COMPUTERISED ACCOUNTING INFORMATION SYSTEMS
ADOPTION AMONG SMEs IN GHANA

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MPHIL ACCOUNTING DEGREE.

JUNE, 2018.
DECLARATION

I hereby declare that this Thesis is the result of my original research and that no part of it has been presented for another Degree in any University. However, all sources of borrowed material have been duly acknowledged.

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ENUSAH ABDULAI  DATE
CERTIFICATION

I hereby certify that this long essay was supervised and coordinated in conformity with the duly laid down procedures of the University of Ghana.

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DR. F. K. ABOAGYE-OTCHERE DATE

.................................................. ................................

MR. J. K. OTIEKU DATE
DEDICATION

I dedicate this work to my mother; Salamatu Enusah, for the relentless support and sacrifices she made in order for me to successfully complete the two-year MPhil program. I am very grateful.
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A man can have nothing unless it is given from above. The Sovereign Lord above, unto Him, is the success of this work attributed to.

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ABSTRACT

Although SMEs are touted as the engines of economic growth, recent empirical findings suggest that non-application of appropriate Information Technology (I.T), and Improper Accounting Practices often lead to their non-performance. Yet to be successful in the Information Era requires businesses to apply I.T in managing key business functions like accounting. This therefore necessitates research at the intersection of I.T and accounting. The study sought to investigate constructs within the Technology-Organization-Environment Framework (TOE) and the Diffusion of Innovation Theory (DOI) that influence SMEs adoption of Computerised Accounting Information Systems (CAIS). Cross-Sectional Survey using Questionnaires was employed in gathering data from 194 SME owners in the Greater-Accra, Ashanti and Western Regions of Ghana. SMEs were drawn from databases of the National Board for Small Scale Industries, and the Association of Ghana Industries. Using the PLS-SEM technique of analysis, findings of the study suggest that SME owner innovativeness has significant direct, and indirect influence on CAIS adoption. Other factors which were found to have a significant influence on CAIS adoption include Government support, Relative advantage, and Cost of technology adoption. Neither competitive pressure, technology Complexity nor Security Concern were significant. It is recommended that policy directives aimed at increasing technology adoption be focused on ICT education and training programmes. Also, SMEs should consider adopting CAIS on the basis of Software-as-a-Service (SaaS) since it is relatively cheaper than locally hosted CAIS systems. The originality of the study lies both in the context of the study and in the fact that existing studies did not consider the mediating role of organizational readiness in technology adoption.
CHAPTER ONE
INTRODUCTION

1.1 BACKGROUND OF THE STUDY
The present economic era is described as the information technology era and as such, businesses (regardless of size) who fail to adopt modern technologies such as Accounting Information Systems risk being competitively disadvantaged (Alsaaty, 2012; Marston, 2014; Rogers, 2016). The case of small and medium enterprises (SMEs) is a special one that requires attention, since empirical evidence suggests that SMEs make a significant contribution to most developing economies as far as poverty alleviation, employment, and economic growth are concerned (Abor & Quartey, 2010; Ayyagari, Demirguc-Kunt & Maksimovic, 2011; Amidu, Effah & Abor, 2011). For instance, according to the SME Competitiveness Report (2016) produced by the International Trade Centre (ITC), about 80% of registered firms in Ghana are Small and Medium Scale Enterprises (SMEs) who contribute more than 70% to GDP growth, and up to 75% of employment in the country. With such massive contributions, one would expect a vibrant SME sector in a developing country like Ghana; but contrary to that expectation is the fact that empirical evidence indicates that most SMEs in developing countries are underperforming or at worst, are unable to survive in the long run (Abor & Quartey, 2010; Ayyagari et al., 2011). Inappropriate accounting practices (Alsaaty, 2012; Rogers, 2016) and non-adoption of appropriate information technology (Abor & Quartey, 2010) have been cited among the major causes of such a predicament. Going forward, solving the challenges of “Inappropriate accounting practices” and “Non-adoption of appropriate technology” calls for research at the intersection of Accounting and Information Technology (Moffitt et al., 2016; Murthy, 2016); precisely, to investigate the factors that influence SMEs adoption of
Computerised Accounting Information Systems (hereinafter referred to as CAIS or E-Accounting Systems or AIS) in performing accounting functions.

Moreover, beyond the practical background of low-level technology adoption among SMEs, the theoretical background of accounting information systems 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 accounting information systems (AIS) research since 1985 of AIS research publications in the top 20 accounting journals. They all concluded that AIS related research faces an “identity crisis”; that is to say that research related to AIS 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 documents published by the top 5 accounting journals from 1992-2000, only five articles related to accounting information systems. Murthy (2016) also followed up on his earlier work in 1999 to verify if there has been an improvement in the number of AIS-related publications. He concluded that there is still relative paucity in AIS research. This worrying trend in AIS research was what led the Association to Advance Collegiate Schools of Business (AACSB, 2013) to enact a new Standard, called “Standard A78”. This standard required that all accredited universities redesign their accounting syllabus to include modules in accounting information systems 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 Paucity in AIS research” and “Identity Crisis”, there is the need for more research at the intersection of Information Technology and accounting (Moffitt et al., 2016; Murthy, 2016); and this study aims at fulfilling that purpose in the context of Ghanaian SMEs.
1.2 RESEARCH PROBLEM

Some previous attempts have been made at investigating the drivers of computerised accounting information systems adoption among SMEs. However, the limitations of such previous studies provide justification for the conduct of further research.

Firstly, the few previous studies that sought to investigate Accounting Information Systems adoption emphasized on large firms in developed countries (Rahayu & Day, 2015; Rogers, 2016) to the neglect of Small and Medium Enterprises in developing countries. Meanwhile, studies show that Small and Medium Enterprises structurally differ from Large firms. For instance, empirical evidence (e.g. Thong, 1999; Rahayu & Day, 2015; Rogers, 2016) suggests that in SMEs, owners usually have a direct influence on the decision-making process (as far as technology adoption is concerned), a situation which is seldom the case in large businesses. Moreover, in terms of technology infrastructure, the World Bank’s ICT Development Index has consistently ranked developing countries at the bottom, compared to developed countries. This is an indication of the fact that factors that influence technology adoption 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 drivers of technology adoption among SMEs in developing countries differ from those in developed countries, hence it might be wrong for one to assume that research findings (in relation to technology adoption) from developed countries are necessarily applicable to developing countries. This therefore justifies the need to study accounting information systems adoption from a developing country’s (Ghana) perspective, and in the context of Small and Medium Enterprises (SMEs).

Secondly, from a theoretical perspective, existing studies on information systems adoption face the challenge of theoretical status quo bias (Wu, 2016). That is, most of the existing studies on information technology adoption (as far as SMEs are concerned) have resorted to the use of
standalone firm-level theories (Ferguson & Seow, 2011; Poston et al., 2000) like the TOE framework, to the neglect of individual-level theories and mixed theories. Meanwhile, Dincer and Dincer (2016) join Oliveira and Martins (2011) in arguing that technology adoption research is a complex area that is difficult to explain from a single theoretical lens, hence the need to integrate theories at different levels in order to adequately explore technology adoption. This study integrates different but consistent constructs of the DOI and TOE theoretical frameworks in order to adequately examine the influence of both individual and firm-level factors on technology adoption.

Furthermore, the concept of investigating “Owner Innovativeness” as a determinant of SMEs’ adoption of information technology can be traced to the earlier work of Thong (1999), in “An Integrated Model of Information Systems Adoption in Small Businesses”. However, in that study, Thong (1999) only showed that owner innovativeness directly influences CAIS adoption. He however failed to investigate the likelihood of an indirect relationship between owner innovativeness and technology adoption. Recent studies by Sam, Fazli, Hoshino, and Tahir (2012), and Quaddus and Woodside (2015) also failed to address this situation as they all focused only on the direct relationship between owner innovativeness and technology adoption. Going forward, there is the need to investigate whether owner innovativeness has any indirect influence on technology adoption. This is particularly important, considering the fact that previous studies which focused solely on the direct relationship yielded mixed results. For example, whereas the study by Sam et al. (2012) concluded that owner innovativeness significantly influences technology adoption among SMEs, findings by Quaddus and Woodside (2015) was rather contrary. In this study, the indirect effect of owner innovativeness on CAIS adoption will be examined through the mediating role of organizational readiness.
Lastly, the globally recognised “Identity Crisis” and “Relative paucity Problem” in accounting information systems research has led to calls for more studies focusing on accounting information systems. Notable among the global bodies calling for more AIS-related studies includes; the American Accounting Association (AAA), The Association to Advance Collegiate Schools of Business (AACSB), and the Editorial Board of the Journal of Accounting Information Systems (JIS) (Rogers, 2016; Murthy, 2016). This study contributes to bridging the “Relative Paucity” gap, which represents an issue gap occasioned by a less discussed disciplinary area (Boateng, 2016).

1.3 RESEARCH OBJECTIVES

The broad objective of the study is to investigate factors within the Technology-Organization-Environment framework that influences the adoption of Computerised Accounting Information Systems among SMEs’ in developing countries. Specifically, the study seeks to achieve the following objectives:

1. To investigate the technological factors that influence CAIS adoption among SMEs
2. To investigate the organizational factors that have direct influence on CAIS adoption among SMEs.
3. To investigate the influence of SME owner innovativeness on CAIS adoption through Organizational Readiness.
4. To investigate the environmental factors that influence CAIS adoption among SMEs

1.4 SCOPE OF THE STUDY

In terms of delimitation, the study only targets SMEs in Ghana. Ghana is chosen for the study as it has consistently been ranked among the most dynamic I.C.T markets in the developing world (The World Bank’s Measuring the Information Society Report, 2016). Again, focusing
exclusively on SMEs will ensure that the study gains focus, be precise and well controlled. It will also ensure that the research population is identified faster, more easily and accurately. However, limitations of the study stem from the fact that the research will employ the 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 (Ghana) might mean that the study results may not necessarily be applicable to SMEs in other jurisdictions.

1.5 SIGNIFICANCE OF THE STUDY

At the 1997 International Conference on Information Systems (ICIS), the panel discussed the question “why should Information System academics and professionals devote attention to developing countries?” The answer that “developing countries are a huge and yet untapped market” had the most explanatory power. In contrast, Walsham (2001) argued from an ethical perspective 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.

To literature, this study appears to be the first (if not among the very few) to show the mediating role of organizational readiness between Owner Innovativeness and Accounting Information Systems’ adoption among SMEs in developing countries’ context. This is a new theoretical opening in information systems research and it sets the pace for future studies to follow.

To policy, the measurement of government support as part of the environmental drivers of Computerised Accounting Information Systems (CAIS) adoption will at the end of the study
highlight the role of government in SMEs adoption of technology. With this, policymakers will be better informed as to how government intervention programs aimed at enhancing technology usage among SMEs should be channelled in order to yield the desired result.

To practice, the study highlights the role of accounting information systems in the present economic era of information technology. By highlighting the need to adopt AIS technology, SMEs stand to gain knowledge of the associated benefits of CAIS adoption 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. Besides, AIS vendors can use the information in this study to develop information systems with desirable features that will entice SME owners to procure CAIS systems from their end.

1.6 ORGANIZATION OF THE STUDY

This study is organized into five chapters. The first chapter introduces the study by emphasizing on the background leading to the study, the problem that the study seeks to solve, the objectives it aims at achieving and the relevance of the study. The study then proceeds with a review of relevant literature as far as technology adoption is concerned in general, and in the context of SMEs and developing countries in particular. The third chapter concerns the methodology of the study. In regard to this, the philosophical underpinning of the study is discussed after which the research design, population, sample, data gathering, the technique of analysis, ethical considerations among others are discussed. The fourth chapter of the study undertakes an analysis of data gathered by interpreting the data and setting the foundations for inference drawing and conclusion making. The fifth chapter, which also happens to be the last chapter of the study, summarises the study and concludes the study by making recommendations to inform theory, practice and policy.
1.7 DEFINITION OF KEY TERMS

**SMEs** refers to firms employing not more than ninety-nine (99) full-time employees (Amidu, Effah & Abor, 2011).

**Information System (IS)** refers to a group of components that interact to produce information (Monk, 2012).

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

**Information Technology (IT)** is the application of computers to reach a desired goal especially in business (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 or CAIS/AIS** in this study.
CHAPTER TWO
LITERATURE REVIEW

2.1 INTRODUCTION

This chapter synthesizes scholarly views as far as accounting information systems adoption is concerned. The chapter is thematised into seven main sections, they include: Section 2.2 (Information Technology Adoption in Africa); Section 2.3. (Accounting as an Information System); Section 2.4 (Acquisition and Implementation of AIS); Section 2.5 (Paucity in Accounting Information Systems research); Section 2.6 (Accounting Information Systems Adoption); Section 2.7 (Theoretical Frameworks of Technology Adoption); Section 2.7 (Theoretical Gap Analysis Chart); and Section 2.8 (Research Model and Hypotheses Formulation).

To ensure the quality of the review process, the search for literature followed the recommendations of Webster and Watson (2002), and Rowe (2014). First, peer-reviewed articles were downloaded using Keywords such as “accounting information systems”, “SME adoption of technology” among others. Databases encompassing American Accounting Association, Scopus, Taylor and Francis, Wiley, Springer among others were used in the search process. Also, a four-step triangulation of the review process was undertaken by first reviewing relevant journals downloaded, followed by reviewing of relevant conferences, then reviewing of relevant references identified in step 1 and 2 (Going backwards); and finally, reviewing of articles recommended by other key articles (Going forward or Snowballing) (Webster and Watson, 2002).

The Selection of articles was guided by editorial comments and definitional expositions of Poston (2000) and Murthy (2016). For example, according to Murthy (2016), an article is rated
either as “High AIS content” or “Low AIS content” depending on whether the primary objective of the article focused on accounting information systems on one hand, or accounting information systems was just a secondary matter to the study on the other hand. Saturation of publication search was reached when new publications did not seem to add new concepts and/or ideas and/or theories (Webster & Watson, 2002) to the topic under consideration.

