Notwithstanding these distinctions clarifying the status of the local authorities, the three types are essentially equal in power and are given equal consideration in any discussion.

There are subordinate bodies of the District Assemblies. They are constituted by the Sub-metropolitan District Council and Urban or Town or Zonal or Area Councils. Sub-metropolitan District Council are structures immediately below the Metropolitan Assemblies. Their conception is based on the principle of subsidiarity and in recognition of the large size of the Metropolitan Assemblies. It which consist of not less than 25 and not more than 30 members, made up of all elected members of the assembly in that sub-metropolitan district and such other person's resident in the sub-metropolitan district appointed by the president.

Urban Councils are created for settlements with populations above 15,000. It consists of not less than 25 (but not exceeding 30) members made up as follow;

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not more than 8 persons elected from the members of the District Assembly, not more than 12 representatives from the unit committees in the area of authority of the urban council and not more than 10 persons ordinarily resident in the urban area.

Town councils are found in the Municipal Assemblies and is established for settlements with population of 3,000 and have identifiable streets and landmarks, as boundaries. It consists of not less than 15 (but not more than 20) members made up of not more than 5 persons elected from among the members of the relevant municipal assembly, not more than 10 representatives from the unit committees and not more than five persons ordinarily resident in the zone. These are found in the Metropolitan Assemblies and District Assemblies. Town Councils are established for settlements with populations between 5,000 and 15,000 and Area Councils exist for a number of settlements or villages which are grouped together but whose individual settlements have populations of less than 5,000. They cover areas with predominantly rural populations and in some cases can be identified with spheres of influence of a particular traditional authority. The council consist of not less than 15 (but not more than 20) members which is made up of not more than five persons elected from among the members of the relevant assembly, not more than 10 representatives from the unit committees and not more than five persons ordinarily resident in the town or area.

Conceptual Framework
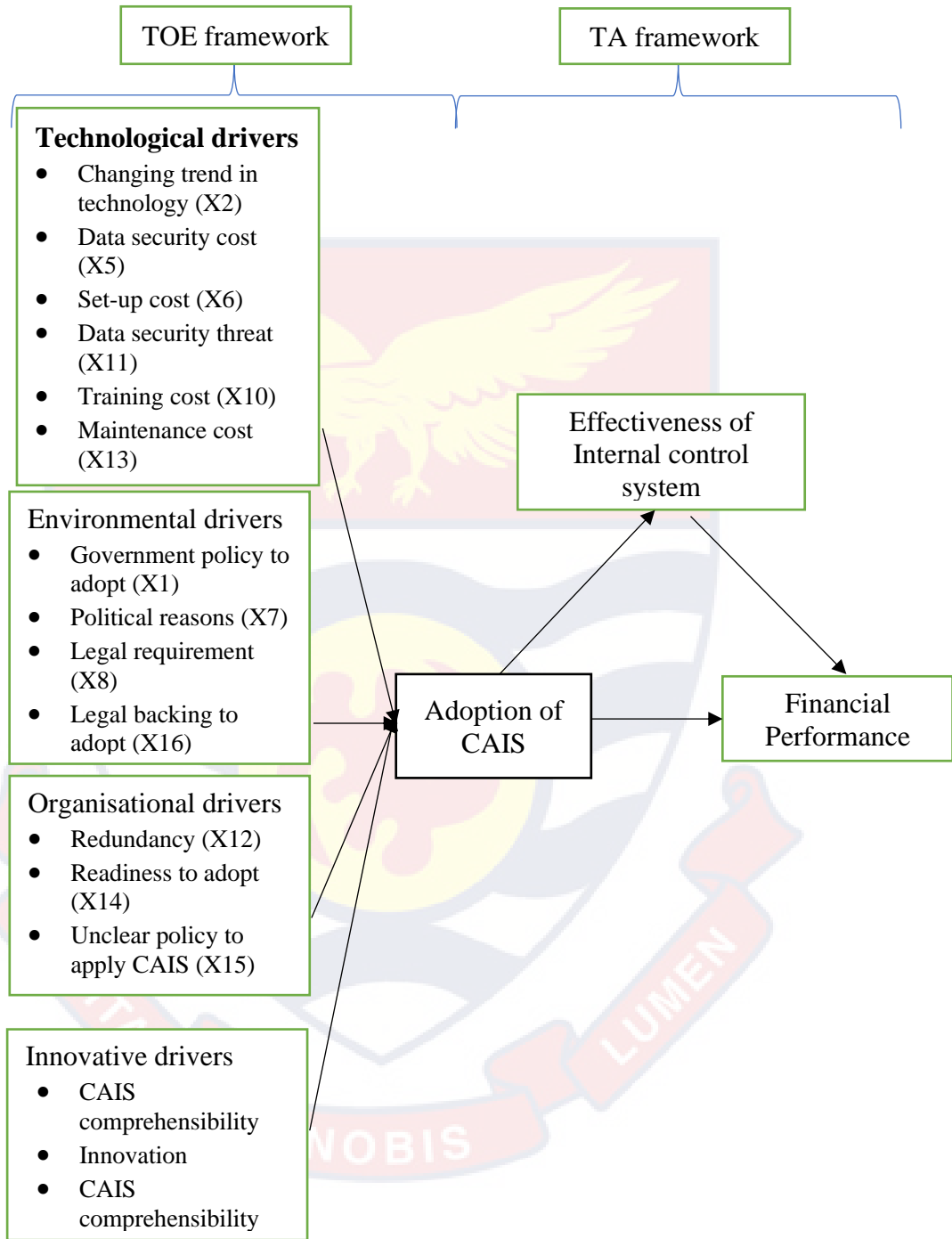
Figure 3: Hypothesized model

Source: Adapted from Tornatzky and Fleischer (1990) and Davis (1989

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Chapter Summary

This chapter provides a review relevant literature relating to adoption of accounting information system and its effect on financial performance of local government in Ghana. It provides a review of the theoretical framework on which the study is based, the empirical literature from which the study hypothesis was developed and then overview of the local government system in Ghana. Following this chapter, it was observed that, there have been mixed result from studies that link adoption of accounting information system and financial performance and that, such results was reported due to the fact that, studies have ignored the mediating role play by some variables in the CAIS effectiveness and financial performance. This study, therefore, mediate the relationship using internal control effectiveness.

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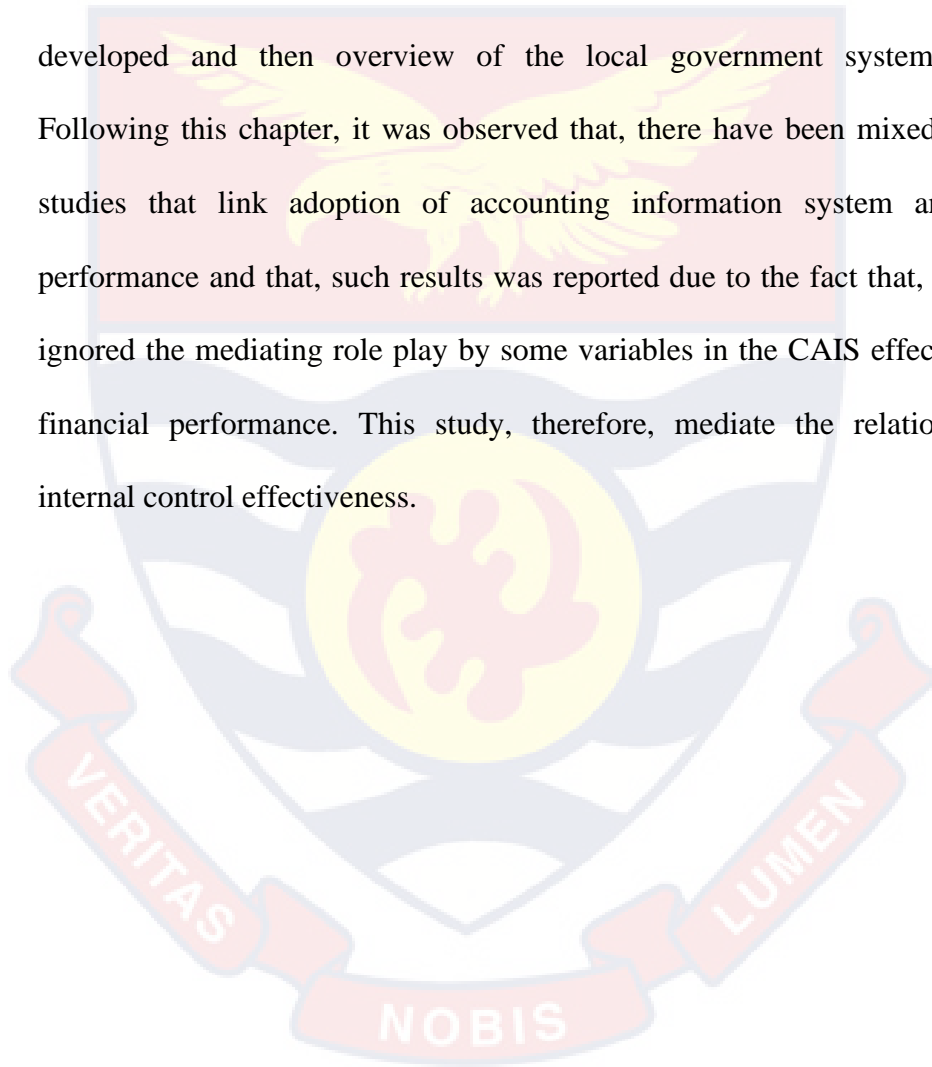
CHAPTER THREE

RESEARCH METHODS

Introduction

This chapter presents a discussion of the means by which the study was carried out. It specifically describes the methods applied in collecting and analyse the data for the study in order to attain the research objectives of the study. The chapter is organized into as follows: the next section describes the research philosophy adopted in the study where the research approach and design of the study is described. The next section describes the research population from which the sample for the study was selected. It also describes the sample selection procedure as well as the instruments applied in collecting the data for the study. This is followed by description of the statistical method applied in analysing the data collected. The measurement model on which the study is based is also described. The chapter conclude with ethical considerations observed in carrying out the study.

Research Philosophy

The philosophical posture of a study determines the research approach and methodological choice of the study (Holden & Lynch, 2004). Although philosophical stance in several studies remain largely hidden, nevertheless, Holden and Lynch (2004) and Creswell (2014) argue that, these are still relevant as this influence the practice of research. As such, the philosophical foundation of the current study is defined on the basis of research approach and the design specified for the study.

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Research Approach

Research in accounting has been widely identified to establish general laws that covers the comportment of empirical events in a scientific manner, hence enabling researchers to connect their knowledge of different phenomena. Accordingly, the basic research questions of the study (that is, what factors drives the adoption of CAIS and what is the effect of CAIS adoption and financial performance?) inherently presuppose that, there exist a real reason for adopting CAIS and that there is a real effect of CAIS adoption on financial performance independent of the observation made in this study, hence in terms of what constitutes reality, the study builds on the assumption of ontological realism. Also, though the real CAIS adoption drivers and the real effect of CAIS adoption on financial performance are facts that do exist, the current study aimed at identifying what constitutes valid knowledge about the CAIS adoption drivers and effect of CAIS adoption on financial performance and how such knowledge can be gained, thus, in terms of epistemological stance, the study adopts an objective approach to knowledge building and hence appeals to positivists' assumptions (Creswell, 2014).

Consequently, the positivist philosophy, which is based on scientific research principles, was adopted as the research approach for the study. As such, the study is associated with the view held by the positivism philosophy that, research is a science, and as such is deterministic and mechanistic; hence, observations and measurement are the main instruments for gaining factual knowledge about a phenomenon. Positivism adopts the empiricist view where knowledge is gain

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from human experience, as such, observations from the study are quantified, leading to statistical analysis. Positivist is free from individual beliefs, judgment and personal assertion, and as a result, knowledge based on positivism is externally objective. Also, the findings of this approach are internally consistent as the findings of the study can be accurately be replicated following strictly, the methodological approach used and the same population, provided the assumptions of the positivist approach are all met. In carrying out the current study, the data obtained and the results presented from the empirical analysis are strictly based on the data gathered from the questionnaires posed to the Metropolitan, Municipal and District assemblies (MMDA) which forms the sampling units, thus, the result of the study is independent of the researcher's own subjective reasoning.

Research Design

The study builds on the positivist philosophy and as such presupposes that, a quantitative methodological choice fits well with the study (Denscombe, 2010). The study therefore adopts the quantitative approach, where we make statistical generalizations about the population based on a sample. Again, a cross-sectional study is employed to capture data relevant to the study. In this case, the study examines the relationship between the variables of interest in respect of a defined population at a specific point in time. The choice of a cross sectional design is justified by the fact that, it allows for the examination of multiple factors, mediation analysis and multiple outcomes in a single study. The current study examines multiple exogenous measures of CAIS adoption and it effect on

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financial performance and the mediating role of internal control within a single study, and this suggests that the cross-sectional design is appropriate for the study.

Population

The population of the study consist of all the MMDAs in Ghana. MMDA is defined to include all the structures that forms the second level administrative subdivisions of Ghana in the local governance system, which represent the administrative and financial decentralization policy framework as enshrined in Article 240 of the 1992 Constitution of Ghana.

Study Area

Consequently, as at 31 December 2019, the number of MMDAs that forms the local governance system of Ghana numbered 260 made up 6 metropolitan Assemblies, 54 municipal assemblies and 200 district assemblies (MLGRD,2019). Contextually, the study adopts the definition of MMDA as contained in the Local Government Act, 1993.

Sampling Procedure

The sample size chosen for the study was guided by the rules outlined by Barclay, Higgins, and Thompson (1995), and Cohen (1992), who posited that, when the largest number of arrowheads directed at a single construct in a structural equation model is eight (8), then the minimum required sample size should at least be fifty-four (54) before one can achieve a statistical power of 80% (at 5% significance level). Barclay *et al.* (1995) further stated that, the minimum required sample size for partial least square structural equation modelling should always be 10 times the maximum number of arrowheads pointing at a latent

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variable anywhere in the structural model. Consequently, the maximum number of arrowheads pointing to a latent variable is four (see Figure 2), hence requiring a minimum sample of forty (40). However, considering the fact that, previous studies on MMDAs have yielded low response rates (see Amidu *et al.,* 2011) coupled with the fact that, the current study is conducted in all the sixteen regions of Ghana, all MMDAs with an organised administrative structures and operating some form of accounting system were considered for the study. Newly created MMDAs who are yet to set up their accounting and administrative systems were excluded from the studies. This resulted in 216 MMDAs out of the current 260 MMDAs in Ghana which were included in the study. The regional distribution of the population and the associated sample selected is shown in Table 1.

Study Respondents

The study basically relies on primary data collected using questionnaire as the main instrument for data collection. In collecting the data, it was ensured that, the sampled MMDAs adopts some form of CAIS in processing and managing their accounting information. During the study, it was ensured that, questionnaire sent to the MMDAs was competed by managers of the accounting and budgeting systems of these assemblies who were considered as the key informant of the study. These include accountants, budget officers and internal auditors.

Table 1: Regional distribution of MMDAs in Ghana and sample selected for the study

Region	Number of MMDAs	MMDA Selected for the study
Upper East	15	10
Upper West	11	5
Northern	16	16
Savannah	7	6
North East	6	4
Bono	12	12
Bono East	11	11
Ahafo	6	6
Ashanti	43	33
Eastern	33	29
Western	15	13
Western North	9	9
Volta	18	17
Oti	8	8
Central	22	20
Greater Accra	28	17
Total	260	216

Source: MLGRD (2019)

An officer is selected in each MMDA to complete the question based on the availability of the officer and in the hierarchy; Accountant, the Budget officer or the Internal auditor. Thong (1999) notes that, the impact of CAIS system on system performance can best be analysed and informed by managers of the accounting system, hence their role as respondents in this study.

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Data Collection Instrument

Data on the latent variables used for the study were collected using questionnaire with Likert scale type of items as the main instrument on the basis of previous research and scale developing procedures. As such a five-point liker scale questionnaire was adapted and applied as the data collection instrument (see Appendix A for sample of the questionnaire). Given that, the use of questionnaire as instrument for data collection for previous studies on adoption of AIS and its effect on business operations have yielded an average of only 39% response rate, the current study triangulates the administration of questionnaires by means of Google survey, e-mails, and through personal visits, whichever may be appropriate, with the aim of ensuring that, the weakness in one method of administering the questionnaire is compensated for by the other.

Debates as to whether the Likert scale is an ordinal or interval scale is still not settled. Whereas Sekaran and Bougie (2009) posit that Likert scale questionnaires are generally regarded as an interval scale, Hair *et al.* (2014) posit that Likert scale questionnaires are inherently an ordinal scale. Hair *et al.* (2014) went further to explain that although the interval scale is more suitable for structural equation modelling techniques like PLS-SEM, results of an ordinal Likert scale questionnaire can be approximated to interval scale and used in conducting PLS-SEM analysis, especially where the properties of symmetry and equidistance are ensured in the design of the questionnaire. In this study, the five-point Likert scale questionnaire used to gather data has the traits of "equidistance", since the difference between points 5-4, 4-3, 3-2 and 2-1 are all

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the same (i.e., 1). Again, the questionnaire has the trait of "symmetry", since on the 5-points Likert scale, moving from the middle point (i.e. point 3) leaves two points below (i.e. points 1 and 2) and two points above (i.e. points 4 and 5). To this extent, the use of Likert scale questionnaires in this study is justified.

Structure of the Instrument

The questionnaire was sectionalized into four parts; the first part is the introductory section, which contains the preamble to the study and provides guidance on ethical concerns in data collection. The second section of the questionnaire sought to obtain data on the level of awareness of accounting information systems and the extent to which these systems have been computerized among the MMDAs. The second section seeks information on indicators that seeks to measure the extent of adoption of accounting information systems, based on indicators adopted from previous studies. The third section focused on the gathering data on the existence and operations of internal control systems and the extent to which these control systems have been integrated into the accounting information systems. The final section of the questionnaire sought to obtain data on the performance on the MMDAs in terms of budgeting and financial management relying heavily on the performance indicators as suggested by the District Assemblies Performance Assessment Tool (DPAT).

Validity and Reliability of the Instrument

Following the procedure adopted by Gangwar *et al.* (2015), two consecutive rounds of pre-testing were employed which involves a review of the questionnaire by experienced academic researchers and local government experts in the area of performance assessment and systems adoption, and then a pilot survey with some selected MMDAs in the Central, Western and Greater Accra region. This according to Gangwar *et al.* would help to ascertain whether the study respondents can provide reliable and valid responses to the questionnaire items in order to obtain the data required. Aside these validity checks, a content and construct validity assessment of the constructs was carried out. Even though the content validity assessment was basically subjective and judgmental (Awa *et al.*, 2015), construct validity and reliability was assessed by means of statistical tests. The test of validity of the constructs focused on the extent to which the data exhibit both convergent and discriminant validity.

Measurement of Variables

The constructs concerning the scales were measured with multiple item-scales based on the related literature, modified to suit the domain of the study. The main construct for the study, as indicated by Figure 2, are the adoption of CAIS, internal controls and financial performance. The constructs are measured as follows; In the current study, CAIS adoption is considered to be influenced by sixteen drivers, grouped into the four main components; technology, environmental, organisational and innovation as suggested by the TOE framework. As such, the MMDAs' CAIS adoption drive is influenced by these

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indicators. Even though specific indicators for each group were not outlined by the TOE, the study mimic the indicators adopted by similar studies in the area of CAIS. Consequently, indicators of technology adoption drive were adopted from the work of Uyar, Gungormus, and Kuzey (2017). Environmental adoption drive indicators were adapted from Romney and Steinbart (2006) and Sori (2009). Organisational adoption drive indicators were obtained based on the contributions of Sajady et al. (2008) and innovation adoption drive indicators were created from those propounded by Sori (2009) and Uyar et al. (2017). All these indicators were modified to suit the objectives of the current study. The indicators are summarized in Table 2.

Table 2: Measurement of Adoption of CAIS constructs

Construct	Grouping per the TOE framework	Indicator	Source
Adoption of CAIS	Technology drivers	Changing trend in technology (X2) Data security cost (X5) Set-up cost (X6) Data security threat (X11) Training cost (X10) Maintenance cost (X13)	Uyar, Gungormus, and Kuzey (2017); Spathis (2006); Qirim (2005); Grandon and Pearson (2004); Prekumar and Robberts (1999).
	Environmental drivers	Government policy to adopt (X1) Political reasons (X7) Legal requirement (X8) Legal backing to adopt (X16)	Romney and Steinbart (2006); Sori (2009).
	Organisational drivers	Redundancy (X12) Readiness to adopt (X14) Unclear policy to apply CAIS (X15)	Wang *et al.* (2010); Sajady *et al.* (2008); Liang, *et al.*(2007);
	Innovation drivers	Complexities of the CAIS (X3) Innovation (X4) CAIS comprehensibility (X9)	Sori (2009) and Uyar *et al.* (2017)

Source: Author's Compilation (2020)

Following the procedure adopted by Pardo and Roman (2013) and Hadi, Abdullah and Sentosa (2016), internal control effectiveness is assessed based on the following indicators; *Control Environment*, which sets out the tone for the entity which intend influence the control consciousness of staff. It serves as the foundation for all other components of internal control; *Risk Assessment*, which involves the identification and analysis of relevant risks to the achievement of objectives and forming a basis for how the risks should be managed; *Information and Communication systems,* which requires appraisal of the processes that support the identification, capturing, and exchange of information in a form and time frame that enable people to carry out their responsibilities; *Control Activities*, which involves policies and procedures that help ensure management directives are carried out and finally, *monitoring*, which involves processes used to assess the quality of internal control performance over time. The indicators for internal control system as a construct are summarized in Table 3.

Table 3: Measurement of Internal Control Effectiveness Constructs

Construct	Indicator	Statement on the questionnaire
Internal control system effectiveness	Control Environment (ICS1)	Level of control consciousness of employees; form control procedure in receiving revenue and other income; form control procedure in requesting for commitments and payments
	Risk Assessment (ICS2)	Availability of processes to identify and analysed relevant risks of achieving organisational objectives.
	Information and Communication (ICS3)	Systems or processes are available to support the identification, capture, and exchange of information.
	Control Activities (ICS4)	Policies and procedures available to help ensure management directives are carried out.
	Monitoring (ICS5)	Processes used to assess the quality of internal control performance over time

Source: Adapted from Pardo and Roman (2013) and Hadi, Abdullah and Sentosa (2016)

The instrument for measurement of financial performance of MMDAs contained three dimensions; revenue generation, expenditure management, and budget performance as suggested by the District Assemblies Performance Assessment Tool (DPAT). The indicators are summarized in Table 4.

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Table 4: Measurement of Financial Performance Construct

Construct	Dimensions	Indicator	Statement on the questionnaire
Financial performance	Revenue generation	Tax revenue generating performance (FIN1)	Gaining inhabitants loyalty (evidenced by the extent to which actual tax revenue exceed budgeted; negative variance '1'; exceeding budgeting between 0% and 25% '2'; exceeding budget between 25% and 50%, '3'; exceeding budget between 50% and 75%, '4' and exceeding budget by above 75% '5')
		Tax revenue generating performance (FIN2)	Enhancement generation of income from other sources other than tax (evidenced by the extent to which actual tax revenue exceed budgeted; negative variance '1'; exceeding budgeting between 0% and 25% '2'; exceeding budget between 25% and 50%, '3'; exceeding budget between 50% and 75%, '4' and exceeding budget by above 75% '5')

	Transfers from other DDF (FIN3)	Improvement in funds received from DDF (evidenced by the extent to which fund received in 2019 exceeds that of 2018; negative variance '1'; exceeding budgeting between 0% and 25% '2'; exceeding budget between 25% and 50%, '3'; exceeding budget between 50% and 75%, '4' and exceeding budget by above 75% '5')
Expenditure management	Cost savings - Goods and services (FIN4)	Operational cost decreasing through saving resources in short-term business operations evidenced by the extent to which actual cost was less than budgeted cost, thus, if cost savings as a percentage of budget is less than 20% '1'; between 20% and 40% '2'; between 40% and 60%, '3'; between 60% and 80%, '4' and above 80% '5'
Budget performance	Financial earnings (FIN5)	The financial earning evidenced by the extent to which the assembly made surplus during the year expressed as the percentage of surplus over revenue less than 5% '1'; between 5% and 20% '2'; between 20% and 40%, '3'; between 40% and 60%, '4' and above 60% '5')

Source: Adapted from District Assemblies Performance Assessment Tool (DPAT), 2019; Urban and Naidoo (2012); Wang, Subramanian, Gunasekaran, Abdulrahman, and Liu (2015); and Perlin, Gomes, Kneipp, and Motke (2018).

Data Collection Procedure

This section discusses how data was collected for the study. Questionnaires were administered to all the MMDAs in the sixteen regions in Ghana. Each MMDA received one questionnaire to be filled by the Finance Officer, Budget Analyst or Internal Auditor. The questionnaires were sent through Google survey, emails and through personal visits. The various assemblies District Assembly Performance Assessment Tool were also collected

Factor Analysis

Factor analysis is a statistical technique used to identify the underlying factors from a large number of observations. It attempts to identify underlying factors, that explain the pattern of correlations within a set of observed variables. Factor analysis is often used in data reduction to identify a small number of factors that explain most of the variance observed in a much larger number of manifest variables. As such, this technique is applied in this study to reduce the drivers of CAIS as perceived by TOE to a small number of factors that explains why MMDAs adopt a CAIS. The major goal of employing this technique is to represent relationships among sets of variables parsimoniously yet keeping the drivers meaningful.

In applying the factor analysis to derive the underlying determinants of CAIS adoption among MMDAs, the following procedure was adopted; first is a preliminary analysis of the responses for each of the variables perceived to drive the adoption of CAIS was described using the basic descriptive statistical techniques. The basic techniques adopted include average, sum, maximum,

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minimum, skewness and kurtosis. This is done to have a fair idea of the responses given by the respondents and to identify the pattern of the responses.

The second step applied in the study involved generating a correlation matrix for all variables perceived to be the drivers of CAIS among MMDAs. In interpreting the matrix, the study focused on identifying variables that are not related to other variables and that, if the correlation between variables are small, it is unlikely that they share common factors. The assumption here was that, variables must be related to each other for the factor model to be appropriate. Here, the correlation coefficient was assessed in their absolute term and as a cut-off, correlation coefficients greater than 0.6 in absolute value was considered as indicative of acceptable correlations (Hair *et al.*, 2014). The Bartlett's Test of Sphericity (Bartlett, 1951) was applied to test the hypothesis that the correlation matrix is an identity matrix (that is, all diagonal terms are 1 and all off-diagonal terms are 0). If the value of the test statistic for sphericity is large and the associated significance level is small, it is unlikely that the population correlation matrix is an identity. If the hypothesis that the population correlation matrix is an identity cannot be rejected because the observed significance level is large, the use of the factor model should be reconsidered. In the case of the current study, the hypothesis that the population correlation matrix is an identity was rejected indicating the appropriateness of the factor model. The result is discussed in detailed in the following chapter. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was also applied to compare the magnitude of the observed correlation coefficients to the magnitude of the partial correlation coefficients. By

convention, the closer the KMO measure to 1 indicate a sizeable sampling adequacy (0.8 and higher are great, 0.7 is acceptable, 0.6 is mediocre, less than 0.5 is unacceptable). The study achieves a (KMO) measure of sampling adequacy was 0.679 which is appropriate for the factor analysis.

The third step in the factor analysis applied in the study involves the factor extraction which was done is to determine the factors that drive the adoption of CAIS among MMDAs. Even though in theory, initial decisions can be made about the number of factors underlying a set of measured variables, applying the principal components method to extract the factors, the number of factors considered was those eigen values greater than 1. Even though there are other methods such as maximum likelihood method, principal axis factoring, alpha method, unweighted lease squares method, generalized least square method and image factoring, the principal component method was adopted due to it common application and strength of extracting the most parsimonious factors.

The next step was to rotate the initial factors as un-rotated factors are typically not very interpretable (most factors are correlated with many variables). As such factors were rotated to make them more meaningful and easier to interpret. The rotation method applied in the study was the varimax rotations (among other methods such as Oblique, Quartimax, Equamax and Promax) as it uses orthogonal rotations, thus, yielding uncorrelated factors/components. This method attempts to minimize the number of variables that have high loadings on a factor. This enhances the interpretability of the factors.

Finally, the rotated factors were interpreted to be the factors that drives the adoption of CAIS among MMDAs. The result of this exercise is discussed in Chapter 4

Structural Equation Modelling

The structural equation modelling (SEM) technique was applied in analyzing data collected. SEM, just as regression models and ANOVAs, is classified under generalized linear models. Mertens, Pugliese, and Recker (2016) posit that, the defining characteristic that delineates SEM from regression models is the presence of many regression equations within one model such that the outcome of one equation can be used to predict another set of regression equation(s) in the same model and at the same time. The current study adopted the structural equation modelling approach for the following reasons; Firstly, Mertens *et al.* (2017) posit that SEM is preferable where the research model involves unobservable latent constructs that are not directly measurable. In the current study, all the six constructs (including the dependent variables) in the research model (see Figure 2) are unobserved variables that are measurable only through their manifest indicators (proxies), hence making the SEM techniques suitable for the study. Secondly, Mertens *et al.* (2017) posit that SEMs are more suitable in situations where the research specification model involves complex hypothesized relationships between multiple endogenous and exogenous variable, including mediation or moderation effects.

The current study builds on eight hypothesized relationships between multiple exogenous and an endogenous construct, plus one mediator effect (*see*

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Figure 2). Clearly, these multiple relationships among variables, coupled with the presence of mediation or indirect effects, make statistical analysis complex and hence justifies the application of SEM in the study. For instance, to analyse the hypotheses in this study using the linear regression approach will require estimating at least eight set of different equations, which at the end even worsens the extent of complexity.

Lastly, in addition to the above, Hair *et al.*, (2014) posits that SEM technique of analysis is preferable where the study seeks to answer questions like "How much variance in the dependent variables does the model explain?"; "What is the directionality of the independent variables' effects on the dependent variables"? and "What is the strength and the significance of the effects?". The hypothesized relations in this study as indicated in chapter two above clearly seeks to answer questions such as these and as such justifies the application of SEM in this study.

Covariance-based or Variance-based?

In applying the SEM in analysing the data collected, the study recognized that, there are two approaches to SEM, namely; the Covariance-Based SEM (CB-SEM) and the Variance-Based SEM (PLS-SEM). The study made use of the PLS-SEM technique. According to Hair, Ringle, and Sarstedt (2011), the philosophical distinction between CB-SEM and PLS-SEM is straightforward. If the research objective is theory testing and confirmation, then the appropriate method is CB-SEM, in contrast, if the research objective is prediction and theory development, then the appropriate method is PLS-SEM. Since the objective of the study is to

predict the relationship between CAIS adoption drivers and financial performance of MMDAs, the PLS-SEM approach is deemed appropriate. The choice of PLS-SEM is further justified as follows;

First, it is appropriate to use the PLS-SEM technique when the objective of applying structural modelling is prediction and explanation of dependent variables, or theory building rather than theory confirmation (Henseller, 2009; Hair *et al.*, 2011). In fact, Herman Wold who developed the PLS technique even positioned it as a method for prediction (Wold, 1975). Accordingly, as the primary aim of the study is to predict the effect of CAIS adoption on financial performance, application of the PLS-SEM is more appropriate than the CB-SEM approach.

Secondly, unlike CB-SEM, PLS-SEM makes no assumptions about data distribution since it is a non-parametric method. Most often social science data tend to deviate from the multivariate normal distribution and by implication, evaluating a path model using CB-SEM amidst non-normal data can lead to underestimated standard errors and inflated goodness-of-fit measures (Hair *et al.*, 2014). The PLS-SEM algorithm transforms non-normal data in accordance with the central limit theorem hence does not require data to be normally distributed. This feature makes the PLS-SEM techniques more appropriate for social science studies (such as the current study) which hardly attains data normality (Hair *et al.*, 2014).

Third, in terms of sample characteristics, it is noteworthy that PLS-SEM works efficiently with small sample sizes comparative to CB-SEM. This characteristic makes PLS-SEM a technique of choice for SME studies of this nature (Amidu *et al.*, 2011). According to Hair *et al.* (2011), PLS-SEM usually achieves higher statistical power and easily reach convergence than CB-SEM, especially when faced with small sample size.

Lastly, the PLS-SEM technique is preferred to the CBSEM where theory regarding the underlying research model is less developed (Acedo & Jones, 2007; Hair *et al.*, 2014). In relation to this study, modelling of the indirect relationship between C*AIS adoption* and *financial performance* through *internal control effectiveness* is captured neither in the TOE or the TA theory which underpins this study. Again, one seldom finds in literature any study that focuses on such indirect relationships. For example, the few scholars (E.g. Thong, 1999; Quaddus & Woodside, 2015) who studied the influence of owner innovativeness on technology adoption all focused on the direct relationships, but not the indirect relationships. This suggests limited theoretical underpinnings as far as the mediating role of organizational readiness in technology adoption is concerned, hence justifying the application of PLS-SEM in the study.

Mediation Analysis

The study seeks to explore the mediating role of internal control effectiveness between AIS effectiveness and sustainable performance. Mediation analysis in this study was performed using the bootstrapping approach following Preacher and Hayes (2008), a selection over Baron and Kenny's (1986) Mediation

Analysis and the Sobel test (1982). The bootstrap approach is a non-parametric resampling test that makes no normality assumptions about data, thus making it fit for smaller sample sizes (Hair *et al.*, 2014). When this approach is adopted in testing for mediation effect, three conditions must be satisfied.

First, the direct path relationship (without the presence of mediation) between the independent variable (CAIS adoption) and the dependent variable (financial performance) must be significant, where the relationship is found to be insignificant, it suggests the absence of mediation (Hair *et al.*, 2014; Wong, 2015).

Second, the indirect path relationship after introducing the mediator variable must also be significant to justify mediation analysis. The last stage is to compute the Variance that the mediator variable accounts for (VAF). Where the VAF is lesser than 20%, it suggests that no mediation exist, however, a VAF ranging 20-80% signifies partial mediation; whereas a VAF greater than 80% is considered a full mediation effect (Preacher & Hays, 2008).

According to Hadi, Abdullah and Sentosa (2016), the bootstrap approach to mediation analysis is better able to detect mediation effect with certainty. The other two approaches to mediation analysis have met with criticisms that make them unsuitable for the study. For example, the Sobel test of mediation makes normality assumptions about data distribution but Hair *et al.* (2014) joins Bollen and Stine (1990) in arguing that the distribution of mediation effect is usually skewed especially when small sample size is involved, thus making the Sobel test unsuitable for the PLS-SEM technique, which makes practically no assumption

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about data distribution and also works well with small sample sizes. Pardo and Roman (2013) have also criticized the Baron and Kenny's (1986) approach to mediation analysis on the grounds that it requires a statistically significant relationship between all paths involved in the mediation relationships, including the direct relationships.