2.2 INFORMATION TECHNOLOGY ADOPTION IN AFRICA

Using three main proxies, namely, Information Communication Technology readiness (infrastructure access); Information Communication Technology Use (Capability and requisite skills to use ICT); and Information Communication Technology Impact (the Outcome of ICT application), the World Bank’s Annual Global ICT Development Index has consistently ranked developing countries in general and Africa in particular at the bottom, as far as information technology application is concerned (World Bank-Measuring the Information Society Report, 2015-2016). As per the index, it would not be inappropriate to reason that low-level information technology application in developing countries will translate to relatively low-level Information Technology application among firms in such countries; Rahayu and Day (2017) join Abor and Quartey (2010) in agreeing to this assertion.

See Fig 2.2 below
As per Fig 2.3, IDI refers to information technology development index. It is observed that Africa, which is a developing continent, is ranked the least as far as technology application is concerned. Africa’s application of information technology is slightly above the world average (marked by the horizontal dotted lines) and is the least among all other regions. This index justifies Abor and Quateys’ assertion in 2010 that lack of the application of appropriate Technology is one of the major banes of SMEs in developing countries. From the Ghanaian perspective, the National Information and Communication Technology for Accelerated Development policy was introduced in 2003 with the primary aim of engineering an ICT-led socio-economic development process. Despite these institutional efforts, large connectivity gaps remain, as Ghana is ranked 109th on ITI’s ICT Development Index (as of 2017). Consistent with this, Beggiato et al. (2016) note that the most worrying situation in ICT application in developing countries is the huge gap that exists in connectivity between SMEs and large firms.
2.2.1 Implications of Low-Level Information Technology (I.T) Application

The trend of low-level I.T application among SMEs is a worrying situation considering that even larger firms with strong financial backgrounds have been challenged by the rapid changes in the technological environment of business. Rogers (2016) believes that firms who fail to respond appropriately to the technological environment will be forced out of competition as they become less efficient. The ICT development index (2016) by the World Bank depicts that although developing countries record the least score in terms of ICT application, they record more improvement year-on-year basis compared to the developed nations. **Fig. 2.2.1.**

below depicts such a relationship

**Fig. 2.2.1 Changes in ICT application**


As per Fig 2.2.1, it is observed that developed countries’ recorded a positive 2.1 percentage change in ICT adoption, whilst that of developing countries was even more, with a 5.6 percentage change. Without caution, one would quickly ask the following questions; *Does this
suggest that developing countries are closing the technology gap? Does it also mean that SMEs are rapidly closing the technology gap?. With regard to the first question, the answer is simply “Maybe” and nothing else. As for the second question, the answer is that the question is misplaced. It would be appropriate to ask about the implications of such rapid change to SMEs, since Beggiato et al. (2016) have shown that large firms in developing countries make more use of ICT than SMEs. The right question would have been “what are the implications of a rapid increment in ICT application to SMEs?”. According to Rogers (2016), the implications are that SMEs who fail to catch up with technological changes in their business environment risk being competitively disadvantaged, and hence may be forced out of business. In terms of the benefits of ICT application in business, several studies conducted in Nigeria, Ghana, Egypt, Kenya, Uganda among other developing countries concluded that information technology adoption in general and CAIS adoption, in particular, has been beneficial to firms that adopted them (e.g. Amidu, Effah & Abor, 2011; Molinillo & Japtura, 2017). In their opinion, AIS can help organizations achieve benefits encompassing administrative efficiency, accuracy and reporting timeliness, information sharing, business integration, effective internal controls among others. Notwithstanding, risks related to input, output, data, environment, cost, etc. can make CAIS adoption a bane than a boon (Eman, 2012).
2.3 ACCOUNTING AS AN INFORMATION SYSTEM

“... It has often been said that accounting is the language of business. If that is the case, then an accounting information system (AIS) is the intelligence—the information-providing vehicle—of that language” (Romney & Steinbart, 2017, p.10).

By definition, accounting is inherently regarded as an information system. This is because it involves a series of interrelated processes that collect, record, store, and process accounting data in order to produce information for decision making. In decades past, accounting information systems were mainly paper-based and manual processes, however, in the digital age, almost every organization apply computer systems in one way or the other in executing accounting tasks. This study to a greater extent, emphasizes the application of information technology (IT) to accounting systems in an organization.

Traditionally, accounting was regarded as an information system to the extent that it involved a three-stage-cycle of processing financial transactions to produce financial statements (Mancini, Dameri & Bonollo, 2016). See Fig 2.3.1 below.

Fig 2.3.1 The traditional view of accounting information systems

Source: Authors Own Construct, 2018
Nonetheless, the 21st century has seen information technology permeate almost all other aspects of accounting. Presently, businesses expect more from their accounting information systems than the simple double entry book-keeping. According to Inghirami (2013, P. 185), most firms in the 21 century run AIS systems that are integrated with organization-wide Enterprise Resource Planning Systems (ERP) and as such, “AIS systems not only support transaction-related activities, but also provide comprehensive tools that are useful to analyse data and make decisions” to support the development and execution of strategies at various management levels (Bodnar & Hopwood, 2012).

**Fig 2.3.2: The contemporary view of accounting information systems**

Contemporary accounting information systems incorporate a wide scope that captures both financial and non-financial businesses processes at the operational, tactical and strategic levels of business. Empirical evidence suggests that accounting information systems are basically composed of three subsystems with each system representing a certain managerial level (Hall,
The transaction processing system (TPS) of AIS support daily operational requirements of accounting data such as generation and recording of receipts, wage calculation, book-keeping, journalizing among others (Hall, 2015; Bagranoff, Simkin & Norman, 2014). The second sub-component of AIS comprises General Ledger/Financial Reporting System (GL/FRS), which is concerned with the generation of traditional financial statements, such as the statement of profit or loss, statement of financial position, statement of cash flows, tax returns among others. According to Hall (2015), the second sub-component of AIS is basically oriented towards supporting the tactical level of management. Within the second sub-component, AIS has the ability to re-organize elementary accounting data in a manner to respond to the requirements of financial accounting reporting standards (Hall, 2015). It is noteworthy that both the TPS and GL/FRS do not highlight the uniqueness of contemporary accounting systems since the traditional systems could play similar roles. The third subcomponent of AIS, which is the management reporting system (MRS), represents a tectonic change in the conventional view of AIS. At the top level of management, MRS technologies are able to produce relevant data to support managerial and strategic decisions (Rom & Rohde, 2007). Most data provided by AIS at this level tend to be special-purpose financial reports needed for strategic decision making in areas encompassing budgets, variance reports, responsibility reports, cost control, relevant costing, among others (Marshall & Steinbart, 2017).
2.3.1 Current Trends in Accounting Information Systems Practice

2.3.1.1 Accounting Information Systems and Data Management

The passage of time has witnessed technological innovations that have changed the manner in which companies manage and process accounting data. Initially, AIS mainly helped firms to gain efficiency in the management of accounting data such as timely information processing, and the generation of accurate and reliable information (Mancini, Lamboglia, Castellano, & Corsi, 2017). Recently, AIS technologies have however shifted emphasis towards business process integration, as highlighted in Mancini et al. (2017). Such integration, as Mancini et al. (2017) argue, does not merely represent the implications of information technology, but rather, represents a different philosophical lens by which one can observe organizational processes through I.T. Mancini et al. (2017) mention Ubiquity and data Sharing as the two most notable keywords that best describes the new philosophy in AIS practice. In terms of ubiquity, Mancini et al. (2016) argue that currently, there is an increasing demand that accounting data and information should flow freely (without restrictions) among firms, groups of people, and even across several functional areas of business. Mancini et al. (2016) argue that the demand for ubiquity is facelifted by the fact that recently, accounting data and information emanate from collaboration and co-creation through a wider stakeholder engagement process. Besides, Mancini et al. (2016) also note that the present generation of AIS requires accounting information to be organized and managed in a manner to facilitate data sharing and re-use.

2.3.1.2 Accounting Information Systems and Sustainability Reporting

New competitive and technological dynamism has triggered a growth in managements’ accounting informational needs. Currently, stakeholders with direct financial interests do not only consider financial information in making investment decisions but also, they consider socially responsible businesses practices (Mancini et al., 2017). As a consequence, the present
day accounting information systems are increasingly incorporating ways and means through which companies 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. According to Kerr et al. (2015), the integration of these new variables in accounting reporting generally produces, among others, benefits such as operationalization of objectives, accountability and transparency, intensified interactions with stakeholders, formalization of organizational beliefs among others.

2.3.1.3 Accounting Information Systems and Big Data

Recently, large volumes of data on the internet and social media have ushered in the concepts of “Big Data” and “Data Analytics”. Big data simply refers to extremely voluminous data sets that may be analysed by firms in order to reveal patterns, trends, and associations that are relevant for decision making (Lainey, 2001). Big data and business analytics are increasingly gaining mainstream attention among both academics and practitioners of accounting information systems (Mancini et al., 2017; Gokhale, 2011). Presently, Capgemini (2015) notes that businesses are increasing their investment in Big data in order to get valuable insights that can lead to Efficiency and cost focus, Growth of existing revenue streams among others. Mancini et al. (2017) note that AIS technologies that incorporate big data analytics can assist management accountants in undertaking cost reduction strategies, for example, by 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.
2.3.1.4 Accounting Information Systems and Financial Reporting (XBRL)

The accounting profession has witnessed a growing emphasis on corporate disclosure, which to a great extent, is due to attempts by regulatory and quasi-regulatory bodies to enhance accountability and transparency. In recent years, the eXtensible Business Reporting Language (XBRL) has been proposed and implemented as “a digital and open standardized language applied to financial reports of private companies” (Mancini et al., 2017, p. 14). Such accounting information systems provide a uniform and standardized platform through which firms can report accounting data. In about 10 years past (since 2008), the Securities and Exchange Commission (SEC) in the United States, the United Kingdom’s Revenue and Customs (HMRC), and Companies House of Singapore begun requiring companies to adopt XBRL as their financial reporting platform (Bhattacharya, Cho, & Kim, 2018). This is because it is believed that XBRL makes financial data readable and understandable by any software, and thus helping improve transparency, and efficiency through savings in time, costs, resources, and risks of error.

2.3.1.5 Accounting Information Systems and Social Media

Gokhale (2011), and Mancini et al. (2017) note that companies are currently moving from the traditional use of the internet as far as communication is concerned, to a new technology called web 2.0, popularly known as social media. Social network tools encompassing blogs, wikis, social messaging (e.g. Twitter, Facebook etc.) are currently opening up new avenues for disclosure of accounting information, as well as improving stakeholder dialogue and participation. For example, most modern firms 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., 2016). One notable feature of these web 2.0 platforms is that they enhance companies’ ability to create a
spontaneous and multi-directional communication whereby information exchange and corporate dialogue can occur simultaneously, unlike the traditional communication platforms.

2.3.1.6 Accounting Information Systems and Cloud Accounting

Accounting information system practitioners are gradually embracing the concept of cloud accounting on the basis of SaaS. SaaS, which is pronounced “software-as-a-service” is an alternative means to access a software via a centrally hosted server on the internet, as against the more traditional methods of purchasing AIS software and hosting it locally. Vendors who provide such services are called SaaS providers. In the developed world, most firms (especially, SMEs) who cannot afford to build their own AIS and Big data centres increasingly resort to the use of AIS on the basis of SaaS (KPMG, 2013; Brandasa, Megana, & Didragaa, 2015).

According to Brandasa et al. (2015), the use of AIS 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 Accounting Information Systems opens new opportunities for businesses to remain competitive, profitable and sustainable in the future, Mancini et al. (2017) note that most of these benefits are enjoyed by large firms, and not SMEs, since Most SMEs do not adopt these systems. This situation once again heightens the need to investigate factors that influence SMEs to adopt Accounting Information Systems.
2.4 MODE OF ADOPTION AND IMPLEMENTATION OF AIS

Firms that plan on adopting AIS have three main routes to acquire such systems, namely: Turnkey systems; Backbone systems; and Vendor-supported systems. A business might decide to purchase and use a completely designed and tested AIS technology that is ready for implementation (turnkey systems). Turnkey AIS technologies may not be suitable for SMEs considering that such systems are generally customized to a specific industry. According to Hall (2015), turnkey AIS technologies usually require end users to adopt standard business practices as the rest of the industry, a situation which is seldom the case of SMEs in a developing country like Ghana, where most SMEs operate in the informal sector. Backbone systems consist of a basic system structure based on which firms can build a customized AIS. These systems contain a preprogrammed primary processing logic that allows the end user to reprogram and/or redesign the system to suit its unique needs. Whereas these systems may be suitable for SMEs, Hall (2015) posits that they can be very costly. Lastly, Vendor-supported systems are custom (or customized) systems that client organizations purchase commercially, rather than develop in-house. These systems have an arrangement that requires the vendor to design, implement, and maintain the system for the client. According to Hall (2015), this approach to acquiring information systems is gaining dominance among firms, regardless of industry and size. Considering that SMEs usually lack the financial resources to employ highly skilled I.T personnel, a vendor–supported AIS systems may be ideal among other acquisition options. Also, the vendor supported systems may likely create a cordial relationship between SMEs and CAIS vendors, leading to flexible payment terms as far as CAIS acquisition costs are concerned.
2.5 PAUCITY IN ACCOUNTING INFORMATION SYSTEMS (AIS) RESEARCH

Poston et al. (2000) asked a question as to whether accounting information systems research can be likened to David’s (1985) description of the QWERTY keyboard as the most used keyboard arrangement in the world, but not the most effective and efficient keyboard on the market. Literally transliterated, this means that AIS is popular as a business term only, but not in terms of its presence in academic literature (see “Clio and the Economics of QWERTY” by David, 1985). This scenario is what has been described as the “Identity Crisis” and the “Relative Paucity” problem in AIS research.

Murthy and Wiggins (1999), Poston et al. (2000), and Stone (2002) all reviewed past trends of accounting information systems research since 1985 of AIS research publications in the top 20 accounting journals (by the American Accounting Association). In one accord, they all concluded that accounting information systems research is fast diminishing and losing its presence in literature, not even in graduate dissertations. For example, Stone (2002) found that out of the 1068 documents published by the top 5 accounting journals from 1992-2000, only five articles were related to accounting information systems. The top 5 journals reviewed as of then were “Accounting, Organizations and Society”; “The Accounting Review”; “Contemporary Accounting Research”; “Journal of Accounting & Economics”; and “Journal of Accounting Research”. Presently, in 2016, Murthy once again followed up on His earlier work in 1999 to check if there has been an improvement in the number of AIS-related publication. He concluded that there is still a relative paucity of AIS research among accounting journals, and also among graduate dissertations.