Confirmatory Factor Analysis

Even though the scales adopted for the study to measure the constructs have been validated and tested for their reliability in previous studies, it is necessary to verify how well the data collected fits the hypothesized model (model fitness test) and also test for the reliability and validity of the construct for the measurement model (see Figure 2). To do this, a confirmatory factor analysis (CFA) was performed. In carrying out the CFA, an assessment of internal consistency, indicator reliability, convergence validity, and discriminant validity (Campbell & Fiske, 1959; Hair *et al.,* 2014) were undertaken to ensure validity and reliability in the measurement model.

Internal Consistency

Internal consistency as a reliability measure is premised on the correlations between various measurement items on a similar test. The intuition is that several items that purport to measure a single underlying construct should produce similar results (Hair *et al*., 2014). The Cronbach alpha (Cronbach, 1951) criterion and the Composite Reliability **(CR)** score are used to assess the internal consistency of the measurement model in this study. As a heuristic, a Cronbach alpha score equal to or above 0.70 is required to establish internal consistency; the

same heuristic applies to the **CR** criterion (Nunnally, 1978; Hair *et al.,* 2014). Hair *et al.* (2014) notes that where a construct fails to satisfy the Cronbach alpha test of reliability but satisfies Composite Reliability (**CR**) test, such construct should be retained since the Composite Reliability test is a more robust test of internal consistency. Results of such tests are discussed in chapter four of this study.

Indicator Reliability

Indicator reliability is another concept related to outer model reliability. A measurement variable (indicator) whose standardized correlation with its associated construct (also known as loadings) is at least 0.708 is assumed to be reliable. Albeit literature recommends a loading of at least 0.708 to warrant the inclusion of an indicator in the measurement model, such a rule may be violated. For example, Hair *et al.* (2014) note that social science researchers often observe weaker indicator loadings below the 0.708 threshold. In such instances, Hair *et al.* (2014) and Henseller (2009) posit that an indicator (measurement variable) may still be retained based on the relevance of its content (Content validity). Again, Hair *et al.* (2014) advices that rather than automatically eliminating indicators when their outer loading is below 0.708, researchers should assess if elimination of the indicator will improve Composite reliability (CR) and average variance extracted (AVE); that is, it is justified to remove a weak indicator if its removal improves CR and AVE values. Besides, psychometrists (e.g., Nunnally & Bernstein, 1994; Churchill, 1979) recommends eliminating reflective indicators from the measurement model at all cost if their outer standardized loadings are

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smaller than 0. 40. To ensure higher validity and reliability in this study, all indicators with loadings lesser than 0.60 were removed (Henseller, 2009).

Convergence Validity

Convergent validity assesses the extent to which indicators that purport to measure an underlying construct are positively related (Hair *et al.*, 2014). The intuition is that since indicators of a reflective construct are treated as different ways of measuring the same construct, it is expected that all indicators that measure a particular construct should converge, be related or share a high proportion of variance. To establish convergent validity on the construct level, Fornell and Larcker (1981) recommend using the average variance extracted (AVE) as a criterion for convergent validity assessment. An AVE is simply the proportion of variance that a latent construct shares with its underlying indicators. As a heuristic, an AVE value of at least 0.5 is required. The implication is that the construct explains at least 50% (half) of variations in its underlying indicators. Also, the standard factor loading (SFL) with bootstrapping which indicates convergent validity if all indicators load significantly on the their respective construct with a loading coefficient ranging of at least 0.7 (Bagozzi and Yi, 2012; Hair *et al*., 2014), indicating acceptable item convergence on the intended construct and bootstrapping result indicating a significant loading at 5%. A more robust measure, Rho_A was also applied which indicate a construct validity if it showed a result above the cut-off 0.75 as recommended by Dijkstra and Henseler (2015).

Discriminant Validity

The discriminant validity test assesses whether concepts or measurements that ought not to be related are actually not related. In this study, three main tests were carried out in assessing discriminant validity of the research constructs, namely the Heterotrait-Monotrait Ratio of Correlations, the Fornnel-Larcker test of discriminant validity, and the Cross Loadings criterion (Hair *et al*., 2014).

Firstly, the HTMT Criterion was used in assessing Discriminant Validity. Henseller, Ringle, and Sarstedt (2015) in a simulation study concluded that a lack of discriminant validity is better detected by the HTMT approach than other approaches. The HTMT approach takes the correlations among indicators across latent constructs (Heterotrait-Hetero method Correlations) and divide it by the correlations of indicators for each specific latent construct (i.e. the average of the Monotrait-Heteromethod Correlations) to the extent that, when the ratio of correlation between two different constructs is close to one (1), it implies a lack of discriminant validity. A correlation is regarded as close to one when it exceeds 0.90 (Gold *et al.* 2001). Results of the application of such criterion are discussed in chapter four.

In addition, the Fornell-Larcker Criterion was employed in assessing Discriminant Validity. The Fornell-Larcker criterion requires that to establish discriminant validity, a construct should share more variance with its underlying variables than with any other construct in the research model. In statistical terms, the square root of each construct's Average Variance Extracted (AVE) must be greater than its correlation with other constructs in the research model. Results of

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the application of the **Fornell-Larcker** test are presented and discussed in chapter four.

Finally, the Loadings Criterion was employed to confirm the discriminant validity of the measurement model. With this criterion, the loading of each indicator on the associated construct is expected to be greater than all of its cross-loadings with other indicators in order to establish discriminant validity. Results of cross-loadings of the measurement variables are presented and discussed in chapter four.

Inner/Structural Model Assessment

According to Hair et al. (2014), after validity and reliability assumptions are met for the outer model, the inner model must also be assessed and interpreted. In this study, a-six step approach is adopted in assessing and interpreting the inner model. This is outlined as follow;

First is to assess collinearity. In theory, it is expected that no collinearity should exist within the structural model, but in practical terms, this is seldom the case (Hair *et al.,* 2014). The Variance inflation factor (VIF) quantifies the severity of multicollinearity to the extent that a VIF value of five (5) and above indicates potential collinearity problem (Hair, Ringle & Sarstedt, 2011). Discussion of collinearity in the estimated model is presented in chapter four.

This is followed by assessment of significance of path relationship. This is done in order to establish the level of significance between hypothesized relationships. In this study, path relationships are estimated in a two-tailed test at 5% significance level. An exogenous construct is deemed to have established a

significant relationship with the endogenous construct if its associated test-statistics (t-statistics) value is equal to or greater than 1.96.

Thirdly, following evaluation of path significance, inner model evaluation is undertaken by assessing the predictive ability of the structural model, using the coefficient of determination (also referred to as R square (R^2)). This measurement (i.e. R^2) shows to what degree the exogenous construct(s) are explaining the endogenous constructs. A guideline provided by Chin (1998), and Moore (2013) holds that R2 values within the ranges of 0-49%, 50-69% and above 70% are interpreted as weak, moderate and substantial respectively. R^2 value of the estimated research model is discussed in chapter four.

In addition, the effect of each individual predictor variable is assessed using Cohen's effect size (f^2). The f^2 measures the relative importance of independent variables (s) in explaining the dependent variables. As a rule of thumb, effect sizes of 0.02, 0.15, and 0.35 are considered as small, moderate, and substantial (Cohen, 1988). These results are discussed in chapter four.

The last but one stage in assessing the structural model entails evaluating the overall predictive relevance of the structural model, also referred to as Stone-Geisser's Q^2. According to Geisser (1974) and Stone (1974), a Q^2 value greater than zero (0) signifies that the structural model has predictive relevance. Finally, after assessing the inner model, the result of the structural model is then discussed.

Chapter Summary

The study builds on positivists' philosophical assumptions regarding reality. The quantitative design is applied in gathering and analyzing data. The population of the study includes 216 MMDAs selected from 260 MMDAs Questionnaires, both manual and online were administered to MMDAs across the sixteen regions of Ghana. The factor analysis and the variance-based Structural Equation Modelling is adopted as the technique of data analysis. In terms of ethics, respondent data are not passed on third parties, and respondents are allowed to abandon the study at any point in time without penalty.
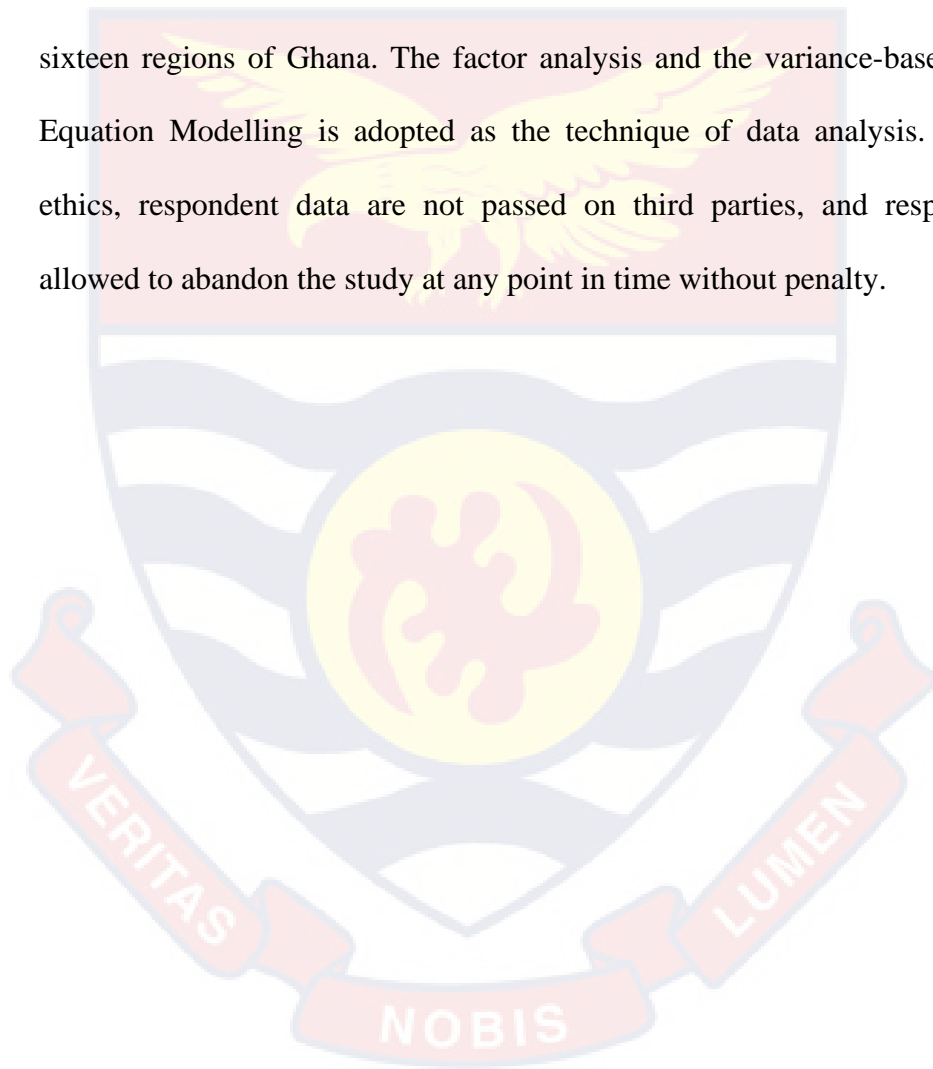
CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

This chapter discusses the results obtained from the analysis of the data collected in relation to the objectives of the study. The chapter is organised into two sections; first section presents and discusses the result of analysis of factors that influence the adoption of CAIS among MMDAs using factor analysis in relation to the first objective of the study. The second section presents and discuss the result of analysing the impact of the factors influencing CAIS adoption have on financial performance of the MMDAs and the mediating role of internal control in the identified relationship. Data collected from the field was analysed using IBM SPSS version 20 and SmartPLS version 3.2.6 (Ringle *et al.,* 2015).

Adoption of Computerized Accounting Information System

The first objective of the study is to identify the factors that influence the adoption of CAIS in the public sector settings. This section presents the analysis and discussion of results on adoption of CAIS. The section is organised as follows; the first sub-section describes the profile of the responses obtained from the respondents using descriptive statistics. Secondly, the section presents results in relation to the linkages between the variables considered using the correlation matrix. The basic assumptions of the correlation matrix for the factor analysis is then tested. This is followed by a factor analysis, where the variables considered in reduced into latent variables deemed to describe the basis on which MMDAs adopt CAIS.

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Profile of the Responses

As stated in earlier sections of the study, sixteen variables were considered based on the literature, to be the factors that have potential of influencing the adoption of CAIS in the public sector. Preliminary analysis of the variables was carried out to have a fair idea of the distribution of the responses given by the operators and controllers of CAIS system in the public sector. Observation of the responses to the rating of the variables shows that, highest rating for each variable is 5 indicating strong agreement to the statement posed to respondents. However, each variable has a minimum rating of 1 indicating strongly disagreement to the statement posed to them. This shows a greater variation in the responses from the respondents. Summary of responses is shown in Table 5.

Observation of responses shows that, generally, respondents tends to agree with the statements posed to them. This is evident by the average response score for all the variables exceeding three (3), except *Training cost* and *Redundancy* which recorded an average score of less than three (3). The response also appears to be normally distributed as indicated by the skewness assuming values closer to the null, even though the peak of the distribution of each variable seems to be leptokurtic. Nevertheless, the profile of the data provides a firm basis for carrying out factor analysis.

Table 5: Descriptive Statistics of Responses

		Mean	Std. Deviation	Skewness	Kurtosis
X1	Government policy to adopt	3.08	2.126	0.010	-1.114
X2	Changing trend in technology	3.02	1.810	0.126	-1.211
X3	Complexities of the CAIS	3.86	1.368	-0.011	-1.270
X4	Innovation	3.56	1.970	0.031	-1.224
X5	Data security cost	3.31	1.725	0.146	-1.131
X6	Set-up cost	3.60	1.684	0.136	-1.079
X7	Political reasons	3.80	1.405	-0.026	-1.173
X8	Legal requirement	3.25	1.155	0.082	-1.239
X9	CAIS comprehensibility	3.21	2.108	-0.009	-1.214
X10	Training cost	2.72	2.177	0.055	-1.245
X11	Data security threat	3.11	1.225	0.066	-1.245
X12	Redundancy	2.89	2.144	-0.179	-1.234
X13	Maintenance cost	3.14	2.255	-0.194	-1.204
X14	Readiness to adopt	3.62	1.355	0.147	-1.151
X15	Unclear policy to apply CAIS	3.61	0.984	-0.135	-1.193
X16	Legal backing to adopt	3.33	1.034	0.106	-1.013

Source: Field Data (2020)

Correlation Analysis and Barttlers' Sphericity Test

Before determining the factors that underline the adoption of CAIS for public sector entities, it is necessary to examines correlations between the variables suspected to determine CAIS adoption. This examination is necessary to determine the group of variables that linearly correlate and hence likely to have a common underlying factor. The correlation matrix of the variables considered in

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the study is shown in Table 6. A basic assumption made in interpreting the correlation matrix is that, a correlation coefficient greater than 0.6 is considered high to warrant grouping of such variables.

From Table 6, it can be observed that X3 (*Complexities of the CAIS*) and X9 (CAIS comprehensibility); X3 (*Complexities of the CAIS*) and X15 (*Unclear policy to apply CAIS*) highly correlate among themselves. Thus, these group of variables (X3, X9 and X15) are likely to correlate with the same underlying factor. Again, variables X2 (*Changing trend in technology*) and X4 (*Innovation)* highly correlate indicating that, they may be explained by the same underlying factor. Similarly, the variables X5 (*Data security cost*) and X11 (*Data security threat*) highly correlate and hence are likely to correlate with the same underlying factor. Finally, it can be observed that X12 (*Redundancy*) and X14 (*Readiness to adopt*); X12 (*Redundancy*) and X16 (*Legal backing to adopt*) and then X14 (*Readiness to adopt*) and X16 (*Legal backing to adopt*) highly correlate among themselves, suggesting that, these variables may correlate with the same underlying factor.

Table 6: Correlation matrix of study variables

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15
X2	-.060														
X3	-.076	.395													
X4	.112	**-.649**	-.199												
X5	-.373	.021	.180	-.074											
X6	.169	-.166	-.219	.030	-.009										
X7	-.287	.212	.168	-.195	.434	-.060									
X8	-.126	.540	.391	-.345	.070	-.308	.327								
X9	.042	-.165	**.601**	.276	-.008	.076	.068	-.039							
X10	-.341	-.006	.092	-.077	.352	**.827**	.278	.144	.072						
X11	.009	.077	-.291	.122	**.683**	.052	.028	.079	.110	.051					
X12	.415	.149	.024	-.113	.217	.010	-.128	.419	.189	.031	.310				
X13	.174	-.159	.025	.006	.185	**.738**	.185	.206	.195	**.625**	.195	.005			
X14	.158	.047	.045	.037	.392	.002	.110	.039	.392	.283	.045	**.661**	.028		
X15	-.007	.005	**.713**	.291	.198	.038	.094	.493	**.711**	.392	.384	.038	.192	.121	
X16	.046	.284	.058	.105	.284	-.024	-.038	.103	.049	.039	.183	**.713**	.219	**.710**	.182

Source: Field data (2020)

Given the observation made from Table 6, and the fact that a relatively smaller number of variables are being considered, we might expect that, the apparent linear relationship between the variables can be explained in terms of, at most, three or four common factors. The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was 0.679 which is appropriate for the factor analysis. The correlation matrix was obtained at the Bartlett's Test of Sphericity test statistic of 520.888 with a degree of freedom of 42 and significant at 1%. We therefore we reject the null hypothesis and conclude that, the population correlation matrix is not an identity matrix. The result obtained provides a support for the use of factor analysis.

Factor Extraction and Renaming of Factors

As the assumptions necessary to apply factor analysis have been satisfied, we go ahead to extract the underlying factors that influence the adoption of CAIS in the public sector using factor analysis. The method applied in extracting the factors is the principal axis factoring, thus, the communality for each variable, X1 to X16 is 1.0 as unities were inserted in the diagonal of the correlation matrix. As there are sixteen variables considered in the analysis, sixteen factors have been extracted as shown in Table 7. The total variation accounted for by all the sixteen factors is 16 (which is equal to the number of variables) relatively, 100%. This variation is explained by the variance (Eigenvalues) of the factors.

The eigenvalues for the factors, as expected, is following a decreasing order of magnitude as we move from Factor 1 to Factor 16. Factor 1 to Factor 4 combined account for 71.1% of the total variance in the data even though after

rotating the sum of square loading, the percentage variance explained decreased to 53.8%. The remaining twelve factors together accounted for 28.9% of the total variance. Despite the fact that sixteen factors were extracted as shown in Table 5, not all sixteen factors will be useful in determining the drives for adopting CAIS. To gain some degree of parsimony and to summarize the information contained in the original variables, a smaller number of factors is extracted. Using the criterion of retaining only factors with eigenvalues of 1 or greater, the first four factors is retained for interpretation. As it accounts for 71.1% of the total variation in the data, the gain achieved in going for an additional factor is marginal, hence decision to retain only four for interpretation.
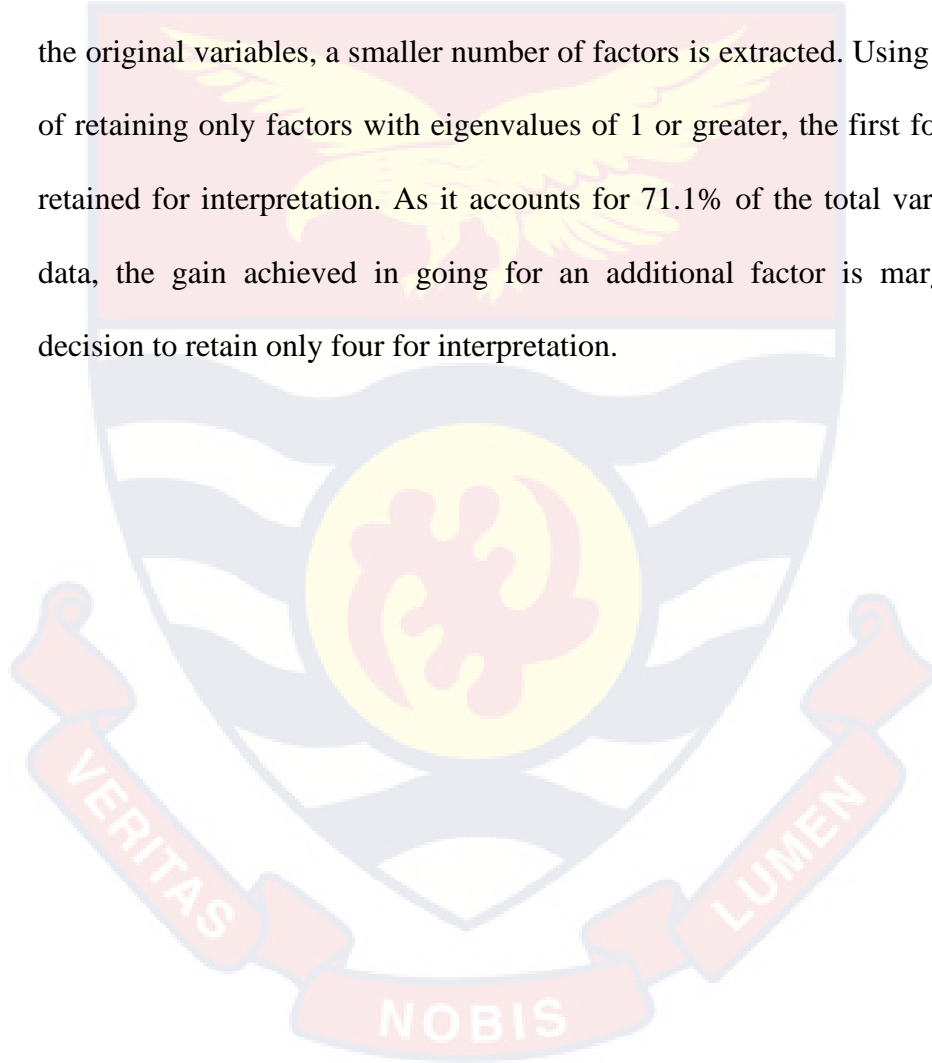
Table 7: Total Variances Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumm %	Total	% of Variance	Cumm %	Total	% of Variance	Cumm %
1	3.973	24.831	24.831	3.315	20.719	20.719	2.316	14.475	14.475
2	3.196	19.975	44.806	2.788	17.425	38.144	2.157	13.481	27.956
3	2.393	14.956	59.763	2.091	13.069	51.213	2.116	13.225	41.181
4	1.824	11.400	71.163	1.015	6.344	57.556	2.014	12.588	53.769
5	0.917	5.731	76.894						
6	0.709	4.431	81.325						
7	0.683	4.269	85.594						
8	0.517	3.231	88.825						
9	0.413	2.581	91.406						
10	0.370	2.313	93.719						
11	0.313	1.956	95.675						
12	0.201	1.256	96.931						
13	0.185	1.156	98.088						
14	0.113	0.706	98.794						
15	0.104	0.650	99.444						
16	0.089	0.556	100.000						

Source: Field data (2020); Extraction Method: Principal component analysis

After four iterations, the rotated component matrix as shown in Table 8 was obtained using the Varimax rotation method with Kaiser Normalization. The matrix presents the correlations or loadings between the sixteen variables considered and the four extracted factors, indicating how closely the variables are related to each extracted factor. For the purpose of interpretation, correlation coefficients of 0.6 or greater are considered to be high, and therefore such variable loads on the extracted factor.

Table 8: Rotated component matrix

		Factor			
		1	2	3	4
X1	Government policy to adopt	-0.018	-0.148	0.322	-0.072
X2	Changing trend in technology	0.262	0.026	-0.152	0.494
X3	Complexities of the CAIS	-0.271	**0.742**	-0.007	-0.055
X4	Innovation	-0.009	0.710	0.350	0.012
X5	Data security cost	0.103	0.556	**0.851**	0.223
X6	Set-up cost	**-0.732**	0.535	0.235	0.053
X7	Political reasons	-0.014	-0.533	0.265	-0.093
X8	Legal requirement	0.271	0.156	0.174	0.122
X9	CAIS comprehensibility	0.206	**0.839**	0.116	0.464
X10	Training cost	**0.809**	-0.043	0.302	-0.411
X11	Data security threat	0.290	0.009	**-0.772**	0.183
X12	Redundancy	0.391	-0.038	-0.022	**0.861**
X13	Maintenance cost	**0.772**	0.122	0.180	0.318
X14	Readiness to adopt	-0.003	0.043	0.064	**0.683**
X15	Unclear policy to apply CAIS	0.106	**0.815**	0.182	-0.288
X16	Legal backing to adopt	0.192	0.028	-0.054	**0.927**

Extraction Method: Principal component analysis. Rotation Method: Varimax with Kaiser Normalization; Rotation converged in 4 iterations.
Source: Field data (2020)

From Table 8, variable X6 (Set-up cost), variable X10 (training cost) and variable X13 (maintenance cost) loads significantly on Factor 1. From the correlation matrix in Table 6, X6 and X10 shows a higher correlation between them and also, X6 and X13 have a significant correlation, indicating that, these variances in these variables is driven by a common underlying factor. As all the variables are in relation to cost of adoption, cost of training and maintenance, factor 1 would be re-labeled as *Cost of adoption*.

Secondly, it can be observed that variable X3 (*Complexities of the CAIS*), variable X9 (CAIS *comprehensibility*) and variable X15 (*Unclear policy to apply CAIS*) loads significantly on Factor 2. From the correlation matrix in Table 4, it can be observed that X3 (*Complexities of the CAIS*) and X9 (CAIS comprehensibility); X3 (*Complexities of the CAIS*) and X15 (*Unclear policy to apply CAIS*) highly correlate among themselves. Thus, the variance in these group of variables (X3, X9 and X15) are likely to be explained by the same underlying factor. As all the variables are in relation how complex and comprehensible the CAIS is, Factor 2 would be re-labeled as *CAIS complexity*.

Again, variable X5 (*Data security cost*) and variable X11 (*Data security threat*) loads significantly on Factor 3. From the correlation matrix, variables X5 (*Data security cost*) and X11 (*Data security threat*) highly correlate and hence are likely to correlate with the same underlying factor. Since both factors describes issues in respect to data security, Factor 3 would be re-labeled as *Data security and cost*.

Finally, variables X12 (*Redundancy*), X14 (*Readiness to adopt*) and X16 (*Legal backing to adopt*) have higher loading on Factor 4 as shown in Table 8. From Table 6, it can be observed that X12 (*Redundancy*) and X14 (*Readiness to adopt*); X12 *(Redundancy)* and X16 (*Legal backing to adopt*) and then X14 (*Readiness to adopt*) and X16 (*Legal backing to adopt*) highly correlate among themselves. This suggest that the variances in these variables are associated with a common factor. As these variables relate to the preparedness of managers of MMDAs to adopt CAIS in terms of dealing with redundancy issues, seek legal backing and be ready in terms of structures and institutions to adopt CAIS, Factor 4 would be re-labeled as ***Readiness to adopt CAIS***.

In summary, four factors have been identified as the main factors that influence the adoption of CAIS among MMDAs in Ghana. These include the following; Factor 1: Cost of adoption (indicators include set-up cost, training cost and maintenance cost); Factor 2: CAIS complexity (indicators include Complexities of the CAIS, CAIS comprehensibility and Unclear policy to apply CAIS); Factor 3: Data security and cost (indicators include Data security cost and Data security threat) and finally, Factor 4: Readiness to adopt CAIS (indicators include Redundancy, Readiness to adopt and Legal backing to adopt).

Adoption of Computerized Accounting Information System and Financial Performance

This section presents and discuss the result of analysis of data necessary to achieve the second and third objective. The second objective of the study seeks to assess the linkage between the factors that drives adoption of CAIS and financial

performance of MMDAs while the third objective seeks to examine the mediating role of internal control in the linkage between drivers of CAIS adoption and financial performance. Structural equation modelling was applied in achieving both objectives. This section is organised as follows; the result of validation analysis is presented and discussed where model fitness, validity and reliability assessment of the tools used in measuring the study variables for the second and third objective are assessed through confirmatory factor analysis. This is followed by descriptive statistics of the responses obtained from the data collection and inter-correlations analysis among the study variables and hypothesis testing of the hypothesized model (Figure 2) using the bootstrapping.

Confirmatory Factor Analysis (CFA)

Despite the fact that the scales adopted to measure adoption of CAIS have been validated through the factor analysis and that of internal control and financial performance have been tested for their reliability in previous studies, it is necessary to verify the validity and reliability of the instruments used in measuring the constructs and also examine how well the data collected fits the hypothesized model (model fitness test) study (see Figure 2). To do this, a confirmatory factor analysis (CFA) was performed. In carrying out the CFA, focused was placed on assessment of model fitness and assessment of the outer model of the hypothesized model.

Model Fitness Test

As stated earlier, the model fitness test was carried out to be satisfied whether or not the hypothesized model fits the data obtained from the field.

Analysis of the cross-sectional data from the 227 MMDAs for model fitness test showed that, a six-factor hypothesized model (performance of MMDAs data input system, data processing system, data storage system and financial statement system mediated by internal control systems) had a good fit to the data. The model fitness test for the six-factor hypothesized model showed SRMR = 0.031, NFI = 0.977 and RMS θ = 0.135. even though the RMS θ threshold seems to be violated, but among the various factor combinations, the six-factor model appears to offer the best result.
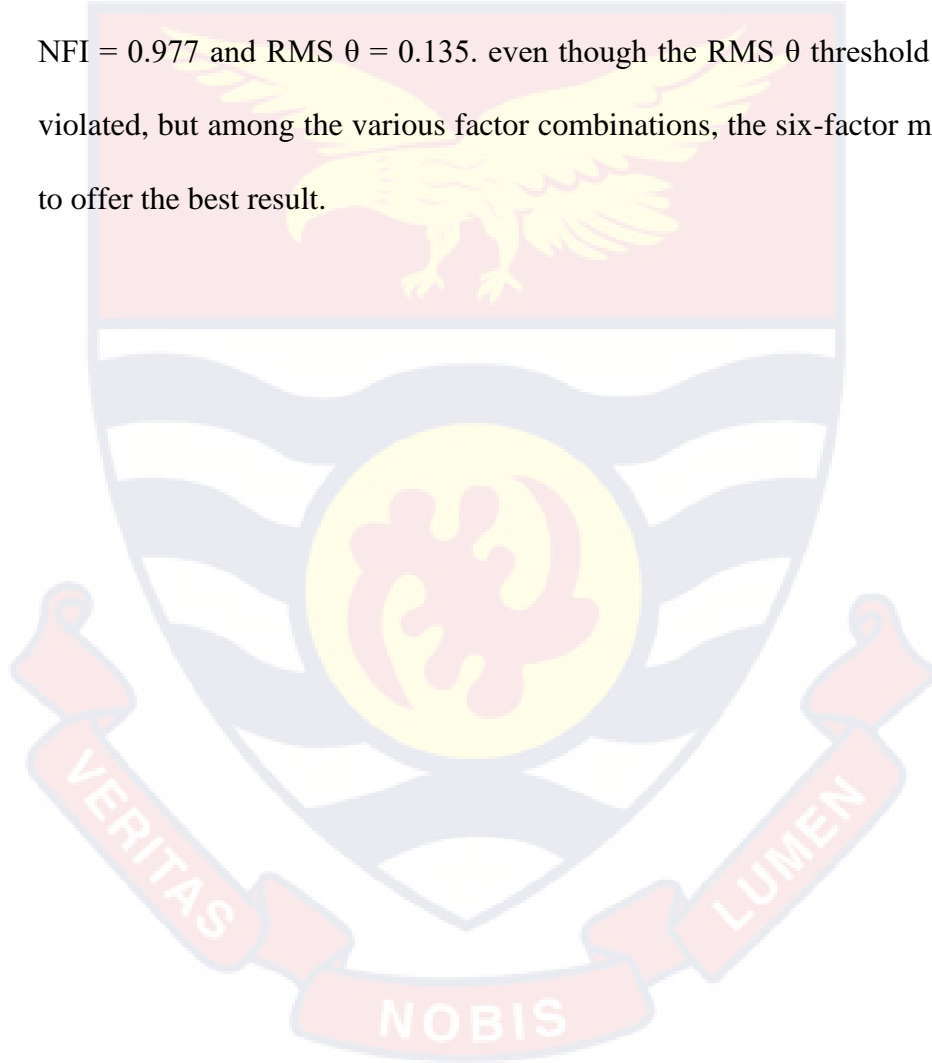
Table 9: Fit Indices for the Measurement Model

Model Fit index	SRMR	d_ULS	d_G	NFI	RMS θ
Acceptable level	*(≤ 0.08)*	*(p > 0.05)*	*(p > 0.05)*	*(≥ 0.90)*	*(< 0.12)*
Six-factor hypothesized model (COS, COM, SEC, RED, ICS, FIN)	0.031	0.133	0.318	0.977	0.135
Four-factor hypothesized model (COS + COM, SEC + RED, ICS, FIN)	0.048	0.104	0.019	0.912	0.355
Four-factor hypothesized model (COS + COM + SEC, RED, ICS, FIN)	0.113	0.041	0.132	0.883	0.145
Four-factor hypothesized model (COS, COM + SEC + RED, ICS, FIN)	0.104	0.001	0.005	0.868	0.217
Three-factor hypothesized model (COS+ COM + SEC + RED, ICS, FIN)	0.211	0.000	0.006	0.855	0.147

Note: $n = 216$. *COS – Cost of adoption, COM – Complexity of CAIS, SEC – Data security cost and threat; RED – Organisational reediness, ICS – Internal control system, FIN – Financial performance*

Source: Field data (2020)

The Bootstrapping result for d_LS and d_G showed a probability of acceptance of the null hypothesis of no difference between the implied correlation matrix and the empirical correlation matric is at 13.3% and 31.8% respectively, hence, we fail to reject the null hypothesis of no difference and conclude that, there is an insignificant difference between the correlation matrix implied by the hypothesized model and the empirical correlation matrix. Relative to the result of other factor hypothesized model, the six-factor hypothesized model appears to have a parsimonious fit and hence considered for further analysis. The result of the model fitness test of the six-factor hypothesized model together with other factor models is shown in Table 9.

Outer Model Assessment

In assessing the out model, focused was placed on consistency of constructs' indicators, validity of the constructs and reliability of the constructs. The result of the consistency, validity and reliability diagnostics is presented in Table 10.