Aside from the general relative paucity and identity crisis, Ferguson and Seow (2011) find a continuing decline in analytical and model building research as far as AIS-related research is
concerned. This crisis in accounting information systems research may be explained by heeding to Webber’s comments about information systems research in 1987. Webber argued that Information Systems (IS) research is a *doomed* domain of research as it lacks clear paradigmatic guidance, and since accounting information systems sprout forth from the Information Systems domain, it may be suffering the same fate as its parent. Contrary to this perception, Murthy (2016) argued that AIS is not a failed domain of research, only that the need to adequately delineate what constitutes AIS research from what does not constitute AIS research has not been adequately addressed.

The Association to Advance Collegiate Schools of Business- AACSB (2013) also recognized such a worrying situation in accounting information systems research. The AACSB’s response to this situation was the enactment of Standard A7 (8) in 2013. The standard required that all universities having an affiliation with AACSB should redesign their accounting syllabus and include AIS contents bordering on “Data creation, Data sharing, Data Analytics, Data mining, Data reporting, and Data storage” (Murthy, 2016, p.166). It is only hoped that educational bodies in developing countries would follow a similar pursuit.

To summarize it, the relative paucity in AIS research and the continuing decline in analytical and model building research calls for more research on accounting information systems aimed at addressing these challenges. For the fact that this study investigates CAIS adoption, it contributes to solving the paucity problem. Moreover, as the study seeks to integrate different but consistent constructs from the Technology-Organization-Environment Framework, and the Diffusion of Innovation theory, the study also contributes to reducing the diminishing trend of model building in AIS research (Ferguson & Seow, 2011).
2.6 DETERMINANTS OF ACCOUNTING INFORMATION SYSTEMS ADOPTION

A careful examination of past literature on AIS adoption would show that basically, all factors predicted to influence CAIS adoption fall under two broad categories or levels; individual-level factors and firm-level factors (Ferguson & Seow, 2011; Molinillo & Japutra, 2017).

2.6.1 Individual level Determinants

At the individual level and as far as SMEs are concerned, factors such as owner ICT knowledge, and owner ICT skills have been identified as key drivers of information technology adoption (Thong, 1999; Premkumar, 2003; Ismail & King, 2007; Rahayu & Day, 2017). The distal roots of measuring SME technology adoption by owner innovativeness (judged by I.T knowledge, and I.T ability) can be traced to the earlier works of Thong et al. (1994), and Thong (1999). Thong (1999) argues that in SMEs, the CEO is usually the owner-manager and as such His level of innovativeness is crucial in determining technology adoption decisions. In other words, just as Al-Qirim (2007), and Sam et al. (2012) find CEOs with more I.T knowledge to be more likely to adopt information technology. Thong (1999) also argues that SME owners who are highly innovative are also more likely to adopt an innovative technology like CAIS. Indeed, in the 1999 study on information systems adoption by Thong, it was established that SMEs whose Owners/CEOs are more knowledgeable about a particular information technology are also more likely to adopt it. To justify this, Thong (1999) further claims that greater CEO knowledge reduces uncertainty concerning technology application and thus positively influences adoption decisions. Al-Qirim (2007) joins Premkumar (2003) in centering the point that owners, or key decision makers in SMEs who have strong technical abilities (in the use of computers) are more likely to adopt new technology (like CAIS). Accordingly, Rahayu and Day (2015) conducted a study on the determinant factors of E-commerce adoption by SMEs in developing countries using a survey of 292 Indonesian SMEs. The results of the multiple regression analysis applied
in that study established a statistically significant relationship between Owner Innovativeness and E-Commerce technology adoption, this once again supports the idea that owner innovativeness influences technology adoption at the SME level; Ismail and King (2007), and Ghobakhloo et al. (2011) could not agree less as far as accounting information systems adoption are concerned. Nonetheless, studies by Quaddus and Woodside (2015) failed to establish any significant relationship between owner innovativeness and information technology adoption. According to Quaddus and Woodside (2015), prior to the study results, they initially anticipated that owner innovativeness would have a statistically significant and direct effect on information technology adoption, but “surprisingly, the result was not consistent with the field study nor with past studies by Thong (1999) and Thong and Yap (1995)” (p. 200). Quaddus and Woodside (2015) explained that the contradictory finding of their study might be due to the fact that their research model included expectation or intention to adopt information technology as an antecedent of actual adoption.

The implication of such contradictory findings by Quaddus and Woodside (2015) suggest that owner innovativeness can have several paths through which it influences technology adoption among SMEs (not only the direct path), hence the need to adequately explore these paths if information technology adoption among SMEs would be properly understood. So far, findings from previous studies as presented above appear to be largely descriptive, thus failing to examine the interrelationships between owner innovativeness and other exogenous variables of information technology adoption. Therefore, given the importance of SMEs in the Ghanaian economy, this study aims at investigating the mediating role of organizational readiness between owner innovativeness and CAIS adoption among SMEs.
2.6.2 Firm Level Determinants

At the firm level, it is believed that technological characteristics, organizational characteristics, and environmental factors influence the adoption of CAIS (Wan et al., 2013). Porter and Millar (1985) analyzed the strategic rationale underlying competitive pressure as an innovation-diffusion driver. They found that by adopting a new innovation, businesses stand the chance of dictating the rules of competition. This analysis (by Porter & Miller, 1985) has been transferred to the field of information technology adoption literature, as empirical evidence suggests that competitive pressure has a significant influence on technology adoption among businesses. For example, Thong (1999) finds that competition in the market, and information intensity in the business sector in which SMEs operate can influence technology adoption. In line with Thong (1999), Zhu and Kraemer (2005) also investigated the determinants of information technology adoption at the firm level by surveying 624 firms across 10 countries (e.g. China, Germany, U.S, France, Brazil, Singapore, Mexico etc.); the study concluded that competitive pressure has a significant influence on firms’ decision to adopt an information technology like CAIS. Al-Qirim (2007) and Battisti et al. (2007) concluded in the same line as Zhu and Kraemer (2005). Notwithstanding, evidence from Indonesia presented in a study by Rahayu and Day (2015) suggest that competitive pressure in SME’s business environment has no influence on technology adoption. Thus, contradicting the previous finding by Thong (1999), Zhu and Kraemer (2005), Al-Qirim (2007) among others. Aside competition being a determinant factor of technology adoption, ample scholarly evidence suggests that SMEs usually depend on government support to be able to adopt information technology. For example, Awigah et al. (2016) argue that the reason why SMEs in Singapore make greater use of information communication technology can be largely attributed to the Singaporean government’s ratification of the Small Enterprise Computerization Program (SECP), which encourages and assist small businesses to become more competitive through the application of IT in their
operations. Bjorn et al. (2003) find that government support can occur both as influence and knowledge, and may vary across knowledge enhancement, subsidies among others. In Ghana, Awiagah et al. (2016) surveyed 200 SMEs as to what the determinant factors of information technology are, as far as SMEs are concerned. Results of the partial least square regression technique applied indicated that government support is the most influential factor that drives SMEs decision to adopt a particular information technology. This finding corroborates with that of Ramanathan et al. (2014), who also demonstrated that government support positively influences technology adoption. Other notable firm-level factors identified to have influenced technology adoption include the Cost of Technology (Awiagah, 2016), firm size (Thong, 1999), benefits to be derived from technology usage (Wan et al., 2013), the extent of organizational readiness (Rahayu & Day, 2015) among others. These are discussed further in subsequent sections.

The missing link in literature as far as government support and information technology adoption are concerned is the fact that almost all of the previous studies focused on management information systems in general, not accounting information systems in particular.
2.7 THEORETICAL FRAMEWORKS OF TECHNOLOGY ADOPTION

Table 2.7 Prominent Theoretical Models of Technology Adoption

<table>
<thead>
<tr>
<th>THEORY</th>
<th>LEVEL OF ANALYSIS</th>
<th>CONSTRUCTS</th>
<th>LITERATURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology Acceptance Model (TAM)</td>
<td>Individual</td>
<td>Perceived Usefulness, Perceived Ease of Use, Attitude, Intentions</td>
<td>Ngadiman (2014)</td>
</tr>
<tr>
<td>Technology-Organization-Environment (TOE)</td>
<td>Firm</td>
<td>Technology, Organization, Environment</td>
<td>Zhu et al. (2005), Wan et al. (2013)</td>
</tr>
<tr>
<td>Diffusion Of Innovation Theory (DOI)</td>
<td>Firm</td>
<td>Innovation Attributes, User innovation Attributes, Firm Attributes</td>
<td>Hsu et al. (2006)</td>
</tr>
<tr>
<td>Institutional Theory (IT)</td>
<td>Firm</td>
<td>Normative Pressures, Mimetic Pressures and Coercive Pressure</td>
<td>Chatterjee et al. (2002), Cater-Steel (2009)</td>
</tr>
</tbody>
</table>

Source: Author’s Own Construct, 2018.

Several theoretical perspectives offer guidance in predicting technology adoption at both firm and individual levels (Ferguson & Seow, 2011; Molinillo & Japutra, 2017). Poston et al. (2000) conducted a 17 year (1982-1998) extant literature review on theories used in accounting information systems research. The study concluded that model building and firm-level theories remain a prevalent method used in AIS-related studies. They also predicted a surge in the use of psychology based theories and firm-level theories than computer science theories in future AIS research. Building on the work of Poston et al. (2000), Ferguson and Seow (2011) conducted a 10-year (1999-2009) literature review on theories used in AIS research with the aim of either confirming or refuting earlier findings made by 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.
Presently, researchers employ a number of theoretical frameworks in a bid to understand technology adoption at the firm level. According to Molinillo and Japutra (2017), specific theories used in information systems adoption studies encompasses the “Theory of Planned Behavior (TPB)” by Ajzen (1985); “Technology Acceptance Model (TAM)” by Davis (1989); “Unified Theory of Acceptance and Use of Technology (UTAUT)” by Venkatesh et al. (2003); “Structuration Theory (ST)” by Giddens (1991); “Diffusion of Innovation Theory (DOI)” by Rogers (1995); “Technology-Organization-Environment (TOE) Framework” by Tornatzky and Fleischer (1990); and the “Institutional Theory (IT)”.

Not all of these theories are discussed. It is noteworthy that because the study seeks to review literature concerning CAIS adoption among Small and Medium Firms, albeit individual-level theories are relevant, much emphasis is placed on firm-level theories. In addition, although the TAM, TPB, and UTAUT theories operate at the individual level (Oliveira & Martins, 2011), only TAM will be discussed since it is one of the most used models in analyzing technology adoption at the individual level due to its predictive ability (Fergusson, 2011). At the firm-level, the TOE, DOI, and Institutional theory are the most used theories in information systems adoption research (Poston & Grabsky, 2000; Molinillo & Japtura, 2017), hence their subsequent discussion.

2.7.1 Individual Level Theories

2.7.1.1 The Technology Acceptance Model

The Technology Acceptance Model (TAM) describes how users come to accept and use a particular information technology (Molinillo & Japutra, 2017). TAM is premised on the “Theory of Reasoned Action (TRA)” and the “Theory of planned behavior (TPB)”. TAM operates on the basis that the decision to use information technology depends on two factors;
“Perceived usefulness (PU)”, which refers to "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320), and “Perceived ease-of-use (PEOU)”, which is defined as "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989, p. 320).

For example, Ngadiman (2014) studied accounting information systems adoption by means of the TAM framework. Constructs such as system quality, relevance, and system compatibility were used as proxies in measuring CAIS’ perceived usefulness, whereas screen design, exploring power and system terminology measured perceived ease of use. The study concluded that system quality and system relevance has a significant positive influence on perceived usefulness and ease of use, which in turn positively influences the intention to adopt CAIS and actual adoption.

Moreover, Ngadiman (2014) found that risk perception of individuals encompassing data security risk, and financial and performance risk hampers intention to adopt CAIS technology. Social and time risks were however insignificant.

2.7.2 Firm Level Theories

2.7.2.1 Technology-Organization-Environment (TOE) Framework

Prior to the TOE framework, existing theories used in Information Technology adoption studies were devoid of constructs that could measure environmental drivers of technology adoption at the firm level, not even the popularly acclaimed Diffusion of Innovation theory (Oliveira & Martins, 2011). The technology–Organization–Environment (TOE) framework was first presented in Tornatzky and Fleischer’s “The Processes of Technological Innovation”
The book meticulously described the entire process of innovation adoption and implementation, spanning right from the initial stages of technology development by engineers to their eventual adoption and implementation by users within the context of a firm. The framework posits that technology adoption is influenced by three major factors encompassing Technological factors, Organizational factors, and Environmental factors.

- **The Technological Dimension**

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 notes, plays a crucial role in technology adoption decision 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. However, Dincer and Dincer (2016), and Oliveira and Martins (2011) were able to prove through an extant literature review that, researchers seldom use the original constructs under the technological dimension of the TOE framework. They attribute this to the fact that constructs of the TOE framework are too generic, and lacks precision. For example, the framework posits that technology characteristics influence the adoption of a particular information technology, it however does not provide a detailed guideline as to what constitutes “technology characteristics”. To this extent, in an attempt to measure the technological dimension of the TOE framework, most previous studies resorted to borrowing constructs from different but consistent theoretical frameworks and integrating them into the technological dimension of the TOE framework. Notable among such lender theories is the Diffusion of Innovation theory (DOI). As Dincer and Dincer (2016), and Oliveira and Martins (2011) note, the “owner innovation characteristics” construct of the DOI
theory is highly consistent with the technological dimension of the TOE framework, hence it is not surprising to witness many scholars integrating the TOE and DOI frameworks as far as Technology adoption is concerned. For example, Thong (1999) joins “CEO characteristics” from the DOI theory to the TOE theory in measuring the influence of SME owner innovativeness on technology adoption. In line with Thong (1999), Chong et al. (2009) also borrowed “innovation attributes” (i.e. relative advantage, compatibility, and complexity) from the DOI theory to measure the technological dimension of the TOE framework. Again, Zhu et al. (2006) also integrated innovation attributes (relative advantage, compatibility, cost, and security concern) from the DOI theory into the technological dimension of the TOE framework in order to investigate E-business adoption at the firm level. In centering this trend in theory synthesis, Wang et al. (2010) also added “relative advantage, complexity, and compatibility” from the DOI theory to the technological dimension of the TOE theory in studying Radio-frequency identification (RFID) systems adoption.