Internal Consistency

Assessment of internal consistency of a construct aimed at judging whether several indicators that purport to measure the same underlying construct produce similar results. Applying the Cronbach alpha with a minimum acceptable score of 0.70 to indicate internally consistent construct as recommended by Nunnally (1978), Table 6 indicates that, apart from the constructs, *complexities of AIS* (which achieve α = 0.683) and *financial performance* (which achieved α = 0.693), all the other constructs in the specification model met the Cronbach

criterion. Using the Composite reliability (CR) index, a score of 0.70 is an acceptable level of internal consistency, whereas a higher CR score signifies higher internal consistency. Albeit the constructs, *complexities of AIS* and *financial performance* could not satisfy the Cronbach threshold for inclusion, they are still included in the current study since they satisfied a more robust internal consistency test using the composite reliability index of internal consistency as suggested by Hair *et al.* (2014).

Validity and Reliability

Validity and reliability test were also carried out as part of the CFA to ascertain validity and reliability of the hypothesized model shown in Figure 2 and result reported in Table 10. Two aspects of validity were tested; convergent validity and discriminant validity.

Assessing convergent validity using the standard factor loading with bootstrapping, all the indicators load significantly on their respective construct with a loading coefficient ranging 0.728 to 0.941 for all the factors in the hypothesized model after performing six iterations resulting from step-wise deletion of indicators with lower loadings. These loading exceed the recommended level of 0.7 (Bagozzi and Yi, 2012; Hair *et al*., 2014), indicating acceptable item convergence on the intended constructs. The bootstrapping result indicate that, the loading obtained are significant at 5% in the final iteration. Also, the reported AVE values indicate that on average, all the constructs in the hypothesized model are able to account for more than half (an AVE above 0.50) of the variance in their underlying indicator items. For example, the construct that

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recorded the highest AVE was *organisational readiness* as it accounted for 82.3% of variation in all of its associated indicators after six iterations. Again, it is also observed from the final iteration in Table 6 that even the latent construct, *data security cost and threat*, with the lowest AVE was 0.743 exceeding the minimum threshold. This demonstrates that, the measurement items in the hypothesized model are valid as far as convergence is concerned. Applying a more robust measure, Rho_A also showed a result above the cut of 0.75 as recommended by Dijkstra and Henseler (2015). The results indicate a satisfactory convergent validity for all constructs in the measurement model.
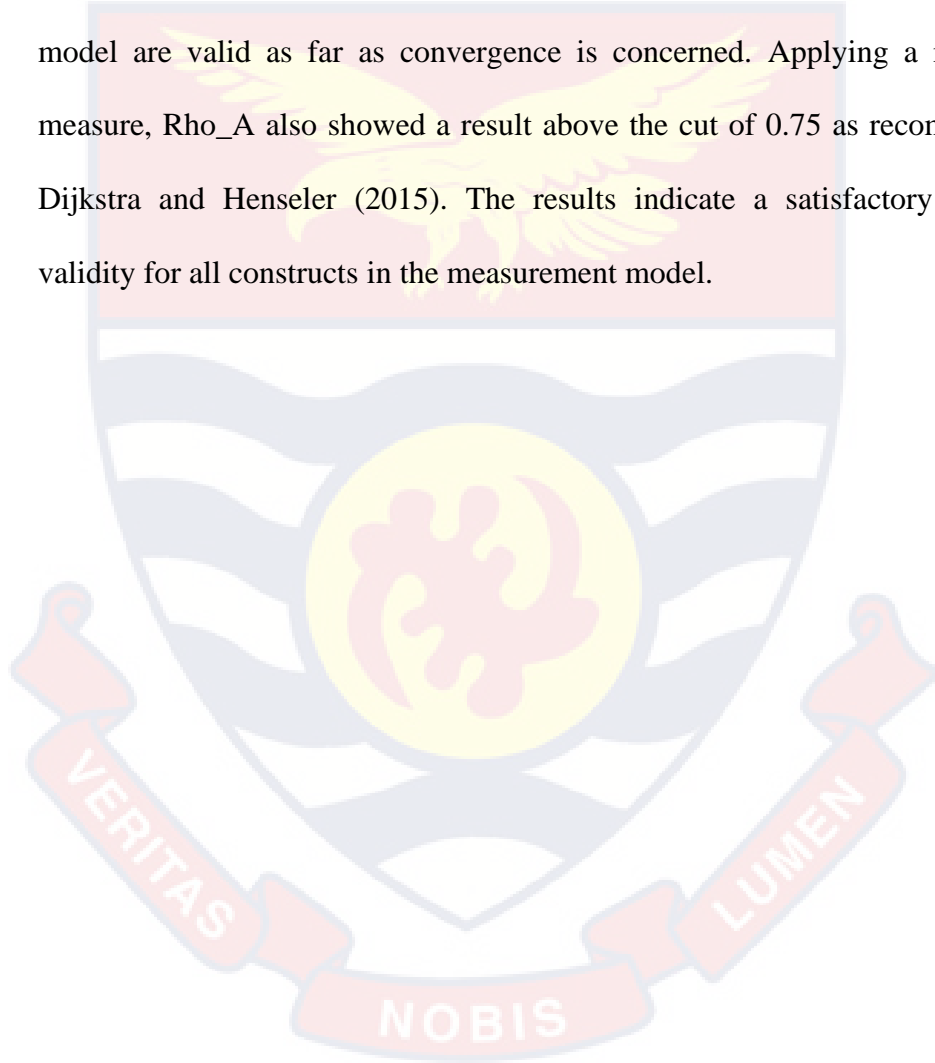
Table 10: Consistency, Validity and Reliability Diagnostics

Constructs and their indicators	Standard factor loadings with bootstrapping (≥ 0.70)		Composite reliability (CR) (≥ 0.70)		Average variance extracted (AVE) (≥ 0.50)		α (≥ 0.70)	Rho_A (≥ 0.75)
	Initial iteration	Final iteration	Initial iteration	Final iteration	Initial iteration	Final iteration	Final iteration	Final iteration
Cost of adoption			0.687	0.698	0.822	0.821	0.811	0.734
COS1_	0.738***	0.782***						
COS2	0.882***	0.844**						
COS3	0.770**	0.780**						
Complexity of AIS			0.589	0.721	0.741	0.743	0.842	0.798
COM1	0.903***	0.885***						
COM2	0.568*	Omitted						
COM3	0.704**	0.778***						
Data security cost and threat			0.821	0.811	0.792	0.791	0.683	0.897
SEC1	0.946***	0.899**						
SEC2	0.754**	0.831**						
Organisational readiness			0.538	0.744	0.788	0.823	0.901	0.833
RED1	0.725*	0.795**						
RED2	0.557*	Omitted						
RED3	0.890**	0.889***						

Internal control system			0.862	0.866	0.754	0.755	0.815	0.712
ICS1_	0.880*	0.883**						
ICS2	0.867***	0.868**						
ICS3	0.845***	0.841***						
ICS4	0.511*	Omitted						
ICS5	0.312	Omitted						
Financial performance			0.469	0.736	0.695	0.813	0.693	0.710
FIN1	0.770**	0.792***						
FIN2	0.825***	0.741***						
FIN3	0.708**	0.721***						
FIN4	0.827**	0.706**						
FIN5	0.759***	0.815***						

Source: Field data (2020)

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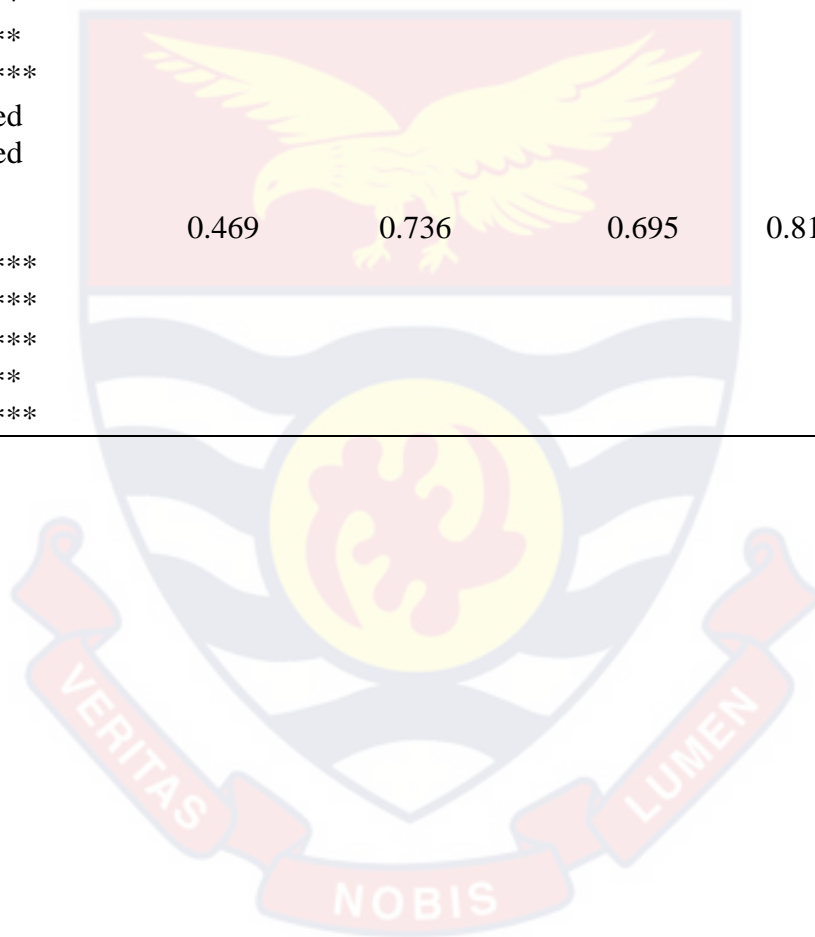
Discriminant Validity

Following the procedure adopted by Hair *et al*. (2014), discriminant validity test was carried out using the Heterotrait-Monotrait Ratio of correlations, the Fornnel-Larcker test of discriminant validity, and the cross loadings criterion. The result of these tests is shown in Table 11, Table 12 and Table 13 respectively.

Based on the Heterotrait-Monotrait Ratio of Correlations (HTMT), Table 11 shows the HTMT ratios of correlation between the constructs which meets the threshold of below 0.80 (Gold *et al.* 2001) and are all significant at 5% after conducting the bootstrapping of 500 sub-samples from the 216 MMDAs sampled demonstrating that, the scale measures that are not supposed to relate are actually not relating.

Table 11: Hetrotrait-Monotrait ratio of correlation

	Study constructs				
	COS	COM	SEC	RED	ICS
COM	0.513				
SEC	0.329	0.618			
RED	0.411	0.519	0.382		
ICS	0.296	0.318	0.281	0.448	
FIN	0.417	0.410	0.319	0.382	0.519

Source: Field data (2020)

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Secondly, applying the Fornell-Larcker criterion to evaluate the adequacy of discriminant validity requires that, the diagonal elements (which is the square root of AVEs) of the Fornell-Larker matrix should be greater than the off-diagonal elements in the corresponding rows and columns. Table 12 shows the results of the Fornell-Larker matrix which demonstrate that, the discriminant validity assumption is satisfied as the correlation between any two latent variables is less than to the square root of AVEs on the leading diagonal elements of underlying constructs. The higher diagonal values of the Fornell-Larket matrix is an indication that, the latent constructs share more variance with its respective underlying indicators than with any other construct in the research model (Henseller, 2009; Hair *et al.*, 2014) which is a basic requirement for discriminant validity.

Table 12: Fornell–Larcker criterion

	Study contracts					
	COS	COM	SEC	RED	ICS	FIN
COS	*0.906*					
COM	0.631	*0.862*				
SEC	0.514	0.611	*0.889*			
RED	0.729	0.713	0.729	*0.907*		
ICS	0.628	0.668	0.639	0.737	*0.869*	
FIN	0.652	0.703	0.681	0.772	0.817	*0.902*

Source: Field data (2020)

The final technique adopted in assessing discriminant validity involves the examination of indicator cross-loadings. The cross-loading of the indicators shown in Table 9. For discriminant validity, the loading of each indicator on the associated construct is expected to be greater than all of its cross-loadings (Chin, 1998; Hair *et al.*, 2014) with other indicators. From Table 13, it can be observed that, the indicators of each construct have higher loading on that construct and any other construct. For instance, it is observed that the indicators of the construct *cost of adoption* loadings between 0.739 to 0.891 on its underlying construct but loaded between 0.221 to 0.664 on other constructs. Similar story can be told on other constructs. This is an indication that, all the other measurement variables maintained in the final estimation of results adequately established discriminant validity.
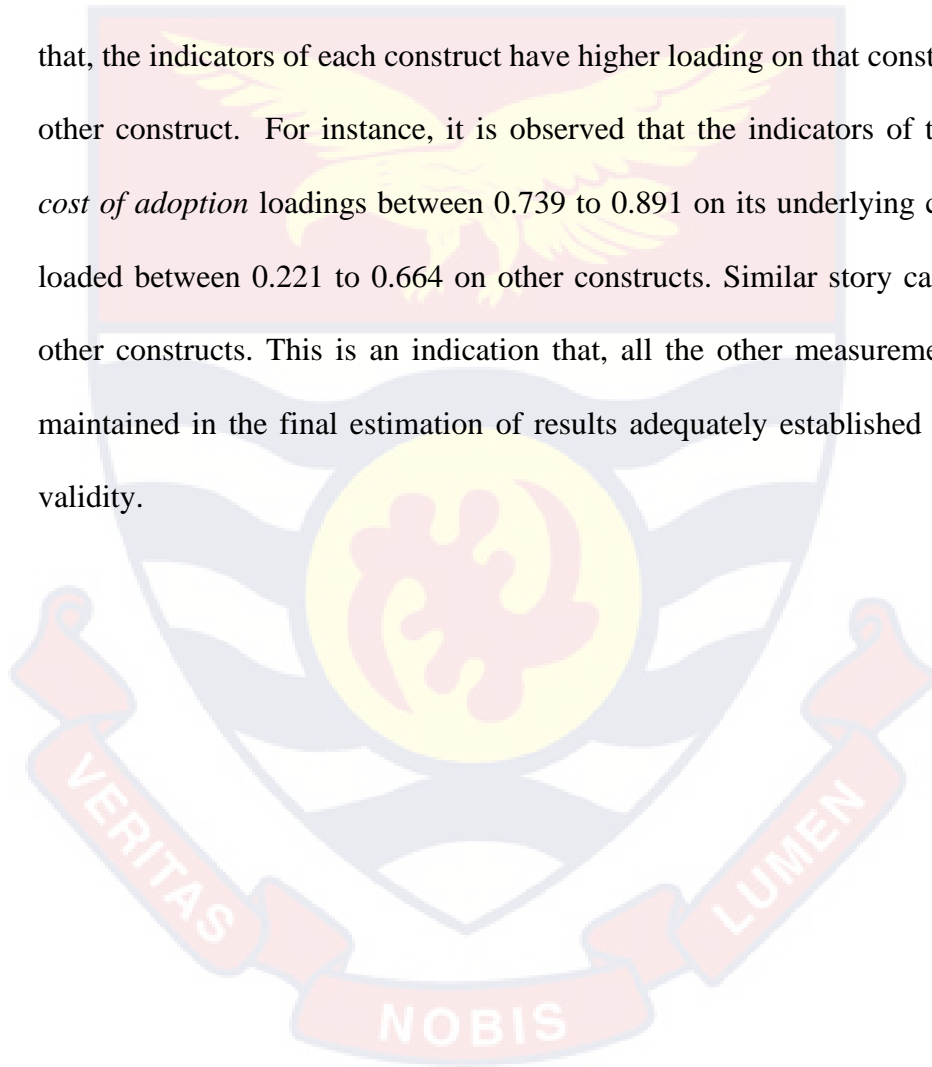
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Table 13: Cross loading on construct indicators

Constructs	Indicators	Cost of adoption	Complexity of AIS	Data security threat and cost	Organisational readiness	Internal Control System	Financial Performance
Cost of adoption	COS1_	**0.832**	0.621	0.363	0.539	0.493	-0.596
	COS2	**0.859**	0.619	0.513	0.543	0.608	-0.696
	COS3	**0.826**	0.551	0.492	0.498	0.538	-0.602
Complexity of AIS	COM1	0.368	**0.926**	0.484	0.576	0.571	0.659
	COM3	0.221	**0.955**	0.345	0.432	0.414	0.539
Data security threat and cost	SEC1	0.552	0.509	**0.868**	0.487	0.518	0.587
	SEC2	0.426	0.361	**0.927**	0.429	0.429	-0.454
Organisational readiness	RED1	0.520	0.525	0.341	**0.912**	0.43	0.506
	RED3	0.586	0.566	0.477	**0.910**	0.554	0.596
Internal Control System	ICS1_	0.441	0.599	0.487	0.58	**0.892**	0.537
	ICS2	0.571	0.497	0.477	0.517	**0.895**	0.636
	ICS3	0.564	0.511	0.471	0.492	**0.849**	0.63
Financial Performance	FIN1	0.351	0.36	0.242	0.321	0.461	**0.785**
	FIN2	0.519	0.468	0.386	0.413	0.458	**0.750**
	FIN3	0.664	0.591	0.435	0.51	0.557	**0.787**
	FIN4	0.587	0.588	0.358	0.509	0.498	**0.794**
	FIN5	0.361	0.317	0.522	0.34	0.394	**0.795**

Source: Field data (2020)   **Note:** Deleted indicators are not presented

Construct reliability

Reliability of the indicators in measuring the construct was assess using the standard loading of the indicators for each construct which should be at least 0.708 to be considered reliable. Initial iteration shows a lower loading on some indicators which were deleted in a step-wise manner. After six iterations, the reliability threshold was achieved as shown in Table 10.

In conclusion, the results obtained reveal that the measurement model used in this study has good internal consistency, reliability, convergent validity and discriminant validity. In other words, these results on validity and reliability provide evidence for the instruments used in this study.

Inter-correlations and Descriptive Statistics

The object of this section is to describe the responses in relation to the study constructs using basic descriptive statistics. It also seeks to assess the appropriateness of the study hypothesis as well as examining whether or not there is the presence of multi-collinearity, absence of which is a necessary condition for structural modelling. Table 14 presents descriptive statistics of the study variables and the correlation between them. The variance inflation factor of the study construct is presented as well.

From Table 14, judging from their skewness coefficient and their kurtosis, all the constructs considered in the study appears to be approximately normally distributed. The responses to the questionnaire items seem to be fairly answered with most of the responses agreeing to the statement posed to them as the average score for each contract tend to exceed the average score for each question item.

On their relationship, it can be observed that, *cost of adoption*, security *cost and threat* and *complexities of the CAIS* relate negatively with the dependent variable, financial performance, whereas other variables relate positively with financial performance.

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Table 14: Descriptive statistics and Inter-correlation coefficients

	Descriptive				Inter-correlation coefficients					
	Mean	SD	Skew.	Excess Kurt.	COS	COM	SEC	RED	ICS	FIN
COS	3.151	1.322	0.013	-1.162	(1.411)					
COM	2.865	1.281	0.076	-1.017	0.414	(1.623)				
SEC	3.095	1.359	-0.115	-0.901	0.324	0.316	(2.341)			
RED	2.929	1.137	0.053	-1.265	0.333	0.315	0.161	(2.413)		
ICS	3.135	1.316	-0.185	-1.044	0.256	0.386*	0.368	0.231	(1.614)	
FIN	3.056	1.209	0.095	-1.057	-0.774**	-0.876	0.696	0.376**	0.336**	

Note: $n = 216$. COS, Cost of adoption; COM, CAIS complexities; SEC, Security cost and threat; RED, Readiness to adopt; ICS, Internal control system; FIN, Financial performance. Figures on the leading diagonal of the correlation matrix put in parenthesis are the variance inflated factors (VIF). ** $p < 0.05$
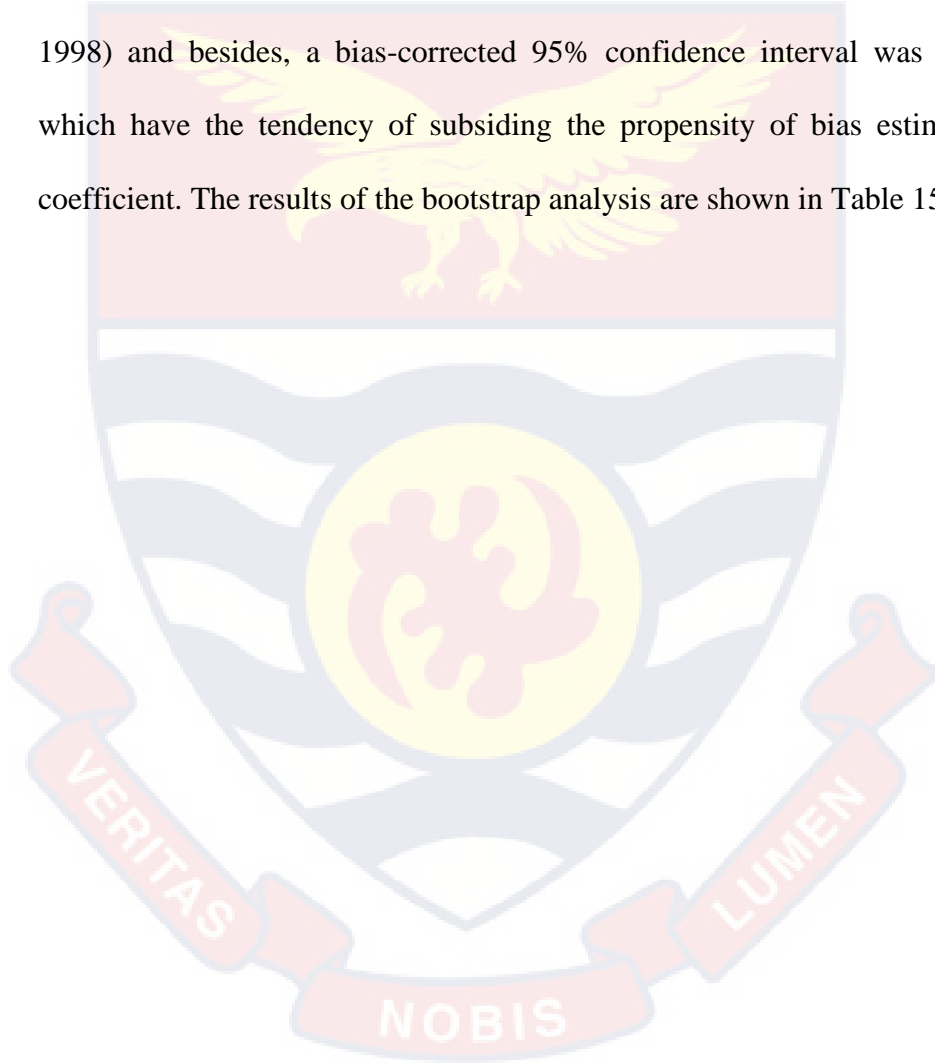
Source: Field data (2020)

This is an indication that, improvement in adoption cost, security threat and cost, CAIS complexities and readiness as well as internal control system of MMDAs is likely to improve their financial performance.

Assessing the inner model for multi-collinearity which occurs when there is a strong and significant correlation between two or more predictor variables in a regression model (Field, 2009), Hair *et al*. (2014) recommended two approaches; First, it involves examination of the correlation matrix among the predictor variables. A correlations coefficient greater than or equal 0.90 is an indication of substantial collinearity. From Table 14, the reported highest correlation coefficient among the predictor variables to be 0.386 indicating absence of collinearity. Secondary, to avoid a collinearity due to the combined effect of two or more predictors, as recommended by Hair *et al*. (2014) again recommended the use of the variance inflation factor (VIF) of the predictor variables. Applying the threshold of VIF values of 10 as recommended by Gaur and Gaur (2009) and Hair *et al*. (2014), the VIF values (ranging from 1.411 to 2.413), as shown in parentheses on the leading diagonal in Table 14 indicates that, there is no problem of multi-collinearity among the predictor variables. Consequently, the hypothesis of the study can now be tested.

Structural Modelling

The hypothesized model (see Figure 2) was empirically tested using the structural equation modelling (SEM) as it allows all paths to be evaluated concurrently. The result of the path analysis is presented in a path diagram as shown in Figure 4. The two set of hypotheses were tested by conducting a

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bootstrap analysis with bias-corrected 95% confidence interval using the Smart PLS, where 5000 sub-samples were created with observations randomly drawn (with replacement) from the original set of data. As the number of respondents (216 MMDAs) is ten times more than the exogenous constructs, the problem of bias estimates of path coefficients and indicator loading is not expected (Chin, 1998) and besides, a bias-corrected 95% confidence interval was constructed, which have the tendency of subsiding the propensity of bias estimate of path coefficient. The results of the bootstrap analysis are shown in Table 15.
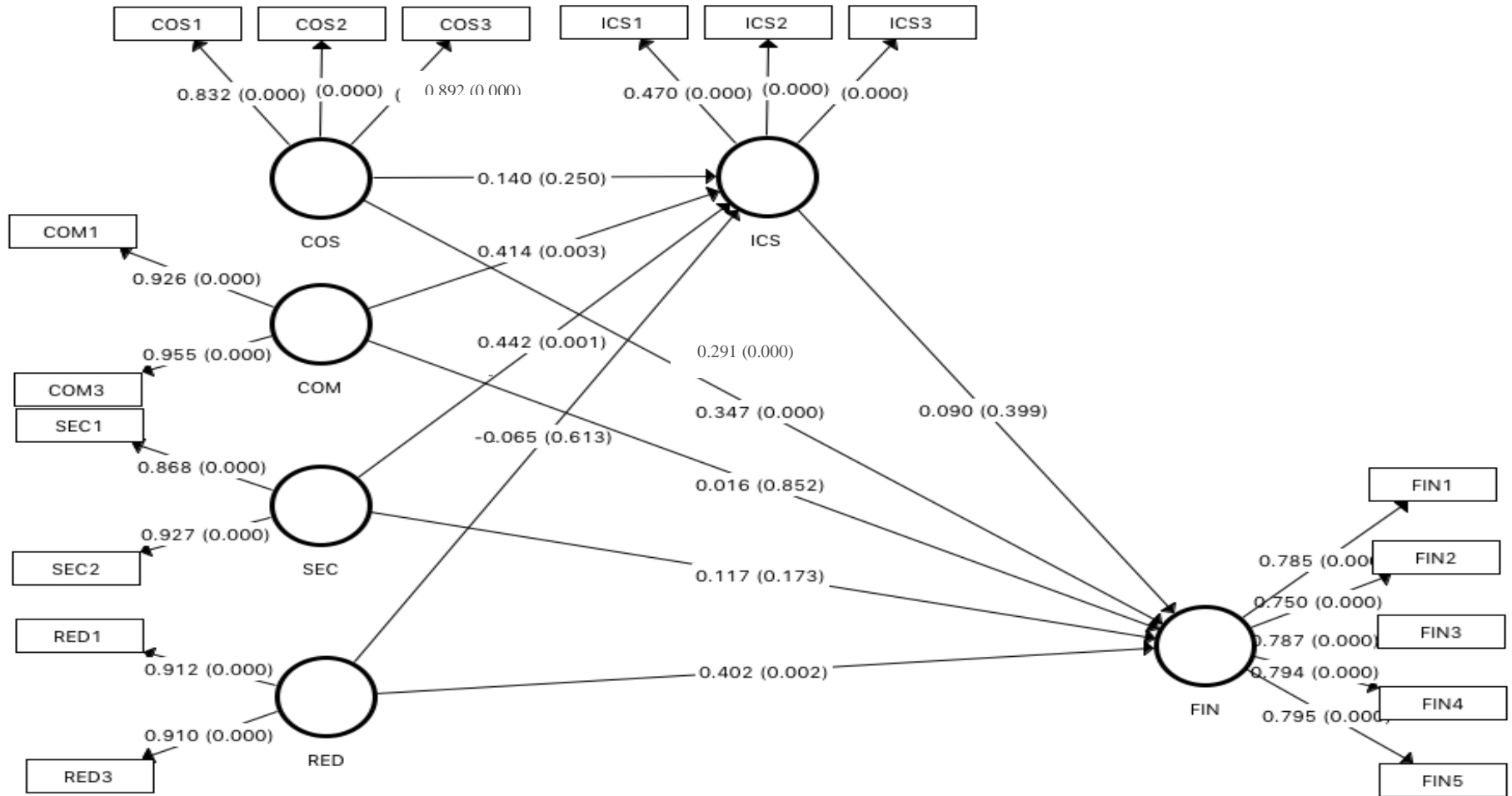
Figure 4: Path diagram for the hypothesized Model. The R-values for ICS and PERF is 53.7% and 69.9% respectively

Source: Field data (2020)

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Hypothesis Testing

In order to achieve the second and third objectives of the study, two set of hypotheses were set to be tested. The first set of hypotheses seek to test the relationship between the drivers of CAIS adoption and financial performance, as such, four hypotheses were set (H1a to H1d), each testing the relationship between a determinant of CAIS adoption and financial performance. The second set of hypotheses seek to assess the mediating role of internal control system on the relationship between the drivers of CAIS adoption and financial performance. Consequently, four hypotheses were set (H2a to H2d), each testing the role of internal control system in the relationship between a driver of CAIS adoption and financial performance. The result of the hypotheses testing is shown in Figure 4 and Table 15 and then discussed in the following sections.

Effect of drivers of CAIS adoption on financial performance of MMDAs

H1a – H1d. The first group of hypotheses, H1a – H1d predicts the direct relationship between drivers of CAIS adoption and financial performance of MMDAs in Ghana. **H1a** hypothesized a no relationship between cost of adopting CAIS (COS) and financial performance. From Table 12, COS is negatively related to MMDAs' financial performance *(r = -0.774, p < 0.05).* From the path diagram in Figure 4 and Table 15 the result of the direct effect of COS on MMDAs' financial performance is negative and is significant at 1% (β = -0.347, |t| = 5.507, p < 0.01). Hence, the null hypothesis is rejected at 1% level of significance and concluded that, increase in cost of adoption of CAIS have a deteriorated effect on financial performance.

H1b hypothesized a no relationship between CAIS complexities (COM) and financial performance. There is a strong negative correlation between the complexities CAIS and financial performance of MMDAs (*r = -0.876, p > 0.1*) even though the relationship was not significant as shown in Table 14. The path diagram in Figure 4 and associated result in Table 15 shows a direct negative effect of CAIS complexities on MMDAs' financial performance (β = -0.016, |t| = 0.302, p > 0.1) but the effect is not significant. The result obtained provide a basis to fail to reject the null hypothesis. We therefore conclude that, the complexities of CAIS do not directly influence the financial performance of MMDAs even though, making the CAIS simplified enough will enhance efficiency of usage.
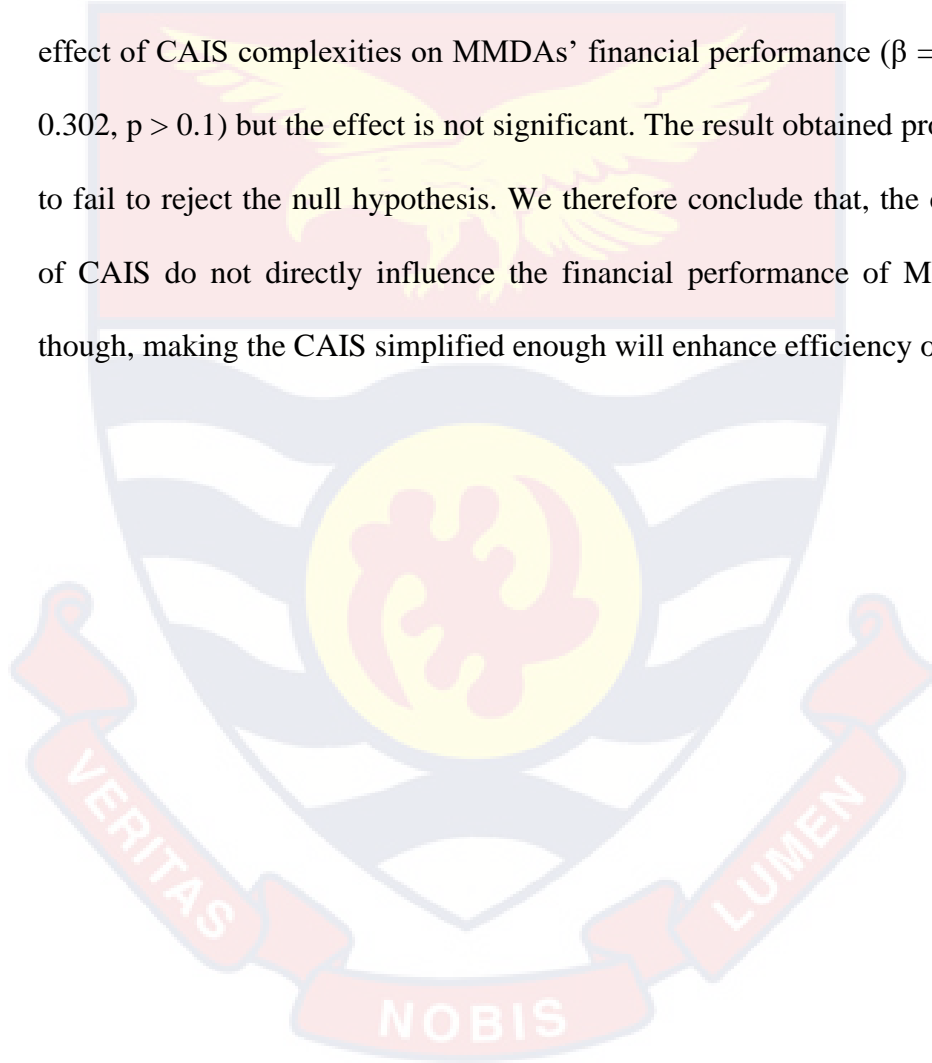
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Table 15: Direct, indirect and total effects of the hypothesized model

	Std Estimate	Std Error	t-value	Bias Corrected 95% CI		p value	Decision on null hypothesis
				LLCI	ULCI		
Standardised direct effects							
COM → FIN	-0.016	0.083	-0.188	-0.164	0.175	0.851	Accepted
COM → ICS	0.414	0.140	2.965	0.148	0.653	0.003	Rejected
COS → FIN	-0.347	0.090	-3.854	-0.177	0.515	0.000	Rejected
COS → ICS	0.140	0.127	1.106	-0.097	0.378	0.269	Accepted
ICS → FIN	0.291	0.104	2.798	0.091	0.317	0.002	Rejected
RED → FIN	0.402	0.135	2.981	0.154	0.651	0.003	Rejected
RED → ICS	-0.065	0.123	-0.529	-0.304	0.158	0.597	Rejected
SEC → FIN	0.117	0.092	1.277	-0.085	0.281	0.202	Accepted
SEC → ICS	0.442	0.127	3.486	0.159	0.66	0.001	Rejected
Standardised indirect effects							
COM → ICS → FIN	0.127	0.043	2.953	0.025	0.153	0.004	Rejected
COS → ICS → FIN	0.013	0.027	0.473	-0.009	0.114	0.637	Accepted
RED → ICS → FIN	-0.006	0.018	-0.326	-0.086	0.01	0.744	Accepted
SEC → ICS → FIN	0.143	0.052	2.758	0.042	0.159	0.005	Rejected

N=227, *COS, Cost of adoption; COM, CAIS complexities; SEC, Security cost and threat; RED, Readiness to adopt; ICS, Internal control system; FIN, Financial performance. Standardised estimate was obtained from 5,000 sub-samples generated from the sample size. **p<0.05; ***p<0.01;*

Source: Field data (2020)

H1c states that data security cost and threat (SEC) have no effect on financial performance of MMDAs. From Table 14, Data security cost and threat have a positive but insignificant relationship with financial performance (*r = 0.696, p > 0.1).* nevertheless, the path diagram in Figure 4 and associated result in Table 15 shows a positive effect of data security cost and threat on MMDAs' financial performance, but the relationship observed is not significant (β = 0.117, |t| = 1.227, p > 0.1). The null hypothesis is accepted in this case and concluded that, though data security cost and threat influence the adoption of CAIS of MMDAs but do not have any impact on the financial performance of the MMDAs.