For this study, constructs under the Technological dimension of the TOE framework were adapted from the DOI theory and they encompass the following:

A. Relative advantage
B. Cost
C. Complexity
D. Security Concerns.

These are discussed at the Hypotheses formulation stage.
• The Organizational Dimension (TÖE)

The Organizational context of the TOE framework captures attributes of a firm that may influence its decision on technology adoption. Under the organizational context, “formal and informal linking structures, communication processes, size, and slack resources” (Oliviera & Martins, 2011, p.112) have been proposed by Tornatzky as inherent organizational attributes that influence technology adoption. However, just as the technological context, 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 Information Technology Adoption. 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.

To this extent and for this study, the organizational dimension of the TOE framework was captioned as “Organizational Readiness” to adopt AIS technology, measured by the availability of financial resources and technical ability; thus following the approach of Rahayu and Day (2015).

• The Environmental Dimension (TOE)

Tornazky’s TOE framework posits that environmental context of business influences its decision to adopt information technology. 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, not even
the DOI, TAM, nor TPB theories. According to Rahayu and Day (2015), environmental
pressures that can influence technology adoption among SMEs may emanate from direct
competition, government regulation, and government support. For instance, Hsiu-FenLin
(2015) 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).

2.7.2.2 Diffusion of Innovation Theory (DOI)
Diffusion of Innovation (DOI) is a theory that explains the mechanism and the rate at which
“new ideas and technology spread through cultures, operating at the individual and firm levels”
(Oliviera & Martins, 2011, P. 111). The DOI theory sees innovation as being communicated
through certain channels over time and within a particular social system (Rogers, 1995). It
posits that there are differences in the rate at which individuals and firms adopt an innovation,
but generally, both become normally distributed over time (Rogers 1995). Rogers (1995)
enlisted five phases leading to the normal distribution of technology adoption, namely;
“innovators”, “early adopters”, “early majority”, “late majority”, “laggards” (Rogers 1995).
The DOI Model, propounded by Rogers (1995), holds that the adoption of an innovation
depends on technology characteristics encompassing relative advantage, compatibility,
complexity, trialability, and observability. Many studies that investigated technology adoption
used constructs of the DOI theory as a sub-component to measure the Technological dimension
of the TOE framework (e.g. 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 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. 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 among SMEs.

2.7.2.3 Institutional Theory

The institutional theory emphasizes that external institutional pressures can influence organizational structure and actions (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 (e.g. Teo et al., 2003, Cater-Steel, 2009; and Li et al., 2010). For example, Teo et al. (2003) conducted a study on information technology adoption 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
parent corporations; with normative pressures emanating from industry associations. Within the South African context, Cater-Steel (2009) in a study on accounting information systems adoption found that, Coercive Pressures to adopt CAIS 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.

2.7.3 Theoretical Framework Gap Analysis Chart

<table>
<thead>
<tr>
<th>Theory</th>
<th>Empirical Support</th>
<th>Precision Of Constructs</th>
<th>Level Of Operation</th>
<th>Technological Attributes</th>
<th>Organizational Attributes</th>
<th>Environmental Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOE</td>
<td>√</td>
<td>×</td>
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<td>DOI</td>
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<td>×</td>
</tr>
</tbody>
</table>

Source: Author’s Own Construct, 2018

Technology adoption is a complex phenomenon that is difficult to capture in one single theoretical framework, giving that each theory has its inherent weakness (Oliveira & Martins, 2011; Dincer & Dincer, 2016). Table 2.7.3 depicts the strength and weaknesses of the Diffusion of Innovation Theory, and the Technology-Organization-Environment (TOE) theory which underpins this study. It is observed from Table 2.7.3 that both theories have strong empirical support and they both can operate at the firm level (Oliveira & Martins, 2011). Again, it can also be observed that both theories offer constructs that measure technological and organizational dimensions of Information Technology Adoption. However, in terms of construct precision, it is observed that although the TOE framework has a strong presence in
literature, it lacks precise measurement constructs as its constructs are too generic (Oliveira & Martins, 2011); the DOI theory, on the other hand, has precise constructs (Oliveira & Martins, 2011). Again, it is observed that whereas the DOI theory cannot measure the environmental dimensions of technology adoption, the TOE framework incorporates an environmental dimension of technology adoption. Lastly, as Thong (1999) argued, it would be inadequate to investigate SMEs technology adoption decisions without measuring the influence of their owners or key decision makers. The TOE framework which mainly operates at the firm level does not have constructs that can measure individual factors of technology adoption (like owner innovativeness). However, the DOI theory has two main constructs that can measure personal innovativeness at the individual level; namely Key decision maker I.T characteristics and I.T ability. Going forward, Oliveira and Martins (2011), and Mollinilo and Japutra (2017) recommend integration of theories based on their strengths to be able to adequately capture the determinants of technology adoption. In this study, innovation attributes and decision maker attributes are adapted from the DOI framework and added to the technological and organizational dimensions of the TOE framework. This will ensure that both Firm-level and Individual-level determinants of technology adoption are adequately captured in the study.
2.8 RESEARCH MODEL AND HYPOTHESES FORMULATION

Fig 2.8 Research Model

Source: Adapted TOE Model, 2018

2.8.1 Hypotheses Formulation Based on Research Model

2.8.1.1 The Technology Context

The Technological context of the TOE framework as indicated earlier on refers to the influence of technology already in use, and those available on the marketplace on a firm’s technology adoption decision. Variables used by Zhu et al. (2006) is hailed as being overarching in measuring the technological context of the TOE framework, hence such variables are adopted
in this study. The variables (relative advantage, complexity, cost, and security) are discussed below;

- **Relative Advantage and CAIS Adoption**
  This refers to the benefits that a firm stand to gain by adopting a technology than otherwise. Rogers (1985) defines it as the degree to which a technological factor is perceived as providing greater benefit for firms. Taiwo and Taiwo (2016) and Dekeng (2014) found that AIS adoption improves both financial and non-financial performance of firms, whereas Ware (2015) concluded that adoption of CAIS enhances financial reporting quality. Such benefits are not limited to the private but also the public sector. Among state owned enterprises in developing economies, findings by Appiah, Agyemang, Agyei, Nketiah and Mensah (2014) suggest that the potential benefits of CAIS adoption include improved processing speed and accuracy, improved decision making and improved work-life of employees. In essence, these findings suggest that SMEs will be more likely to adopt CAIS technology if they perceive that it will bring new benefits on-board. Hence the study hypothesis that;

  **H1:** There is a significant positive relationship between Relative Advantage and CAIS adoption among SMEs.

- **Complexity and CAIS Adoption**
  Rogers (2003, p. 257) defines complexity as “the degree to which innovation is perceived as relatively difficult to understand and use”. According to Premkumar and Roberts (1999), complexity creates uncertainty regarding the successful implementation of innovation and thus may negatively impede technology adoption (Rogers, 1995). Researchers encompassing Thong (1999), Grandon and Pearson
(2004), Wang et al. (2010) and Gwangwava et al. (2012) document that high level of technical complexity negatively affects technology adoption. Hence the study hypothesis that;

**H2:** There is a significant positive relationship between ease of use and CAIS adoption among SMEs.

- **Cost and CAIS Adoption**

Cost, as used in this context, refers to the initial cost of acquiring and adopting information technology, as well as implementation and maintenance cost. Generally, SMEs in developing countries are characterized by inadequate financial resources and hence tend to adopt relatively cheaper information technology (Thong, 1999; Senyo, Effah & Addae, 2016). However, recent research findings regarding the influence of “cost” on technology adoption are mixed. For instance, in Nigeria, whereas Irefin et al. (2012) found that “cost” significantly influences technology adoption among SME, Adebayo et al. (2013) did not find any significant relationship, although both studies were conducted in Nigeria. In the United States, Bressler et al. (2006) were shocked to learn that cost was not among the top major determinants of CAIS adoption, whereas in Kenya, Nyang’au (2015) found “cost” to be the single most significant factor that influences CAIS adoption. Following the general laws of demand, it is assumed that the higher the cost of technology, the lower the demand. Hence the study hypothesis that;

**H3:** Cost has a significant negative influence on CAIS adoption among SMEs.
Security Risk and CAIS Adoption

Contextually, risk is defined as uncertainty about potential negative consequences of adopting computerized accounting information systems (CAIS). In Jordan, Eman (2012) documents that users of computerized accounting systems face risks encompassing security compromise by viruses, unauthorized access to data, and risks regarding natural and unnatural disasters done by humans. In addition, Ngadiman et al. (2014) found that risks associated with performance, finance, and security negatively influence adoption of accounting information systems. The study therefore hypothesis that;

H₄: There is a significant negative relationship between Risk Concern and CAIS adoption among SMEs.

2.8.1.2 Organizational and Individual Contexts: A case for Mediation

Rungtusanatham et al. (2014) clarified the issue of how to formulate hypotheses for mediation effects, two main recommendations were made; whether to use the segmentation approach or the transmittal approach. When adopting the segmentation approach, three hypotheses are developed, that is: H₁) independent variable (X) affects mediator (M), H₂) mediator (M) effects outcome variable (Y) and H₃) mediation effect (e.g. M mediates the relationship between X and Y). The transmittal approach, in turn, requires a single hypothesis stating that mediator (M) mediates the relationship between X and Y without delving into hypotheses relating X to M and M to Y. In this study, the segmentation approach was adopted as it allows one to demonstrate all the paths involved in the mediation effect (Papers using the segmentation approach include Zhou et al., 2011; Wu, Choi, & Rungtusanatham, 2010). Hypotheses relating to the mediating role of organizational readiness are presented below
Organizational Readiness as a Mediator of CAIS Adoption

In SMEs, owners usually play a key role in decision making. Rahayu and Day (2015) assert that the level of SME owners’ innovativeness (e.g. creativity, I.T skills and experience) drives technology adoption. The concept of investigating owner innovativeness as a determinant of SMEs adoption of information technology can be traced to the earliest work of Thong (1999), however, in that study, Thong (1999) only showed that owner innovativeness directly influences technology adoption. In respect of accounting information systems adoption, Ismail and King (2007), and Ghobakhloo et al. (2011) draws similar conclusions to the effect that owner innovativeness directly influences Technology adoption among SMEs. However, studies by Quaddus and Woodside (2015) failed to establish any significant direct relationship between owner innovativeness and information technology adoption. The implication of this contradictory finding suggests that owner innovativeness, as a predictor of CAIS adoption, has not been adequately explored. This study, therefore, seeks to explore other channels through which owner innovativeness may influence CAIS adoption. Specifically, the study will examine the mediating role of organizational readiness between Owner innovativeness and CAIS adoption.

In this study, it is presumed that since owners in SMEs play a key role in technology adoption decisions, an owner that is highly innovative is also more likely to prepare His firm toward adopting accounting information systems, and hence, leading to subsequent adoption. The preparedness of an organization (e.g. in terms of availability of technological infrastructure, technical know-how etc.) to adopt an information technology is what is referred to as organizational readiness. The study to this extent posits that the level of owner innovativeness influences organizational readiness, which in turn influences CAIS adoption. That is, level of Owner innovativeness → Extent of
organizational readiness to adopt CAIS → subsequent adoption. All previous studies have only looked at the direct effect (i.e. level of Owner innovativeness → adoption). Using the segmental approach to mediation analysis, the study hypothesizes that:

\[ \text{H}_5: \text{Owner Innovativeness has a significant positive influence on CAIS adoption through Organizational Readiness.} \]

\[ \text{H}_6: \text{Organizational Readiness significantly mediates the positive relationship between Owner Innovativeness and CAIS adoption among SMEs} \]

\[ \text{H}_7: \text{Owner Innovativeness has a significant positive influence on Organizational readiness.} \]

2.8.1.3 The Environmental Context

Two hypotheses are formulated under the Environmental context of the TOE framework; they include hypotheses on competitive pressure and Government support.

- Competitive Pressure and CAIS Adoption

Environmental attributes within a firm’s business environment such as competitive pressure have been found to impact innovation adoption at the firm level. In a study, Tread-gold (1990) found that Competition may prompt the adoption and utilization of new technologies. For example, He notes that whereas direct competitive pressures may influence a firm to adopt new technology in order to meet or beat the competition, pressures from wholesalers, trade associations, franchisors and voluntary groups can also influence SMEs to adopt information technology. Recently, in the Ghanaian context, Awiagah et al. (2016) concluded in a study that competitive pressures influence information technology adoption among SMEs as they tend to imitate
successful first-movers in the business environment. The study therefore hypothesis that:

**H8:** Competitive pressure has a significant positive influence on CAIS adoption among SMEs.

- **Government Support and CAIS Adoption**
  
  Government support has additionally been found to influence technology adoption, especially among SMEs. Ample scholarly evidence shows the significance of government support in influencing technology adoption at the firm level. For example, Scholars encompassing Chan and Al-Hawamdeh (2002), and Martinsons (2008) found that technology adoption decisions at the firm level are greatly influenced by governments’ participatory role in providing the empowering infrastructure and other support necessary for technology adoption to thrive. The case of Singapore is a special one. For example, Al-Hawamdeh (2002) cited in Awiagah et al. (2016) argues that SMEs in Singapore make greater use of information communication technology largely due to the Singaporean government’s ratification of the Small Enterprise Computerization Program (SECP), which encourages and assist small businesses to become more competitive through ICT application. In a related study, Seyal et al. (2004) find a significant relationship between government support and technology adoption. Moreover, Awiagah et al. (2016) surveyed 200 SMEs in Ghana as to what the determinant factors of information technology adoption are, as far as SMEs are concerned. The study concluded that government support is the most influential factor that drives technology adoption among SMEs in Ghana. To this extent, the study hypothesis that:
**H (9):** Government support has a significant positive influence on CAIS adoption among SMEs.

### 2.9 CHAPTER SUMMARY

First, the literature review followed recommendations by Webber and Watson (2002), and Row (2014) in triangulating the literature review process in so as to ensure that no relevant publication was missed out. Secondly, the literature review, which was mainly concept-centric, has shown that there is a general paucity in AIS research. Thirdly, the review has also uncovered that there is a status quo bias in theory application, a situation whereby previous studies have used standalone firm level theories in studying technology adoption among SMEs, without considering the potential of integrated theories. More importantly, the review uncovered that almost all existing studies on technology adoption among SMEs resorted to examining only the direct relationship between SME owner innovativeness and technology adoption, without considering that potential indirect relationships may exist between SME owner innovativeness and technology adoption. Finally, current trends in AIS practice include Big Data analytics, XBRL reporting, AIS-Sustainability reporting, Social Media disclosure of accounting information, etc.
CHAPTER THREE
RESEARCH METHODOLOGY

3.1 INTRODUCTION
This chapter presents a discussion of the means by which data was gathered and analyzed in order to attain the research objectives outlined in chapter one of the study. The chapter is organized into the following main sections: Section 3.2 (Research Philosophy); Section 3.3 (Research Design); Section 3.4 (Research Population); Section 3.5 (Sampling); Section 3.6 (Data Collection); Section 3.7 (Data Analysis); Section 3.8 (Measurement Model); and Section 3.9 (Ethical Considerations)

3.2 RESEARCH PHILOSOPHY
Holden and Lynch (2004) posit that it is the philosophical stance of a researcher that determines the research approach to theory development and methodological choice of the study, rather than the reverse. Although philosophical ideas remain largely hidden in research, scholars (E.g. Holden & Lynch, 2004; Creswell, 2014) argue that they still influence the practice of research and as such researchers ought to make vivid the larger philosophical ideas they espouse. Research philosophy is a system of beliefs and assumptions held by an individual pertaining to how knowledge is developed (Saunders & Thornhill, 2012).

3.2.1 Accounting Research and Philosophy
Accounting research has been widely identified as one that functions to establish general laws covering the behavior of empirical events or objects in a scientific manner, hence enabling people to connect their knowledge of different phenomena (Belkaou, 2004). Thus, Belkaou’s description of accounting research situates well within the domain of the popularly acclaimed natural science models of research which emphasizes a meticulous approach to data gathering
and analysis as well as inference making. Accordingly, the central question underpinning the study (i.e. what determines the adoption of CAIS?) inherently presupposes that there exist real determinants of CAIS adoption independent of the observer, hence in terms of what constitutes reality, the study builds on the assumption of ontological realism. Again, although the real causes or CAIS adoption are facts that do exist, the aim of the study is to identify what constitutes valid knowledge about those facts 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).

3.2.2 Assumptions about Theoretical Reasoning: Deductive Reasoning
Solid theoretical frameworks have been propounded by different scholars to explain the adoption of Management Information Systems like CAIS, however, as to whether the explanations offered by such theories are valid is what is left to be tested or verified, hence the study tests hypotheses based on the Technology-Organization-Environment framework and the Diffusion of Innovation theory in order to be able to deduce from the results as to whether propositions held by these theories should be accepted or rejected; in essence, the study builds on the deductive or hypothetico-deductive approach to reasoning, as described by Popper (2002).

3.3 RESEARCH DESIGN
A good research is the one that exhibits consistency in methodological procession (Fisher, 2010). The fact that the study builds on a positivist and a deductive approach presupposes that a quantitative methodological choice fits well with the study (Denscombe, 2010). The study adopts the quantitative approach to study in order to be able to make statistical generalizations about the population. Again, a cross-sectional study is employed to capture data relevant to the study. The cross-sectional study examines the relationship between variables of interest in
respect of a defined population at a specific point in time, usually over a short period of time (e.g. calendar year). The choice of a cross sectional design is justified by the fact that the cross sectional design allows for the examination of multiple factors and multiple outcomes in a single study. This research examines multiple exogenous factors for their effect on CAIS adoption within a single study, and this suggests that the cross sectional design is appropriate for the study. Besides, the cross sectional design saves time, cost, and usually achieves valid results when well executed (Creswell, 2014).

3.4 STUDY POPULATION

3.4.1 Unit of analysis: SMEs

The population of the study entails all SMEs in Ghana. There is no single definition for SMEs as far as different countries, governments and institutions are considered. Several criteria such as the number of employees, annual sales, and fixed assets are used to define SMEs. Nonetheless, the common size criteria used by scholars is the number of employees (e.g. Ismail et al., 2003; Oladipupo & Ajape, 2013; Amidu et al., 2011). This is due to the fact that disclosing annual revenue data and financial performance is something that SMEs are reluctant to do (Filatotchev et al., 2009). Contextually, the definition of SMEs is premised on the definition given by the Regional Project on Enterprise Development for SMEs in Ghana, they define SMEs as firms having less than 100 employees (Amidu et al., 2011).

3.4.2 Source of Data

The study basically relies on primary data. The study population (i.e. registered SMEs) are taken from the databases of the National Board for Small Scale Industries (NBSSI-Ghana) and that of the Association of Ghana Industries (AGI). The NBSSI was established by an Act of parliament to create an enabling environment for SME development in the country.
The NBSSI (Ghana) and the AGI databases contain formal information concerning registered SMEs in Ghana, details such as the name of firms, products, contact details, number of employees, contact person among others can be found in the directory (Amidu et al., 2011). Whereas the NBSSI database contains a list of Small Businesses in Ghana, it does not contain information about Medium-Sized firms, hence the need to draw on the AGI database.

As an inclusion criterion, only firms having less than 100 employees (full time or full-time equivalent) were considered for the study, thus being consistent with the definition of Amidu et al. (2011). As a measure of reliability, the list of firms obtained from the databases was first screened for consistency and sufficiency of information. For example, firms whose records show to have more than 100 employees were excluded. Also, firms who do not report their registered addresses and business names (in the database) were excluded from the list.

The NBSSI database had about 5123 registered firms (these excluded unreadable content in the database). Of this, about 512 firms did not have registered names and were eliminated, about 745 did not have complete contact addresses, about 437 were large firms employing more than 100 employees (which is outside the definition of SMEs adopted in this study), about 402 had their contact addresses to be either inaccurate or unreachable. A total of about 3027 firms remained in the register after applying the inclusion criterion. Accordingly, the database obtained from AGI had about 1300 registered members in total. Out of this, about 213 firms did not have complete contact addresses and were eliminated, whereas about 248 of the firms were either unreachable or failed to respond to the letter of consent. In addition, about 102 of these firms were employing more than 100
employees. In all, a total of about 737 registered firms remained in the list after deleting files that did not satisfy the inclusion criterion.

3.4.3 Study Location

The main focus of the empirical study are SMEs in the Ashanti, Western and Greater Accra regions of Ghana. These regions were selected for the following reasons:

First, the three regions are the main business centres in the country and they altogether represent about 70% of all registered businesses in the country (Institute of Economic Affairs, 2016). In addition, these regions are also equipped with modern ICT facilities (e.g. fast Internet connections, advanced telecommunications systems etc.) relative to other geographic areas in Ghana (Siwar & Kasim, 1997), hence making SMEs in these locations better positioned to respond to questions related to technology adoption. Lastly, the three regions are considered as a modern model business centres in the country (Adarkwa, 2012), hence making SMEs located within such regions more suitable for studies bordering on the adoption of contemporary technologies like CAIS.

3.5 SAMPLING

3.5.1 Sampling Technique

The research process would be obstructed by time, cost and other limitations if an attempt is made to take a census of the population. Sampling is a way of reducing cost, fatigue and economizing time whilst achieving reliable results (Sekaran & Bougie, 2009). The stratified random sampling technique was applied in selecting respondents for the study. This technique was considered appropriate since the population under study has some attributes of heterogeneity, hence prompting the need to group the population into homogeneous subgroups prior to sampling. According to Hunt and Tyrrell (2001), stratified sampling ensures that
different groups within the population gain a fairer representation in the sample selection process. The stratified random sampling procedure adopted in the study entailed the following:

Firstly, the overall population was classified into two based on the database from which they were drawn, namely, SMEs listed in the NBSSI database, and those listed in the AGI database. This was done to ensure that the selection of sample from both databases was based on a uniform objective criterion, and not subject to the judgment of the researcher (see fig 3.5 below, next page).

Second, SMEs within the stratum (i.e. NBSSI, and AGI) were further sub-divided based on the sector within which they operate (see Fig 3.5 below, next page). The sectoral classifications used were the manufacturing and the service sector. This was necessary since studies by Thong (1999) have shown that SMEs’ sector of operations may influence their technology adoption decisions. To this extent, sub-dividing the population based on sectoral classification will ensure that both sectors have a fairer chance of selection in the sampling process (see Fig 3.5 below, next page)
Thirdly, for each sectoral classification, SMEs were sub-grouped based on the regions in which they operate (Ashanti, Greater Accra, and Western). This was done with the view that each of the regions under study will gain a fairer representation in the sample selection process.

Lastly, the simple random sampling technique was then used to select a proportional number of samples from each region to represent the population of the study. In all, four hundred (400) respondents were drawn out of the population. The next section discusses how the sample size was derived.
3.5.2 Sample Size

Selection of sample size for the study was guided by the rules outlined by Barclay, Higgins, and Thompson (1995), and Cohen (1992). Cohen (1992) indicated 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). Accordingly, Barclay et al. (1995) posit 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 variable anywhere in the structural model.

In this study, the maximum number of arrowheads pointing at a latent variable is eight (see Model specification in Fig 3.8.4) and this means that the minimum required sample size should be eighty (80). However, considering that previous studies on SMEs yielded low response rates (e.g. Amidu et al., 2011); coupled with the fact that this study is conducted in only three out of the ten regions of Ghana, the minimum required sample size of 80 was multiplied by five (5) (representing at least half of the 10 regions in Ghana as of 2017) to attain a sample size of 400 for the study. The intuition is that a relatively larger sample size can counter the challenge of insufficient response rates. Relating to the distribution of the sample size, a total of 133 questionnaires were sent each to the Greater Accra and Western Regions respectively, whereas 134 questionnaires were sent to the Ashanti Region. The intent was to ensure an even distribution of the questionnaires but since 400 is not evenly divisible by 3 (to arrive at a whole number), the extra questionnaire remaining was added to the Ashanti region since it had a relatively higher number of registered SMEs than the other two regions considered.
3.5.3 Study Respondents

In this study, the sample of SMEs includes both adopters and Non-adopters of E-Accounting systems. The Owners/CEOs of the SMEs surveyed were chosen to be the key informant in this study. Thong (1999) notes that among SMEs, the Owners (who are usually the CEOs) are the key decision makers as far as technology adoption is concerned, hence their role as respondents in this study.

3.6 DATA COLLECTION

3.6.1 Instrument and Structure

A 5-point liker scale Questionnaire is adapted and used as the survey instrument for data collection purposes (refer to appendix A). Bearing in mind that questionnaires issued to SMEs in previous studies on Electronic - Accounting systems by Amidu et al. (2011) yielded only 29% response rate, this study triangulates the administration of questionnaires by means of e-mail, and through personal visits, whichever may be appropriate, with the aim that the weakness in one method will be compensated for by the other.

The design of the questionnaires was sectionalized into four parts encompassing the Introductory Section, and Sections A, B, and C. First, the introductory section contains the preamble to the study and provides guidance on ethical concerns. Secondly, section A of the questionnaire gathered information about the level of awareness of computerized accounting systems among SMEs. Section B measured the determinants of computerized accounting information systems adoption among SMEs, whereas section C gathered data on respondents’ profile.
3.6.2 Questionnaire Validity

The study employs pre-testing of two consecutive rounds entailing a review of the questionnaire by experienced academic researchers, and a pilot with SME owners known; this according to Gangwar et al. (2015) helps to ascertain whether the study respondents’ can provide reliable and valid answers. Aside from this, content and construct validity of measurement variables will be assessed. Whereas content validity is purely subjective and judgemental (Awa et al., 2015), construct validity and reliability is assessed by means of statistical tests encompassing composite reliability, average variance extracted and the Heterotrait-Monotrait Ratio of Correlations (refer to appendix BC1). These are discussed in detail in subsequent sections.

3.6.3 Justification for Questionnaire Measurement Scale

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) goes further to explain that although the interval scale is more suitable for structural equation modelling techniques like PLS-SEM (Hair et al., 2014), 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 liker 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 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.
3.7 DATA ANALYSIS

The structural equation modelling technique is applied in analyzing data gathered.

3.7.1 Justification for Adopting Structural Equation Modelling (SEM)

There are different methods of analyzing the relationship between some given set variables, namely:

a. Multiple Regression Analysis (MRA)

b. Path Analysis (PA)

c. Factor Analysis (FA)

d. Structural Equation Modelling (SEM) among others

In this study, Structural equation modelling (SEM) was chosen as the analytical approach. Structural equation models (SEM) just as regression models and ANOVAs are all classed under general linear models. Mertens, Pugliese, and Recker (2016) posit that the defining characteristic that delineates SEMs from “simple” 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 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 this study, all the Nine (9) constructs (including the dependent variable) in the research model (see Fig. 3.8.4) are unobserved variables that are measurable only through their manifest indicators (proxies), hence making the SEM techniques suitable for the study. For example, latent constructs in the likes of “competitive pressure” and “organizational readiness” could only be measured through proxies.
Second, 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 multiple exogenous variables, including mediation or moderation effects. The study builds on eight hypothesized relationships between multiple exogenous and multiple endogenous constructs, plus one mediator effect (see Fig 3.8.4). 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 simple linear regression approach will require estimating at least nine (9) 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.