Finally, **H1d** hypothesized that MMDAs readiness to adopt CAIS (RED) have no effect on their financial performance. The correlation matrix in Table 14 depicts a positive and significant correlation between MMDA's readiness to adopt CAIS and financial performance (*r = 0.376, p < 0.05).* The path diagram in Figure 4 and associated result in Table 14 shows a positive direct significant effect of MMDA's readiness their financial performance. (β = 0.402, |t| = 2.981, p < 0.05). The null hypothesis is therefore rejected and concluded that, preparedness of MMDAs to adopt CAIS actually have a significant positive impact on their financial performance.

In summary, whiles cost of adopting CAIS and readiness to adopt CAIS significantly influence the financial performance of MMDAs, CAIS complexities and data security cost and threat have no significant influence on financial performance.

Mediating Role of Internal Control System

H2a – H2d. The second group of hypotheses, H2a – H2d predicts the indirect relationship between drivers of CAIS adoption and financial performance of MMDAs in Ghana with internal control system mediating the relationship. **H2a** hypothesized that, internal control system (ICS) does not mediate the relationship between cost of adopting CAIS (COS) and financial performance. From Table 14, COS is positively associated with effective internal control system *(r = 0.256, p > 0.1)* even though the association is not significant. Also, ICS is positively and significantly associated with financial performance *(r = 0.366, p < 0.05)*. From the path diagram in Figure 4 and Table 15 the result of the direct effect of COS on internal control effectiveness is positive but not significant (β = 0.016, |t| = 1.106, p > 0.1), even though the direct relationship ICS and financial performance is positive and significant at 1% (β = 0.291, |t| = 2.798, p < 0.01). Also, the indirect relationship between cost of adoption (COS) and internal control system (ICS) and then internal control system (ICS) and financial performance (FIN) is not significant (β = 0.013, |t| = 0.473, p > 0.1). Thus, we fail to reject the null hypothesis and concluded that, internal control system does not mediate the relationship between cost of adoption of CAIS and financial performance, rather, cost of adoption has a direct impact on the financial performance of the MMDAs as there is a significant relationship between cost of adoption and financial performance.

H2b posited that, internal control system (ICS) does not mediate the relationship between complexities of CAIS (COM) and financial performance

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(FIN). From Table 14, COM is positively and significantly associated with effective internal control system at 10% *(r = 0.386, p < 0.1)*. Also, ICS is positively and significantly associated with financial performance *(r = 0.366, p < 0.05)*. From the path diagram in Figure 3 and Table 15 the result of the direct effect of COM on internal control effectiveness is positive and significant at 1% (β = 0.414, |t| = 2.965, p < 0.01). Also, the direct relationship ICS and FIN is positive and significant at 1% (β = 0.291, |t| = 2.798, p < 0.01). This suggest that, ICS fully mediate the relationship between complexities of CAIS and financial performance as the complexities of CAIS do not directly influence the financial performance of MMDAs. This observation is confirmed as the indirect relationship between complexities of CAIS (COM) and internal control system (ICS) and then internal control system (ICS) and financial performance (FIN) is significant (β = 0.127, |t| = 2.953, p < 0.01). Thus, we reject the null hypothesis and concluded that, internal control system fully mediates the relationship between complexities of adopting CAIS and financial performance. Thus, CAIS can have a positive impact on financial performance only when there are effect and clearer internal control system.

H2c posited that, internal control system (ICS) does not mediate the relationship between data security cost and threat (SEC) and financial performance (FIN). From Table 14, SEC is positively associated with effective internal control system *(r = 0.368, p < 0.1)*. Also, ICS is positively and significantly associated with financial performance *(r = 0.366, p < 0.05)*. From the path diagram in Figure 4 and Table 15 the result of the direct effect of SEC on

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internal control effectiveness is positive and significant at 1% (β = 0.442, |t| = 3.486, p < 0.01). Also, the direct relationship ICS and FIN is positive and significant at 1% (β = 0.291, |t| = 2.798, p < 0.01). This suggest that, ICS fully mediate the relationship between data security and threat (SEC) and financial performance as SEC do not directly influence the financial performance of MMDAs. This observation is again, confirmed as the indirect relationship between data security and threat (SEC) and internal control system (ICS) and then internal control system (ICS) and financial performance (FIN) is significant (β = 0.143, |t| = 2.758, p < 0.01). Thus, we reject the null hypothesis and concluded that, internal control system fully mediates the relationship between data security and threat and financial performance. Thus, protecting data security and can have a positive impact on financial performance only when there are effect and clearer internal control system.

H2d postulated that, internal control system (ICS) does not mediate the relationship between readiness to adopt CAIS (RED) and financial performance (FIN).   From Table 14, RED is positively associated with effective internal control system *(r = 0.231, p > 0.1)* even though the association is not significant. Also, ICS is positively and significantly associated with financial performance *(r = 0.366, p < 0.05)*. From the path diagram in Figure 4 and Table 15 the result of the direct effect of RED on internal control effectiveness is negative but not significant (β = -0.065, |t| = 0.529, p > 0.1), even though the direct relationship RED and financial performance is significant at 1% (β = 0.402, |t| = 2.981, p < 0.01). Also, the indirect relationship between readiness to adopt (RED) and

internal control system (ICS) and then internal control system (ICS) and financial performance (FIN) is not significant (β = -0.006, $|t|$ = 0.362, p > 0.1). Thus, we fail to reject the null hypothesis and concluded that, internal control system does not mediate the relationship between readiness to adopt CAIS and financial performance, rather, readiness to adopt CAIS has a direct impact on the financial performance of the MMDAs as there is a significant relationship between readiness to adopt and financial performance.

In summary, whiles internal control system mediates the relationship between CAIS complexities and financial performance, and then data security threat and cost, internal control system does not mediate the relationship between cost of adopting CAIS and financial performance and then readiness to adopt CAIS and financial performance.

Discussion of Research Findings

The main research findings of the study are summarized in line with the three constructs of the Technology-Organization-Environment framework (TOE framework) and institutional theory. Thus, the research objectives are premised on the constructs of the TOE framework and the institutional theoretical framework. Research objective one relates to the technological and environmental dimension of the TOE framework whereas Research objective two and three, relates to the Organizational dimension of the TOE and the institutional theory. In essence, the findings of the study are summarized as follows:

Technological and environmental determinants of CAIS adoption

Findings on the determinants of CAIS adoption relates to study objective one and these are discussed as follows.

Cost and CAIS Adoption

The study found that MMDAs are more likely to adopt an affordable CAIS technology for managing their accounting information systems compared to a relatively expensive one. Notably, cost of initial acquisition, operating and maintenance costs were found to be the major indicators of adoption cost of CAIS among MMDAs. This finding corroborates with findings by Senyo, e*t al.* (2016), and Thong (1999) who found that usually, public sector entities, especially those in developing tend to be financially dependent on the central government who also have varying policies to pursue, hence, they are not to be financially sound and as a result tend to adopt a relatively less expensive technology. The finding is also consistent with the technological dimension of the TOE framework which posited that, the decision to adopt a new technology is influenced by affordability of the system.

Complexity of CAIS Adoption

Complexity of CAIS measures ease with which MMDAs can apply CAIS technology in managing their accounting information system. Complexity of CAIS was found to have to be the second driver of CAIS adoption. This was expected as most MMDAs included in the study had adopted simple office packages such as Word and Excel in performing accounting function. These

MMDAs are not in the position to deal with the complexities that is associated with adopting a full scale CAIS.

Data Security threat and cost

Data security risk which measured the extent to which potential negative consequences of CAIS technology also influence adoption of CAIS. Even though, some MMDAs acknowledge the benefits they can derived from adoption of such system, they are not in the position to deal with the associated risk in terms of the threat it poses and cost. Among MMDAs who have already adopted CAIS technology such as Accra Metropolitan Assembly, Kumasi Metropolitan Assembly and Tamale Metropolitan Assembly, it was found that, they adopted CAIS because it improves accounts receivables and payables tracking, inventory management, timeliness of reporting accounts, among others and was have put strategies to deal with the associated. Accordingly, among the MMDAs who plan to adopt CAIS in the near future, the study found that the decision to adopt CAIS was greatly influenced by the security risk instead of the associated benefits. This finding is supported by the earlier finding of Thong (1999), Rahayu and Day (2015) and Appiah et al. (2014) who also corroborate with the finding of this study as far as data security threat and cost is concerned.

Readiness to adopt CAIS

The study found that MMDAs are more likely to adopt CAIS technology if the all the institutional structures supports the adoption. Specifically, they asserted that, they would require the support of the government in one way or the other to enable a successful adoption. Notably, such support could either be

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financial (where the government bear the cost of acquisition and maintenance or subsidizes the cost of technology adoption) or regulatory (where the government ensures a favourable regulatory environment exist to support technology adoption) etc. This finding is in line with earlier findings by Awiagah *et al.* (2016) who noted that, in Ghana, government support is the most significant driver of technology adoption among MMDAs.

Influence of Drivers of Adoption of CAIS on Financial Performance

The second and third objective of the study is posited within the Organizational dimension of the TOE and the institutional theory. The second objective of the study assess the influence of the drivers of CAIS adoption on financial performance whereas the third objective examine the mediation role of internal control on the relationship between the CAIS adoption drivers and financial performance. the summary of the findings for objective two and three are summarized below.

Secondly, the findings of the study showed that whiles cost of adopting CAIS and readiness to adopt CAIS significantly influence the financial performance of MMDAs, CAIS complexities and data security cost and threat have no significant direct influence on financial performance. Most of the MMDAs who have adopted a CAIS stated that, very little or no funding is received from the central government in for acquiring, managing and maintaining the CAIS. As such, the CAIS is usually maintained out of their internally generated funds which puts extra burden on their budget and eventually affect their financial performance. thus, even though it improves revenue collection and

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other income due to the automation nature of the system, the cost of maintaining can be expensive. This finding is in line with findings by Thong (1999), and Rahayu and Day (2015) who found that cost of adopting CAIS has a **direct** influence on financial performance. To add to this, due to the absence of structures to support the adoption of CAIS, those that have adopted the CAIS have done it out of their own budget which keeps their budget in a strict position to consider other projects.

Finally, whiles internal control system mediates the relationship between CAIS complexities and financial performance, and then data security threat and cost, internal control system does not mediate the relationship between cost of adopting CAIS and financial performance and then readiness to adopt CAIS and financial performance. The study found that CAIS complexities and data security threat and cost has an indirect influence on financial performance through internal control systems. By implication, this means that when an internal control system is well improved and applied effectively, the CAIS will be simplified enough and data will be well protected, thereby translating into improve performance of the MMDAs.

Predictive Assessment of the Structural Model

In evaluating the structural model, the coefficient of determination (R^2 value) as it measures of the model's in-sample predictive power and represents the exogenous latent variables' combined effects on the endogenous latent variable (Rigdon, 2012; Sarstedt *et al.,* 2014). From Table 16, the R^2 value of financial performance is 74.3% indicating that, 74.3% of the variation in financial

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performance of MMDAs is substantially explained by the exogenous variables in the research model. Also, 66.3% of the variations in the mediator variable is explained by the variations in the exogenous variables. Nonetheless, as indicated by Hair *et al.* (2014), selecting a model solely based on the R^2 value is not a good approach since adding additional (nonsignificant) constructs to explain an endogenous latent variable in the structural model always increases its R^2 value. The more paths pointing toward a target construct, the higher its R^2 value. This is known as *curse of dimensionality*. To overcome this weakness, we again presented the adjusted R^2 which overcomes this weakness by penalizing the research model in order to eliminate the effects of the *curse of dimensionality*. In the study, an adjusted R^2 value of 72.9% was attained for financial performance which although lesser than the raw R^2 value, it still confirms that variation in financial performance of MMDAs is substantially explained by the exogenous variables in the research model.
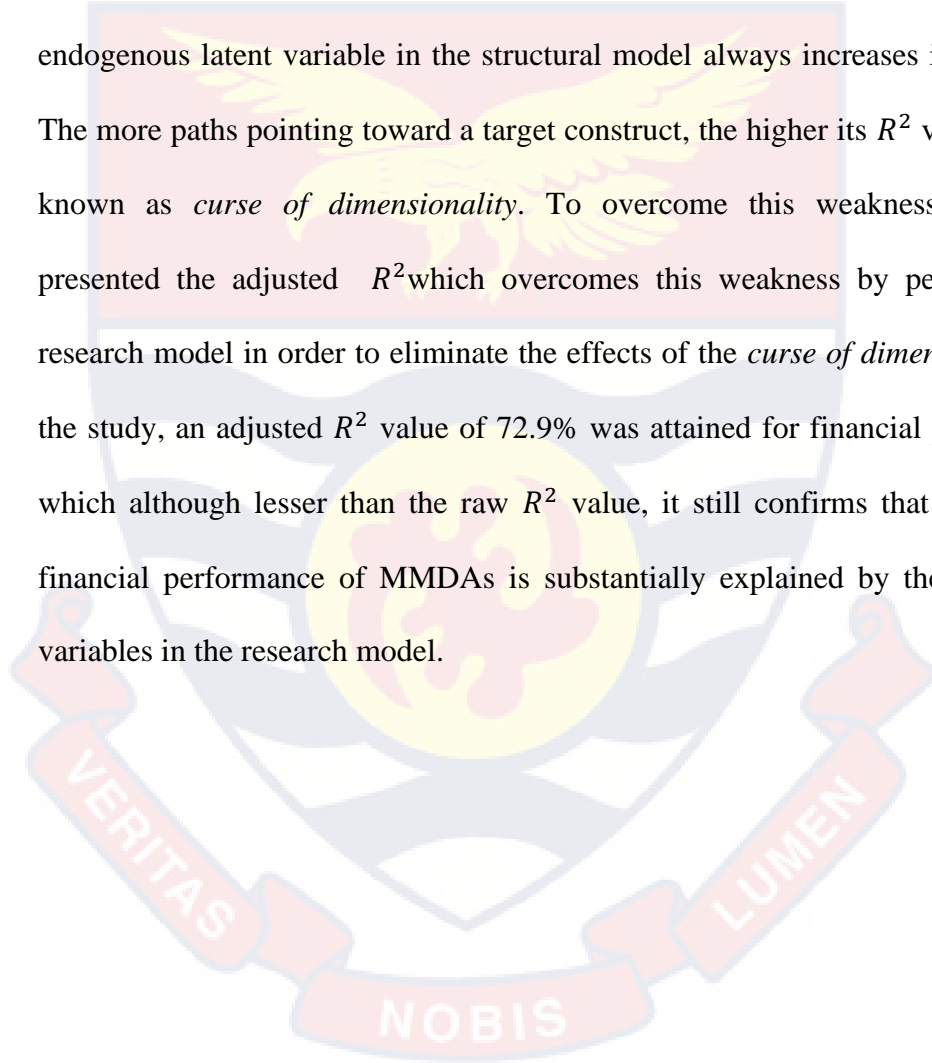
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Table 16: Predictive evaluation indices

	Coefficient of determination		Effect size (f^2)		Predictive relevance
	R^2	Adj R^2	FIN	ICS	Q^2
COS	n/a	n/a	0.211	0.003	n/a
COM	n/a	n/a	0.021	0.141	n/a
SEC	n/a	n/a	0.118	0.151	n/a
RED	n/a	n/a	0.241	0.030	n/a
ICS	66.3	64.8	0.216	n/a	0.365
FIN	74.3	72.9	n/a	n/a	0.425

Source: Field data (2020)

Apart from using the R^2 to assess the predictive power of the hypothesized model, it is necessary to measures the relative importance of the exogenous constructs (COS, COM, SEC and RED) in explaining endogenous constructs (ICS and FIN) by observing the change in the R^2 value when a specified exogenous construct is omitted from the model. This is done by estimating the effect size (f^2) through a re-computation of the R^2 through the blindfolding procedure. Evaluating the impact of COM and SEC on FIN following the guidelines of Cohen (1988), effect size of 0.021 and 0.151 was attained indicating that, these variables contributed less in explaining the variations in the FIN with COM showing virtually no effect. However, COS, RED and ICS showed a higher effect in explaining the variations in FIN. Similar story can be told in explaining the variations in ICS.

In addition to evaluating the is-sample predictive accuracy of the model, the Stone-Geisser's Q^2 value (Geisser, 1974; Stone, 1974) was also applied to measure the model's out-of-sample predictive power or predictive relevance. The model exhibiting predictive relevance is an indication that, the model is accurately predicting data not used in the model estimation. Predictive relevance values larger than zero for a construct proves that the construct has predictive relevance (Hair *et al.*, 2014). As can be seen, the Q^2 values of both endogenous constructs are considerably above zero. More precisely, FIN have the highest Q^2 values (0.425), followed by RED (0.365). These results provide clear support for the model's predictive relevance regarding the endogenous latent variables.