3.7.2 Justification for the type of SEM: PLS-SEM

There are two approaches to structural equation modelling (SEM) namely; the Covariance-Based SEM (CB-SEM) and the Variance-Based SEM (PLS-SEM). The study makes use of the PLS-SEM technique. According to Hair, Ringle, and Sarstedt (2011, p. 140),

“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 CAIS adoption among SMEs in Ghana, the PLS-SEM approach is deemed appropriate. The choice of PLS-SEM is further justified below.

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 CAIS adoption through an integrated TOE-DOI theory, application of the PLS-SEM is more appropriate than the CB-SEM approach.

Second, 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 (like this 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, where the population being researched often have higher nonresponse rates (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 owner innovativeness and CAIS adoption through organizational readiness is captured neither in the TOE nor the DOI theory which underpins this study. Again, one seldom find 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.

### 3.7.3 Approach to Mediation Analysis

The study seeks to explore the mediating role of Organizational Readiness between owner Innovativeness and CAIS adoption. Mediation analysis uses one of three approaches namely:

1. The bootstrap approach (Preacher and Hayes, 2008)
2. Baron and Kenny’s (1986) Mediation Analysis
3. The Sobel test (1982)

#### 3.7.3.1 The Bootstrap Approach and justification

The bootstrap method developed by Preacher and Hayes (2008) is adopted in this study. 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) in general, and the PLS-SEM analysis techniques in particular. 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 (owner innovativeness) and the dependent variable (CAIS adoption) 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 about data distribution and also works well with small sample sizes. Pardo and Roman (2013) have also criticised 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 (i.e. an unnecessary requirement!).
3.8 MEASUREMENT MODEL

The process of assigning numbers to variables in research is referred to as Measurement (Hair et al., 201). The measurement model looks at proxies or variables that can be used to measure latent variables in a structural model. As a matter of fact, it is generally easy to assign figures to a phenomenon like age, but it is relatively difficult to do the same for a phenomenon like “competitive pressure”. In such instances, measurement is not straightforward since the phenomenon supposed to be measured are abstract (unobservable). To this extent, researchers resort to using the existence of certain manifestations or indicators that prove the existence or absence of the underlying abstract phenomenon.

3.8.1 Measurement Theory (Reflective Measurement)

In PLS-SEM, the measurement theory specifies how latent constructs are measured. Two main measurement theories in conducting SEM analysis are the formative and reflective measurement theories. In formative measurement theory, it is assumed that a latent variable is formed by its measures or indicators. To this extent, it presupposes that each indicator uniquely measures a certain aspect of the latent variable without error and for that matter, only a census of the indicators can be representative of an underlying latent Variable (Hair et al., 2014; Chin, 1998). A reflective measurement theory, on the other hand, operates on the assumption that the measurement variables or indicators are rather a consequence of an underlying latent Construct. Deciding on the most appropriate measurement theory to adopt in social science studies is subject to considerable debate that is not yet settled. However, scholars encompassing Chin (1998), Jarvis (2003), and Jarvis et al. (2014) offer some guidelines in deciding on how best to measure research constructs. The study adopts the reflective measurement theory for reasons discussed below:
First, Chin (1998) recommended that researchers assess whether a change in the latent construct will necessarily lead to a change in its underlying indicators, if this is found to be true, then it implies that the latent variable causes the indicators hence should be measured reflectively. For this study, a change in a latent construct like competitive pressure will necessarily mean that all indicators used to measure it must also change (since the indicators primarily derive their nature from the latent variable), hence the reflective measurement theory is suitable based on this criterion.

Secondly, Jarvis et al. (2003) suggest that the reflective measurement model is more suitable where indicators measuring a particular underlying construct are interchangeable. In this study, the indicators derive their nature from the same underlying latent construct and since their nature is derived from a single source, they share similar traits (Hair et al., 2014) that make them interchangeable. In regard to this, the reflective measurement model is more appropriate for this study and has been adopted herein.

See Fig 3.8.1.1 and Fig 3.8.1.2 below for a pictorial representation of the formative and reflective measurement theories respectively.
**Fig.3.8.1.1 Formative Measurement**

From Fig. 3.8.1.1 It is observed that the arrows point from the indicators to the latent variable, implying that the indicators form the latent variable. It also implies that a change in the indicators will cause the latent variable to change. Each indicator represents a unique portion of the latent variable hence multicollinearity is not tolerated in formative measurements.

**Fig.3.8.1.2 Reflective Measurement**

From Fig 3.8.1.2, it is observed that the arrows point from the latent variables to the indicator variables, implying that the latent variable causes the indicators. This also means that since all the indicators are coming from the same latent variable, they will share some common attributes which makes them interchangeable. It also means that collinearity is expected among the indicator variables when the reflective measurement theory is applied.

Source: Adapted from Hair *et al.*, 2014.
3.8.2 Outer (Measurement) Model Reliability and Validity

The Outer model provides a basis for interpreting the structural model, hence the need to ensure that all reliability and validity assumptions (for the measurement model) are met within an acceptable range. In the study, 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 outer model. Thus, a four-stage approach as shown in Fig. 3.8.2 below was adopted in the study.

![Fig. 3.8.2 Outer/Measurement Model Assessment](source: Author’s Own Construct, 2018)

3.8.2.1 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 (C.R) 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) note 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.

3.8.2.2 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) advises 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 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). See chapter four for discussion of indicator reliability test results.
3.8.2.3 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. Results of the AVE test are discussed in chapter four.

3.8.2.4 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 are 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-Heteromethod 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 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.

3.8.3 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. Fig. 3.8.3 below depicts the six-stage approach to assessing the inner model.
3.8.3 Collinearity assessment

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.

3.8.3.2 Assessment of significance of path relationship

The second stage of inner model assessment entails interpretation of path relationships 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.

3.8.3.3 Assessment of Co-efficient of determination ($R^2$)

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 $R^2$ 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.

3.8.3.4 Assessment of effect size ($f^2$)

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.

3.8.3.5 Assessment of predictive relevance and discussion of results

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 (see chapter four).
3.8.4 Model Specification

Fig. 3.8.4 Model Specification

**NB:** All circles in blue colour are latent constructs to be measured by their respective indicators (which are in yellow rectangles)

### 3.8.4.1 Dependent Variable

The dependent variable is “Adoption” as seen in Fig 3.8.4 above and Table 3.8.4 below. Adoption as an endogenous variable is used to refer to SMEs initial acquisition and application of computerized accounting information systems. This was measured as a continuous variable,
thus following the approach of Hellegers et al. (2011). See Table 3.8.4 below for a description of indicators.

### Table 3.8.4 Endogenous and Exogenous Variables

<table>
<thead>
<tr>
<th>Category</th>
<th>Code</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative Advantage</td>
<td>REL_AD1</td>
<td>Operational efficiency (Cost and time savings)</td>
<td>Rogers (1995, p.213); Prekumar and Robberts (1999); Grandon and Pearson (2004); Qirim (2005); Spathis (2006)</td>
</tr>
<tr>
<td></td>
<td>REL_AD2</td>
<td>Improved Internal Controls</td>
<td></td>
</tr>
<tr>
<td></td>
<td>REL_AD3</td>
<td>Improved quality of accounting reports</td>
<td></td>
</tr>
<tr>
<td></td>
<td>REL_AD4</td>
<td>Enhanced financial analysis</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>COST_A</td>
<td>Maintenance and Operating Cost</td>
<td>Moore &amp; Benbasat (1991); Kuan and Chau (2001); Qirim (2005); Rahayu and Day (2015)</td>
</tr>
<tr>
<td></td>
<td>COST_B</td>
<td>Software License Renewal Cost</td>
<td></td>
</tr>
<tr>
<td></td>
<td>COST_C</td>
<td>Acquisition Cost</td>
<td></td>
</tr>
<tr>
<td>Complexity</td>
<td>COMPLEX_A</td>
<td>Difficulty in Learning to use CAIS</td>
<td>Rogers (1995, p.230); Prekumar and Robberts (1999)</td>
</tr>
<tr>
<td></td>
<td>COMPLEX_B</td>
<td>Ease of interaction with CAIS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>COMPLEX_C</td>
<td>Training period required to use CAIS</td>
<td></td>
</tr>
<tr>
<td>Security Concern</td>
<td>SECURITY_A</td>
<td>Data Security Concern</td>
<td>Hanini (2012); Erisman (2013)</td>
</tr>
<tr>
<td></td>
<td>SECURITY_B</td>
<td>System Reliability Concern (Uptime)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SECURITY_C</td>
<td>Physical security of hardware</td>
<td></td>
</tr>
<tr>
<td>Organizational Readiness</td>
<td>READ_EMPLO</td>
<td>Availability of Employee Technical Skill</td>
<td>Kuan and Chau (2001); To &amp; Ngai (2006); Wang et al. (2010)</td>
</tr>
<tr>
<td></td>
<td>READ_FIN</td>
<td>Availability of Financial resources</td>
<td></td>
</tr>
<tr>
<td></td>
<td>READ_INF</td>
<td>Availability of technological infrastructure</td>
<td></td>
</tr>
<tr>
<td>Competitive Pressure</td>
<td>COMP_PREA</td>
<td>Adopters preferred by trade contacts</td>
<td>Thong (1999); Grandon and Pearson (2004); Qirim (2005); Liang et al. (2007); Low et al. (2011)</td>
</tr>
<tr>
<td></td>
<td>COMP_PREB</td>
<td>Industry Rivalry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>COMP_PREC</td>
<td>Trading partner Pressure</td>
<td></td>
</tr>
<tr>
<td>Government Support</td>
<td>GOV_A</td>
<td>Government subsidy</td>
<td>Gibbs et al. (2003); Liang, et al.(2007);</td>
</tr>
<tr>
<td></td>
<td>GOV_B</td>
<td>Government Commitment to ICT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GOV_C</td>
<td>Laws on data security</td>
<td></td>
</tr>
<tr>
<td>Innovativeness</td>
<td>INO_A</td>
<td>Originality</td>
<td>Thong (1999)</td>
</tr>
<tr>
<td></td>
<td>INO_B</td>
<td>Creativity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>INO_C</td>
<td>Experience with computers</td>
<td></td>
</tr>
<tr>
<td>CAIS Adoption</td>
<td>ADOPT_A</td>
<td>Encourage adoption</td>
<td>Thong (1999), Zeng (2011)</td>
</tr>
<tr>
<td></td>
<td>ADOPT_B</td>
<td>Encourage extensive use of CAIS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ADOPT_C</td>
<td>Encourage business integration</td>
<td></td>
</tr>
</tbody>
</table>
3.8.4.2 Independent / Exogenous Constructs

As seen from Table 3.8.4 above, the independent variables purported to influence CAIS adoption encompasses Relative Advantage, Cost, Complexity, Security Concern, Organizational Readiness, Competitive Pressure, Government Support and Owner Innovativeness (see description Table 3.8.4 above).

3.9 ETHICAL CONSIDERATIONS

Creswell (2014) stresses the need for researchers to anticipate the ethical issues consequential to their research. Punch (2013) intimates that social science research involves collecting data from people and about people, hence, researchers must protect their research participants; develop a trust with them; promote the integrity of research; guard against misconduct and impropriety; and cope with new, challenging problems (Israel & Hay, 2006).

In this study, responses from respondents are not passed on to third parties and are also kept under lock and Key. Again, respondents were allowed to freely withdraw from the study at any point in time without any consequence to them. Moreover, having obtained ethical clearance from the university regarding data gathering activities demonstrate that ethical standards have been ensured throughout the study.

3.10 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 SMEs listed in databases of the National Board for Small Scale Industries (NBSSI-Ghana) and the Association of Ghana Industries (AGI). The stratified random sampling technique is applied in selecting a sample of 400 respondents. Questionnaires, both manual and online were
administered to SME owners across the Ashanti, Greater Accra, and Western Regions of Ghana. 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, they are kept under lock and key, and respondents are allowed to abandon the study at any point in time without penalty.
CHAPTER FOUR
DATA ANALYSIS, INTERPRETATION AND DISCUSSION

4.0 INTRODUCTION

Data obtained from the survey are analyzed and interpreted in this chapter of the study. The chapter is organized into four main sections, including Section 4.1 (Distribution of Sample Characteristics); Section 4.2 (Statistical Analysis of CAIS Adoption); Section 4.3 (Discussion of Hypothesized Relationships); Section 4.4 (Chapter Summary)

4.1 DISTRIBUTION OF SAMPLE CHARACTERISTICS

In all, four hundred (400) questionnaires were administered and out of this, 194 responses were received (representing about 49% response rate). Such a low response rate is common with SME studies in developing countries (Amidu et al., 2011). Most of the responses were received from the Ashanti Region of Ghana (representing 41.8%), followed by the Greater Accra Region (33%), and the Western Region of Ghana (25.3%). These responses seemed sufficient compared to previous research (Thong & Yap, 1995; Grandon & Pearson, 2004; Amidu et al., 2011).

With regard to the sectoral distribution of SMEs, most of the SMEs surveyed were found in the service sector, thus representing 57.2%; whereas the remaining 48.2% were in the manufacturing sector. A similar sectoral distribution pattern was previously predicted by the ITC SME Competitiveness Index Report-Ghana (2016). See distribution of respondent characteristics in Table 4.1.1 below
Table 4.1.1 Distribution of Respondent Characteristics

<table>
<thead>
<tr>
<th>GENDER</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FEMALE</td>
<td>70</td>
<td>36.1</td>
<td>38.9</td>
</tr>
<tr>
<td>MALE</td>
<td>110</td>
<td>56.7</td>
<td>61.1</td>
</tr>
<tr>
<td>Total</td>
<td>180</td>
<td>92.8</td>
<td>100.0</td>
</tr>
<tr>
<td>Missing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System</td>
<td>14</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>194</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REGION</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GREATER ACCRA</td>
<td>64</td>
<td>33.0</td>
<td>33.0</td>
</tr>
<tr>
<td>ASHANTI</td>
<td>81</td>
<td>41.8</td>
<td>41.8</td>
</tr>
<tr>
<td>WESTERN</td>
<td>49</td>
<td>25.3</td>
<td>25.3</td>
</tr>
<tr>
<td>Total</td>
<td>194</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SME INDUSTRY SECTOR</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SERVICE</td>
<td>111</td>
<td>57.2</td>
<td>57.8</td>
</tr>
<tr>
<td>MANUFACTURING</td>
<td>81</td>
<td>41.8</td>
<td>42.2</td>
</tr>
<tr>
<td>Total</td>
<td>192</td>
<td>99.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Missing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System</td>
<td>2</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>194</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: Field Data, 2018

It is also observed from Table 4.1.1 that majority of the respondents who returned their questionnaires were males, thus representing 56.7% as against the female percentage of 36.1%.