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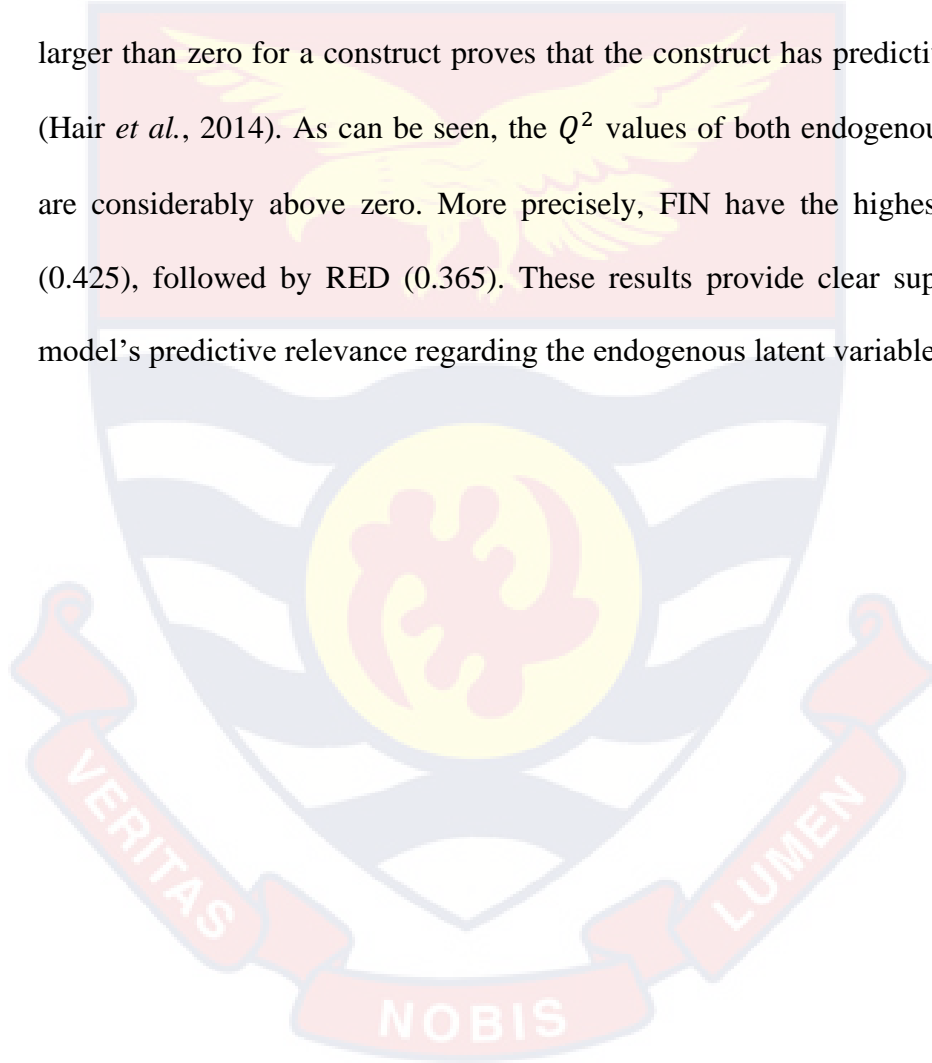
CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Introduction

This chapter summarizes the findings of the study, draws conclusions and makes policy recommendations based on the findings of the study. It also outlines some contribution and suggests areas for further research.

This study aimed at exploring the factors that influence the adoption of computerized accounting information system (CAIS) among MMDAs in Ghana. It also sought examine the how the identified factors influence the financial performance of the MMDAs and also explore the mediating role of internal control system in the linkage between the drivers of CAIS adoption and financial performance of MMDAs. Data was collected from the operators and controllers of CAIS of 227 MMDAs across the sixteen regions of Ghana using questionnaire as the main instrument of data collection. Using the quantitative research design, factor analysis and the structural equation modelling was employed to identify the drivers of CAIS adoption and to analyse the hypothesized relationships between the drivers and financial performance as well as the mediating role of internal control. The initial model specification considered 16 measurement variables, but through the data reduction technique, factor analysis, four factors were identified as being the main determinants of CAIS adoption. Using these factors as exogenous constructs, the study assessed how the identified factors influence financial performance of the MMDAS using the structural equation modelling and the mediating role in the said relationship. The constructs were assessed in terms

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of their validity (convergent and discriminant) and internal consistency reliability. The structural model was assessed by means of the adjusted *coefficient of determination (Adj* R^2), effect sizes (f^2) and predictive relevance (Q^2) using the blindfolding procedure in structural equation modelling. The study observed that, the exogenous variables explained about 73% of the variation in financial performance of the MMDAs whiles they explained 64% of the variations in internal control system. Moreover, since all the constructs recorded VIFs (variance inflation factors) lesser than five (5), it was assumed that the result of the study is valid and not biased by issues pertaining to multicollinearity (Hair *et al.*, 2014).

Summary of Key Findings

First, the study concludes that lack of knowledge and insufficient awareness of the potential benefits of CAIS adoption and its resultant effect on financial performance has limit MMDAs from adopting the technology-based accounting information system. Secondly, Cost (i.e. acquisition, implementation, and maintenance cost) is a deterrent to adoption of CAIS technology among MMDAs. Following the assertion of Awiagah *et al., (*2016), MMDAs face challenges with respect to investing funds towards acquisition and implementation of these system and this often sets back their effort to adopt needed innovations in their accounting systems. The study also concludes that government support aimed at enhancing technology adoption among MMDAs would have a positive influence on CAIS adoption as this will improve the

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readiness of MMDAs to adopt CAIS. Such support as identified in the study encompasses subsidization of the cost of CAIS adoption and regulatory support.

Recommendations

The study makes the following recommendations to inform policy, managers of MMDAs and Academia as follows:

Government interventions should aim at improving technology adoption among MMDAs and should place more emphasis on ICT education, training, and awareness creation programs among key controllers of the MMDAs such as the District Chief Executives, Presiding members, finances officers, budget officer and internal auditors. ICT education will increase knowledge about the potential benefits of CAIS adoption, hence leading to subsequent welcoming of the idea of adoption.

The adoption of the Ghana Integrated management Information System (GIFMIS) is in a right direction as this system seeks to automate all form of accounting functions. Nevertheless, the study recommends that, government should speed up the adoption and implementation processes to cover all MMDAs since currently only some few MMDAs have been hooked to the system.

One main finding of the study was that, cost influence adoption decision and that, cost of adoption is inversely and significantly related to financial performance. it is therefore recommended that, subject to the approval of the approving authority, MMDAs should consider CAIS technology on the basis of Software-as-a-service (SaaS), also known as *cloud accounting*. There has been an ample empirical evidence that suggest that, cloud accounting systems are far

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cheaper than locally hosted CAIS systems, and besides, cloud accounting systems will reduce the burden of costs involved in employing specialised network administrators to manage Local servers hosting CAIS systems, hence reducing management of the CAIS. The intuition is that, in a SaaS arrangement, direct costs of managing CAIS systems are mainly borne by the SaaS provider and spread among subscribers, hence making the cost of adoption relatively cheaper than locally host CAIS.

Again, one of the major findings of the study was that, organizational readiness (in terms of technical know-how, regulatory and institutional structures) influences CAIS adoption and directly impact on the financial performance of MMDAs. The study recommends that MMDAs supplement their inadequate knowledge by engaging external CAIS experts such as consulting firms and IT vendors to help train and equip their staff with the technical know-how as far as CAIS application is concerned and put up the necessary institutional structure necessary for the adoption of CAIS as this in likely to positively impact the performance of the MMDAs in terms of revenue mobilisation and expenditure management.

This study is among the few studies to have investigate the mediating role of internal control in the effect of the drivers of CAIS adoption on financial performance in AIS research. The current study therefore, represents a new theoretical direction for further studies in AIS research. It is therefore recommended that future studies build on the conceptual framework (adapted from the TOE Model) of this study.

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Contribution of the study

In 1997 during the International Conference on Accounting Information Systems (ICAIS), the panel discussed a fundamental question, "*why should Accounting Information System academicians and professionals devote attention to developing countries*?" The answer that came includes; "developing countries are a huge and yet untapped market" had the most explanatory power. In contrast, Walsham (2001) arguing from an ethical point of view, asserted that, information systems research is needed in developing countries so that the vast majority of people who are born in non-affluent regions of the "*contemporary world*" can also experience improvement in their living conditions as a result of Information Technology application. The value of this research can be judged by its contribution to literature, practice, and policy in this direction.

To literature, this study appears to be among the very few studies that seeks to test the mediating role of internal control systems between AIS adoption drivers and financial performance among MMDAs in developing countries' context. The study, thus provides a new conceptual ground in AIS research and it sets the pace for future studies to follow.

To practice, the study highlights the role of computerized accounting information systems in the present economic era of information technology. By highlighting the need to adopt CAIS technology, MMDAs stand to gain knowledge of the role of CAIS adoption plays in their financial performance and their subsequent decision to adopt. Those who have already adopted would also gain knowledge that will enhance the benefits they derive from such systems.

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Besides, CAIS vendors can use the information in this study to develop information systems with desirable features that will entice governments and other stakeholders to procure CAIS from their end.

To policy, mediating internal control effectives in the CAIS adoption and financial performance relationship will, at the end of the study, highlight the role of internal control system in MMDAs adoption of technology in accounting and financial reporting. With this, policymakers will be better informed as to how internal control system should be enhanced among MMDA in order to realize the effect of CAIS adoption on financial performance.

Suggestions for Future Research

The study recommends the following areas for future studies; First the current study employed a quantitative design, and as such, in-depth knowledge as to why respondents provided certain responses pertaining to CAIS adoption and it resultant relationship with financial performance was not ascertained. As such, it is recommended that, future studies consider a qualitative design to explore the depth of why responses behave the way the behaved.

Secondly, the current study applied a cross-sectional design and as such data was collected at a specific point in time. A longitudinal study could be considered where the study would establish the drivers of CAIS adoption over several periods and a long-term relationship with profitability.

Finally, the current study fused on CAIS in general. Future studies could consider specific areas in AIS such as automated revenue management system,

automated expenditure management systems or computerized assisted aided techniques.

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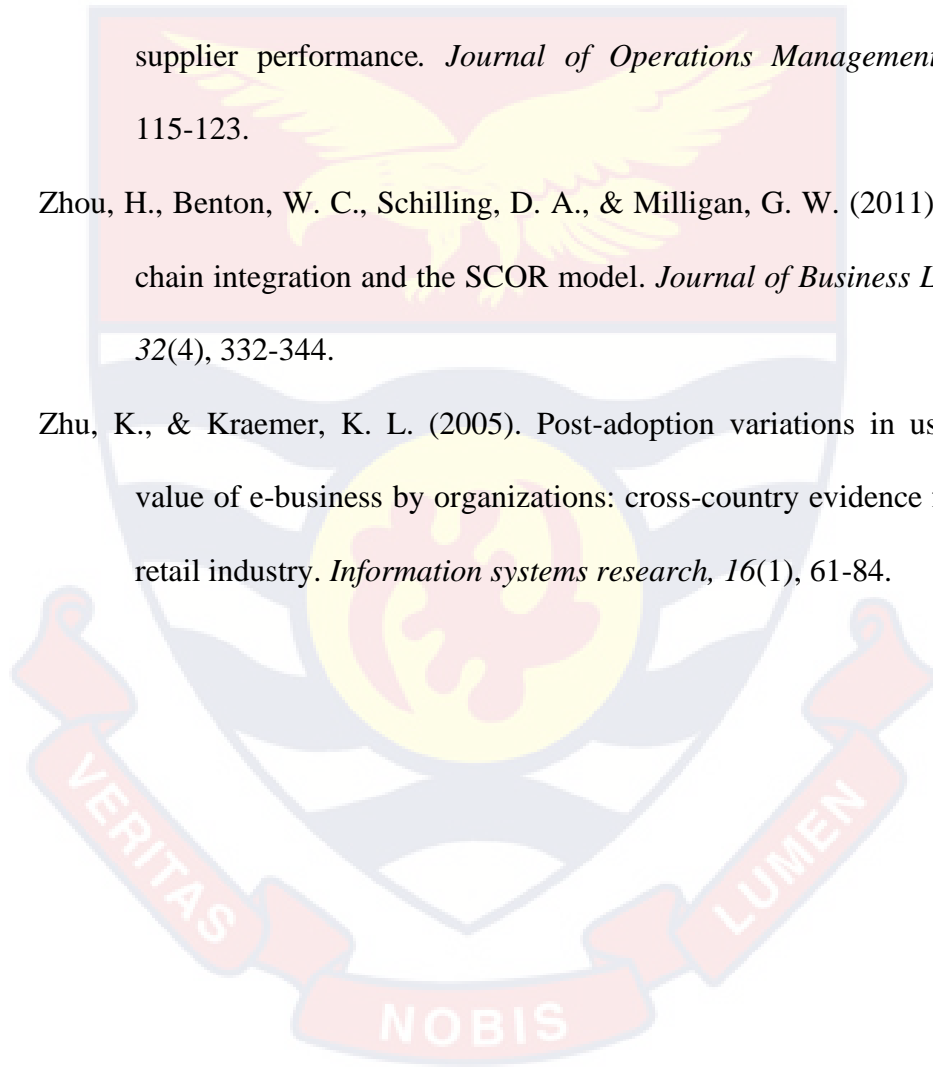
APPENDIX A: QUESTIONAIRE

UNIVERSITY OF CAPE COAST

COLLAGE OF HUMANITIES AND LEGAL STUDIES

SCHOOL OF BUSINESS

DEPARTMENT OF ACCOUNTING

<u>**RESEARCH TITLE:**</u>

ADOPTION OF COMPUTERIZED ACCOUNTING INFORMATION SYSTEM

AND FINANCIAL PERFORMANCE OF METROPOLITAN, MUNICIPAL

AND DISTRICT ASSEMBLIES IN GHANA: THE ROLE OF INTERNAL

CONTROL SYSTEMS

Date: ………………

Dear Madam/Sir,

I am Zuwera Tahiru, undertaking a study leading to the award of Master of Commence (MCom) in Accounting at University of Cape Coast. This survey seeks your response on issues relating to the adoption of computerized accounting information system and financial performance of of your Assembly and role of internal control systems plays in this relationship. Responding to the questions will take about 10 to 15 minutes to complete. If you do not wish to answer a question, or if a question does not apply to you, you may leave your answer blank. Confidentiality of this conversation is assured. But before I start, I need to seek your permission and time to go ahead. Do you agree to be part of the study?

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Yes, I agree   **[   ]**   No, I disagree   [   ]

Note that, there is no right or wrong answer, both answers (negative or positive) are equally important.

SECTION A

ADOPTION OF COMPUTERISED ACCOUNTING INFORMATION SYSTEMS

Instruction: The following questions ask you about the extent to which you agree to the following factors as being a driver for the adoption of computerised accounting information system (CAIS) in this Assembly	1= Strongly disagree	2= Disagree	3= Neutral	4= Agree	5= Strongly agree
We are obliged to adopt once is government policy to adopt	1	2	3	4	5
We adopt CAIS when there is a change in trend in technology	1	2	3	4	5
Complexities of the CAIS discourage us from adopting CAIS	1	2	3	4	5
Innovativeness is key in our adoption of CAIS	1	2	3	4	5
Data security cost deter us in the adoption of CAIS	1	2	3	4	5

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Set-up cost is higher and thus discourage our adoption of CAIS	1	2	3	4	5
Political influence determines whether or not we have to adopt CAIS	1	2	3	4	5
We have no option to adopt if it is legal requirement to adopt	1	2	3	4	5
CAIS comprehensibility makes adoption easier	1	2	3	4	5
Training cost deter us from adoption of CAIS	1	2	3	4	5
Data security threat make us vulnerable when we adopt	1	2	3	4	5
When we adopt CAIS, we would have to lay some staffs off	1	2	3	4	5
Maintenance cost deter us from adoption of CAIS	1	2	3	4	5
We are not psychologically just not ready to adopt	1	2	3	4	5
We also do not have clear policy to apply CAIS	1	2	3	4	5
There is no legal backing to adopt CAIS	1	2	3	4	5

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SECTION B

INTERNAL CONTROL EFFECTIVENESS

Instruction: The following questions ask you about the extent to which you agree to the following statement on the effectiveness of your internal control system	1= Strongly disagree	2= Disagree	3= Neutral	4= Agree	5= Strongly agree
Employee have a high level of control consciousness in all aspect of operations	1	2	3	4	5
There is control procedure in receiving revenue and other income	1	2	3	4	5
There is a control procedure in requesting for commitments and payments	1	2	3	4	5
There are processes to identify and analysed relevant risks of achieving organisational objectives	1	2	3	4	5
There are systems and processes to support the identification, capture, and exchange of information.	1	2	3	4	5
There are policies and procedures	1	2	3	4	5

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available to help ensure management directives are carried out.					
There are processes available to assess the quality of internal control performance over time	1	2	3	4	5

SECTION C: FINANCIAL PERFORMANCE MEASUREMENT

Can we have access to the following documents

i.   Revenue budget for 2019

ii.   Expenditure budget for 2019

iii.   2019 Revenue and expenditure statement

iv.   DDF receipts for 2018 and 2019

v.   Analysis of operational cost for 2019

End of Questions.

Thanks Very much for your Participation.