It is noteworthy that the distribution about gender cannot be interpreted to mean that most SME owners are males. This is due to the fact that most of the female respondents surveyed failed to submit their responses regardless of efforts made.

4.1.2 Distribution of CAIS Adoption by SMEs

The data extracted from the questionnaires provide information on the level of CAIS adoption among SMEs in Ghana.

These results are presented in Table 4.1.2.1 below.
Table 4.1.2.1 Distribution of CAIS Adoption

<table>
<thead>
<tr>
<th>LEVEL OF CAIS ADOPTION</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual Only</td>
<td>58</td>
<td>29.9</td>
<td>29.9</td>
</tr>
<tr>
<td>Manual And Computers</td>
<td>135</td>
<td>69.6</td>
<td>69.6</td>
</tr>
<tr>
<td>Fully Computerized</td>
<td>1</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Total</td>
<td>194</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TYPE OF CAISE</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turnkey</td>
<td>119</td>
<td>61.3</td>
<td>62.0</td>
</tr>
<tr>
<td>Customized</td>
<td>16</td>
<td>8.2</td>
<td>8.3</td>
</tr>
<tr>
<td>Non</td>
<td>57</td>
<td>29.4</td>
<td>29.7</td>
</tr>
<tr>
<td>Total</td>
<td>192</td>
<td>99.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Missing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System</td>
<td>2</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>194</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: Field Data, 2018.

It is observed (from Table 4.1.2.1 above) that about 69.6% of the respondents combine both manual accounting systems with computerized accounting systems in performing accounting tasks. About 29.9% of the SMEs make use of manual accounting procedures without the application of computers. Only 0.5% of the respondents had adopted fully integrated CAIS technology that does not rely on manual accounting processing.

With regards to the type of CAIS system employed by the respondents, it was observed that 61% of SMEs surveyed made use of off-the-shelf accounting packages in executing their accounting functions, whereas only 8.2% were using customized accounting software packages. This may be due to cost and reliability issues that accompany the development of customized software (Monk, 2012).

According to Thong (1999), firms who operate in the service sector usually require up-to-date information and as such are more likely to adopt information processing technologies than those in the manufacturing sector. Table 4.1.2.2 below corroborates with such an assertion.
Table 4.1.2.2 Business Sector and CAIS Adoption Stage

<table>
<thead>
<tr>
<th>% within sector</th>
<th>yet to consider</th>
<th>plan to evaluate</th>
<th>Evaluating</th>
<th>adopted</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>SECTOR</td>
<td>Service Sector</td>
<td>27.9%</td>
<td>1.8%</td>
<td>70.3%</td>
<td>100.0%</td>
</tr>
<tr>
<td></td>
<td>Manufacturing</td>
<td>22.2%</td>
<td>7.4%</td>
<td>69.1%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Total</td>
<td>25.5%</td>
<td>4.2%</td>
<td>0.5%</td>
<td>69.8%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Source: Field Data, 2018

It is observed (from Table 4.1.2.2) that 70.3% of SMEs surveyed from the service sector had already adopted CAIS technology, whereas in the manufacturing sector, it was 69.1%. This observed trend corroborates with an earlier prediction by Thong (1999) to the effect that, SMEs in the service sector are more likely to adopt new innovations than those in the manufacturing sector.

4.1.3 Descriptive Analysis of Measurement Variables

Table 4.1.3 Indicator Descriptive Analysis

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Mean</th>
<th>Median</th>
<th>Mode</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am concerned about Data security issues</td>
<td>3.62</td>
<td>3</td>
<td>3</td>
<td>0.81</td>
</tr>
<tr>
<td>I am concerned about reliability of CAIS</td>
<td>3.16</td>
<td>3</td>
<td>3</td>
<td>1.37</td>
</tr>
<tr>
<td>Government Subsidy can influence CAIS adoption</td>
<td>3.32</td>
<td>3</td>
<td>2</td>
<td>1.54</td>
</tr>
<tr>
<td>Government is committed to enhancing ICT adoption among SMEs</td>
<td>2.91</td>
<td>3</td>
<td>3</td>
<td>1.30</td>
</tr>
<tr>
<td>CAIS improves quality of accounting reports</td>
<td>4.20</td>
<td>4</td>
<td>4</td>
<td>0.49</td>
</tr>
<tr>
<td>CAIS improves operational efficiency</td>
<td>4.00</td>
<td>4</td>
<td>4</td>
<td>0.68</td>
</tr>
<tr>
<td>It is not difficult for me to learn to use new technologies</td>
<td>2.75</td>
<td>2</td>
<td>2</td>
<td>0.993</td>
</tr>
<tr>
<td>I find it easy to interact with Management info. Systems</td>
<td>2.55</td>
<td>2</td>
<td>2</td>
<td>0.870</td>
</tr>
<tr>
<td>I easily create new ideas</td>
<td>4.27</td>
<td>4</td>
<td>4</td>
<td>0.67</td>
</tr>
<tr>
<td>I have experience in the use of computers</td>
<td>3.87</td>
<td>4</td>
<td>4</td>
<td>0.92</td>
</tr>
<tr>
<td>I am concerned of High Maintenance and Operating cost of CAIS</td>
<td>2.76</td>
<td>3</td>
<td>3</td>
<td>1.02</td>
</tr>
<tr>
<td>I am concerned of High Initial acquisition cost of CAIS</td>
<td>2.75</td>
<td>3</td>
<td>3</td>
<td>1.08</td>
</tr>
</tbody>
</table>
In our industry, adopters of CAIS are preferred by trade contacts 3.57 4 4 0.99  
Rivalry in our industry is intense 3.87 4 4 0.98  
Our firm has required technological infrastructure to adopt CAIS 3.95 4 4 0.60  
Our firm has required financial resources to adopt CAIS 3.80 4 4 0.69  
In all, I encourage CAIS adoption 4.22 4 4 0.70  
I will encourage extensive application of CAIS 3.95 4 4 0.91  
I encourage integration of CAIS with other functional areas. 4.24 4 4 0.43  

Source: Field Data, 2018; *Note: All items are measured on a 5-point scale

Jamieson (2004) in “Likert scales: how to (ab)use them” recommended that researchers focus on interpreting either the median and/or the modal scores of Likert scale questionnaires especially where the numbers attached to the Likert scale points are generally representing verbal statements. This is due to the fact that if the Mean is used as a measure of central tendency it would not have any meaning since one can hardly discern the meaning of the Mean for strongly disagree, disagree, agree etc. In such instance, interpreting the mode is preferable (Jamieson, 2004). The study follows the recommendations of Jamieson (2004) in interpreting a sample of the modal scores of the questionnaire items. Based on the Modes in the Table 4.1.3 above, it can be assumed that most of the respondents “agreed” to the various statements that purport to measure CAIS adoption. For example, most of the respondent’s agreed that rivalry in their business environment was intense. Again, most of the respondents agreed that CAIS can improve operational efficiency and quality of accounting reporting. Besides, it is observed that most of the respondents disagreed with the assertion that accounting information systems are difficult to interact with. The other questionnaire items can be interpreted in this manner.
4.2 STATISTICAL ANALYSIS OF CAIS ADOPTION VIA PLS-SEM

The statistical analysis in PLS-SEM involves two main stages; namely, *outer model assessment*, and *Inner Model assessment* (Hair *et al.*, 2014). A detailed discussion of the procedure is presented below.

4.2.1 OUTER MODEL ASSESSMENT

In this section, the outer model will be assessed for validity and reliability in four main steps as depicted below:

![Fig. 3.8.2 OUTER / MEASUREMENT MODEL ASSESSMENT](image)

Source: Author’s own construct, 2018.

Test results of each of these steps are discussed in detail based on Table 4.2.1 below.
Table 4.2.1 Reliability and Validity Diagnostics

<table>
<thead>
<tr>
<th>Latent Constructs</th>
<th>Indicator Variables</th>
<th>Indicator Loadings (Heuristic = Should Be ≥ 0.70)</th>
<th>Composite Reliability (Heuristic = Should Be ≥ 0.70)</th>
<th>Average Variance Extracted (Heuristic = Should Be ≥ 0.50)</th>
<th>Cronbach Alpha (Heuristic = Should Be ≥ 0.70)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1st iteration</td>
<td>final iteration</td>
<td>1st iteration</td>
<td>final iteration</td>
</tr>
<tr>
<td>Adoption (DV)</td>
<td>ADOPT_A</td>
<td>0.8117</td>
<td>0.8245</td>
<td>0.6505</td>
<td>0.6502</td>
</tr>
<tr>
<td></td>
<td>ADOPT_B</td>
<td>0.8278</td>
<td>0.8207</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ADOPT_C</td>
<td>0.7794</td>
<td>0.7727</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complexity</td>
<td>COMPLEX_A</td>
<td>0.8637</td>
<td>0.9224</td>
<td>0.5461</td>
<td>0.8915</td>
</tr>
<tr>
<td></td>
<td>COMPLEX_B</td>
<td>0.9166</td>
<td>0.9655</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>COMPLEX_C</td>
<td>0.2291</td>
<td>OMITTED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competitive Pressure</td>
<td>COMP_PRE_A</td>
<td>0.9085</td>
<td>0.9191</td>
<td>0.5781</td>
<td>0.855</td>
</tr>
<tr>
<td></td>
<td>COMP_PRE_B</td>
<td>0.9362</td>
<td>0.9303</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>COMP_PRE_C</td>
<td>0.1804</td>
<td>OMITTED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>COST_B</td>
<td>0.5152</td>
<td>OMITTED</td>
<td>0.5722</td>
<td>0.7231</td>
</tr>
<tr>
<td></td>
<td>COST_A</td>
<td>0.7955</td>
<td>0.7758</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>COST_C</td>
<td>0.905</td>
<td>0.9189</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government Support</td>
<td>GOV_A</td>
<td>0.6133</td>
<td>0.6728</td>
<td>0.4742</td>
<td>0.6911</td>
</tr>
<tr>
<td></td>
<td>GOV_B</td>
<td>0.8947</td>
<td>0.9641</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GOV_C</td>
<td>0.496</td>
<td>OMITTED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owner Innovativeness</td>
<td>INO_A</td>
<td>0.3725</td>
<td>OMITTED</td>
<td>0.4926</td>
<td>0.7624</td>
</tr>
<tr>
<td></td>
<td>INO_B</td>
<td>0.8709</td>
<td>0.942</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>INO_C</td>
<td>0.7617</td>
<td>0.7984</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizational Readiness</td>
<td>READ_EMP_LO</td>
<td>0.5811</td>
<td>OMITTED</td>
<td>0.5762</td>
<td>0.7754</td>
</tr>
<tr>
<td></td>
<td>READ_FIN</td>
<td>0.79</td>
<td>0.8869</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>READ_INFR</td>
<td>0.8756</td>
<td>0.8743</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relative Advantage</td>
<td>REL_AD3</td>
<td>0.7378</td>
<td>0.7421</td>
<td>0.5242</td>
<td>0.7544</td>
</tr>
<tr>
<td></td>
<td>REL_AD4</td>
<td>-0.4465</td>
<td>OMITTED</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>REL_AD5</td>
<td>0.9552</td>
<td>0.9788</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>REL_B</td>
<td>0.341</td>
<td>OMITTED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Security Concern</td>
<td>SECURITY_A</td>
<td>0.7032</td>
<td>0.8113</td>
<td>0.4695</td>
<td>0.7802</td>
</tr>
<tr>
<td></td>
<td>SECURITY_B</td>
<td>0.9084</td>
<td>0.9498</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SECURITY_C</td>
<td>0.2953</td>
<td>OMITTED</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Field Data, 2018
In Table 4.2.1 above, the first column contains the names of the latent exogenous as well as endogenous constructs in the research model. The second column contains the names of the indicator variables used to measure the latent variables. Assessment of the measurement model will be premised on Table 4.2.1 unless otherwise stated.

4.2.1.1 Assessment of Internal Consistency

Internal consistency assesses whether several indicators that purport to measure the same underlying construct produce similar scores. Two main approaches were used to assess internal consistency in the study: namely, the Cronbach alpha criterion, and the Composite Reliability criterion.

Firstly, the Cronbach alpha (Cronbach, 1951) provides an estimate of reliability based on the inter-correlations among indicators. A Cronbach alpha score of 0.70 is acceptable (Nunnally, 1978) but a higher alpha value is preferred. Table 4.2.1 demonstrates that all measurement variables in the specification model met the Cronbach criterion, save two; namely Cost and Government support (which recorded an alpha value of 0.63 and 0.62 respectively). Albeit these two indicators could not satisfy the Cronbach threshold for inclusion, they are still included in the study since they satisfied the more robust composite reliability test of internal consistency (Hair et al., 2014).

In addition, composite reliability (CR) score of 0.70 is an acceptable level of internal consistency, whereas a higher CR score signifies higher internal consistency. As per Table 4.2.1, it can be observed that the minimum CR threshold of 0.70 is met for all indicators in the final iteration of results. Compared to the Cronbach alpha criterion, it can be observed that two of the measurement items (namely Cost and government support) could not satisfy the
Cronbach test (as their alpha values of 0.63 and 0.62 respectively were lesser than the minimum required Cronbach threshold value of 0.7), but satisfied the CR test (in which case they recorded 0.81 and 0.86 respectively). In such situations, Hair et al. (2014) recommend that precedence is given to the CR score over the Cronbach values due to limitations inherent in the Cronbach criterion, hence those indicators were maintained on the grounds of their CR scores.

4.2.1.2 Assessment of Indicator Reliability

As a rule of thumb (heuristic), an indicator whose standardized correlation with its underlying latent construct (also known as loadings) is at least 0.708 is deemed to be reliable. It is worthy to note that, albeit literature recommends a loading of at least 0.708 to warrant the inclusion of an indicator, such a rule may be violated based on content validity, the average variance extracted and the composite reliability (Hair et al., 2014). In the study, indicators with loadings below 0.6 were necessarily eliminated (Henseller, 2009).

As observed in Table 4.2.1 above, 28 indicators were initially used to measure the nine (9) constructs in the research model. However, from the first iteration or estimation of the research model, the loadings of nine measurement items (indicators) were lesser than the 0.60 threshold adopted in the study (Henseller, 2009), implying that their reliability was questionable and as such were subsequently removed from the research model. Removal of the indicators was justified since their removal led to an improvement in Average Variance Extracted (AVE) and Composite Reliability (CR) of the underlying constructs (Henseller, 2009; Hair et al., 2014). For instance, it is observed from Table 4.2.1 above that in the first iteration or estimation of the research model, indicators encompassing COMPLEX_C; COMP_PREC; COST_B; GOV_C; INO_A; READ_EM; REL_AD; REL_ADV_B; and SECURITY_C had loadings of (0.2291); (0.1804); (0.5152); (0.496); (0.3725); (0.5811); (-0.4465); (0.341) and (0.2953) respectively.
Clearly, it is observed that all these loadings were below the threshold values of 0.70, and hence justifies their deletion from the measurement model (Henseller, 2009; Hair et al., 2014). Indeed, after their deletion, the AVE and CR scores of the associated constructs (see Table 4.2.1) improved. For instance, COMPLEX_C was one of the indicators used in measuring Technology Complexity. In the first iteration or estimation of the research model (which included Complex_C as one of the indicators), the underlying construct (i.e. Technology Complexity) recorded an AVE of 0.54 and a CR score of 0.74. However, in the final iteration, (i.e. after deletion of Complex_C from the measurement model), the AVE moved up by 34.54% (from 0.54 to 0.89). Similarly, the CR score also moved up by 19.48% (from 0.74 to 0.94), indicating that the decision to omit COMPLEX_C in the final estimation of the research model was right.

Accordingly, COMP_PREC was among the indicators measuring Competitive Pressure in the first iteration. In the first iteration (which included COMP_PREC as one of the indicators), the underlying construct (i.e. Competitive Pressure) recorded an AVE of 0.57 and a CR of 0.76. However, in the final iteration, (after removal of COMP_PREC from the measurement items) the AVE moved up by 27.69% (from 0.57 to 0.89) whereas the CR also improved by 15.77% (from 0.76-0.92), thus once again, indicating that the decision to omit COMP_PREC from the final iteration was right. The other indicators with weak loadings (below 0.6) (see Table 4.2.1 above) were removed on the same grounds.

4.2.1.3 Assessment of Convergent Validity

To establish convergent validity, the average variance extracted (AVE) criterion is applied in this study (Fornell & Larcker, 1981). As a rule of thumb, an AVE score equal to, or greater than 0.50 is acceptable as it implies that a construct explains at least 50% (half) of variation in its associated indicators. From Table 4.2.1 it is observed that on average, all the constructs in
the research model are able to account for more than half (i.e. an AVE above 0.50) of the variance in their underlying indicator items. For example, the construct that recorded the highest AVE was Complexity as it accounted for 89% (0.89) of variation in all of its associated indicators; thus beating the AVE threshold of 50% by 39%. Again, it is also observed from the final iteration in Table 4.2.1 that even the latent construct with the lowest AVE (namely Adoption) exceeded the 50% threshold by 15% (thus an AVE of 65% or 0.65). This also demonstrates the measurement items are valid as far as convergence is concerned.

4.2.1.4 Assessment of Discriminant Validity

As discussed in chapter three, three main tests were carried out in this study to assess discriminant validity. They are:

1. The Heterotrait-Monotrait ratio of correlation.
2. The Fornell-Larcker criterion
3. The Indicator Cross Loadings

The Heterotrait-Monotrait Ratio of Correlations (HTMT) is used in assessing discriminant validity to the extent that an HTMT value lesser than 0.90 demonstrates that discriminant validity has been attained. However, when the ratio of correlation between two different constructs is above 0.90, it implies a lack of discriminant validity (Gold et al. 2001). See Table 4.2.1.1 below for the results of the HTMT test and subsequent discussion.
Table 4.2.1.1 HTMT Ratio of Correlation

<table>
<thead>
<tr>
<th></th>
<th>ADOPTION</th>
<th>COMPETITIVE PRESSURE</th>
<th>COMPLEXITY</th>
<th>COST</th>
<th>OWNER SUPPORT</th>
<th>GOV. SUPPORT</th>
<th>ORG. READ</th>
<th>REL. ADV</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADOPTION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP. PRESSURE</td>
<td>0.722</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMPLEXITY</td>
<td>0.2364</td>
<td>0.5811</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COST_</td>
<td>0.6247</td>
<td>0.5354</td>
<td>0.2459</td>
<td>0.3971</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OWNER. INNOV.</td>
<td>0.4755</td>
<td>0.148</td>
<td>0.3744</td>
<td>0.3971</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GOV. SUPPORT</td>
<td>0.6289</td>
<td>0.6048</td>
<td>0.074</td>
<td>0.1301</td>
<td>0.2663</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ORG. READ</td>
<td>0.7915</td>
<td>0.346</td>
<td>0.0929</td>
<td>0.55</td>
<td>0.3239</td>
<td>0.34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>REL. ADV</td>
<td>0.5626</td>
<td>0.2712</td>
<td>0.3498</td>
<td>0.3776</td>
<td>0.1617</td>
<td>0.2148</td>
<td>0.3129</td>
<td></td>
</tr>
<tr>
<td>SECURITY</td>
<td>0.3621</td>
<td>0.256</td>
<td>0.2021</td>
<td>0.2619</td>
<td>0.1739</td>
<td>0.693</td>
<td>0.5068</td>
<td>0.1508</td>
</tr>
</tbody>
</table>

Source: Field Data, 2018

It is observed from Table 4.2.1.1 above that none of the HTMT correlations between latent constructs exceeded or was even equal to the cut-off threshold value of 0.90, indicating a higher level of discriminant validity in the research model. It is also observed that the highest HTMT correlation between constructs in the matrix was **0.7915** (between latent constructs “organizational readiness and adoption”), which is still below the cut-off point of 0.9 by 11%.

Again, Government support and complexity demonstrated the highest level of discriminant validity as their HTMT ratio of correlation was the lowest in the HTMT matrix. Thus, having recorded an HTMT ratio of **0.074**. All the other constructs in the model demonstrated discriminant Validity.

Secondly, the Fornell-Larcker criterion requires that to establish adequate discriminant validity, the diagonal elements (i.e. square root of AVEs) of the Fornell-Larker matrix should be greater than the off-diagonal elements in the corresponding rows and columns. Where the off-diagonal values are greater than the diagonal values (i.e. square root of AVEs), it signifies a lack of discriminant validity. Table 4.2.1.2 below contains the results of the Fornell-Larker criterion.
test. All values in bold are the diagonal values (i.e. square root of AVEs), whereas all other values are the off-diagonal values.

Table 4.2.1.2 Fornell-Larcker Criterion

<table>
<thead>
<tr>
<th></th>
<th>ADOPTION</th>
<th>COMP. PRESSURE</th>
<th>COMPLEXITY</th>
<th>COST</th>
<th>OWNER INNO</th>
<th>GOV. SUPPORT</th>
<th>ORG. READ</th>
<th>REL._ADV</th>
<th>SECURITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADOPTION</td>
<td>0.8063</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMP. PRESSURE</td>
<td>0.5612</td>
<td>0.9247</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMPLEXITY</td>
<td>0.2004</td>
<td>0.5022</td>
<td>0.9442</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COST</td>
<td>-0.4475</td>
<td>-0.3843</td>
<td>-0.1364</td>
<td>0.8503</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OWNER INNO</td>
<td>0.3515</td>
<td>0.0519</td>
<td>-0.3013</td>
<td>-0.268</td>
<td>0.8731</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GOV. SUPPORT</td>
<td>0.4915</td>
<td>0.4334</td>
<td>0.0177</td>
<td>0.0616</td>
<td>0.1204</td>
<td>0.8313</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ORG. READ</td>
<td>0.5652</td>
<td>0.2663</td>
<td>-0.0712</td>
<td>-0.3703</td>
<td>0.2494</td>
<td>0.2443</td>
<td>0.8806</td>
<td></td>
<td></td>
</tr>
<tr>
<td>REL._ADV</td>
<td>0.4921</td>
<td>0.2534</td>
<td>0.3025</td>
<td>-0.3553</td>
<td>0.072</td>
<td>0.0827</td>
<td>0.1424</td>
<td>0.8685</td>
<td></td>
</tr>
<tr>
<td>SECURITY</td>
<td>0.2302</td>
<td>-0.0376</td>
<td>-0.1085</td>
<td>-0.0012</td>
<td>-0.023</td>
<td>0.5396</td>
<td>0.4016</td>
<td>0.0266</td>
<td>0.8833</td>
</tr>
</tbody>
</table>

Source: Field Data, 2018

Table 4.2.1.2 demonstrates that discriminant Validity assumptions have been satisfied. This is because as can be observed from the matrix above (i.e Table 4.2.1.2), none of the correlation between any two latent variables was larger than or even equal to the square root of AVEs (i.e. the bold text in the matrix) of underlying constructs. For example, it is observed from Table 4.2.1.2 that the latent variable “COMP. PRESSURE” has an AVE of 0.9247 which is higher than any of its correlation with other latent constructs in the research model. This implies that the latent construct “competitive pressure” shares more variance with its underlying indicators than with any other construct in the research model (Henseller, 2009; Hair et al., 2014). Similarly, it is also observed that the latent construct “Adoption (D.V)” recorded an AVE of 0.8063 which was higher than any of its correlation with other latent constructs in the research.
model. The same trend was satisfied for all other constructs in the model, indicating that discriminant validity has been achieved in the study.

The last option (in this study) for verifying discriminant validity involves the examination of indicator cross-loadings. With this, 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. For instance, from the cross-loadings table (see Appendix E), it is observed that COMPLEX_A and COMPLEX_B were indicators measuring the latent construct Complexity. As observed, COMPLEX_A loaded at the rate of 0.9224 on its underlying construct (Complexity). It however loaded at the rate of 0.1475; 0.4215; -0.1549; -0.3661; -0.0228; -0.0772; 0.2787 and -0.0757 respectively on the other latent constructs namely ADOPTION; COMPETITIVE PRESSURE; COST; DECISION MAKER INNOVATIVENESS; GOVERNMENT SUPPORT; ORGANIZATIONAL READINESS; RELATIVE_ADVANTAGE and SECURITY respectively. Notice that the indicator COMPLEX_A has loaded the highest on its associated construct (COMPLEXITY) than on the other constructs named above, this suggests that discriminant validity has been established. Accordingly, COMPLEX_C, loaded at the rate of 0.9655 on its underlying construct (Complexity). It however loaded at the rate of 0.2187; 0.513; -0.112; -0.2313; 0.0435; -0.0609; 0.2923 and -0.1212 on the other latent constructs (namely ADOPTION DV; COMPETITIVE PRESSURE; COST; DECISION MAKER INNOVATIVENESS; GOVERNMENT SUPPORT; ORGANIZATIONAL READINESS; RELATIVE_ADVANTAGE and SECURITY respectively. This demonstrates that discriminant validity has been attained as far as COMPLEX_C is concerned. All the other measurement variables maintained in the final estimation of results adequately established discriminant validity. See cross loadings at Appendix E.
4.2.2 STRUCTURAL / INNER MODEL ASSESSMENT

A six-step approach (discussed in chapter three) as seen in Fig. 3.8.3 below is adopted in assessing the structural model.

![Fig 3.8.3 STRUCTURAL MODEL ASSESSMENT PROCEDURE](University of Ghana http://ugspace.ug.edu.gh)

**Source: Adapted from Hair et al. (2014)**

Discussion of the procedures outlined above are presented on the next page.
4.2.2.1 Collinearity Assessment

Variance Inflation Factor (VIF) criterion is applied in assessing the inner model for collinearity (Hair et al., 2014). As a rule of thumb, a VIF value of 5 and higher indicates a potential collinearity problem (Hair, Ringle & Sarstedt, 2011), as these levels indicate that 80% of a constructs variance is accounted for by the other constructs in the research model.

Table 4.2.2.1 Variance Inflation Factors

| Source: Field Data, 2018 |

<table>
<thead>
<tr>
<th></th>
<th>ADOPTION</th>
<th>COMP_PRE</th>
<th>COMPLEXITY</th>
<th>COST</th>
<th>OWNER</th>
<th>GOV. SUPPORT</th>
<th>ORG. READ</th>
<th>REL_ADV</th>
<th>SECURITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADOPTION</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>COMP_PRE</td>
<td>2.9547</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>COMPLEXITY</td>
<td>1.8536</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>COST</td>
<td>1.7552</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>OWNER INNOV</td>
<td>1.3572</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>GOV. SUPPORT</td>
<td>2.6931</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>ORG. READ</td>
<td>1.6156</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>REL_ADV</td>
<td>1.267</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>SECURITY</td>
<td>2.2176</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

4.2.2.2 Assessment of Path Significance

The test statistics (t statistics) approach is adopted in assessing the significance of hypothesized relationships. A hypothesis is not rejected if its t-statistics is 1.96 or above. In
the study, all statistical tests were run in a two-tailed test at 5% significance level. The result
produced by the PLS-SEM software are presented in Table 4.2.2.2 below

Table 4.2.2.2 Structural Model Assessment

<table>
<thead>
<tr>
<th></th>
<th>T Statistics</th>
<th>Path Coefficient (β)</th>
<th>Hypotheses</th>
<th>Predictive Relevance Q²</th>
<th>Effect Size (f²)</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADOPTION</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>0.306</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>COMPETITIVE PRESSURE-&gt; (DV)</td>
<td>1.515</td>
<td>0.117</td>
<td>Not Supported</td>
<td>0.4446</td>
<td>0.0198</td>
<td>N/A</td>
</tr>
<tr>
<td>COMPLEXITY-&gt; (DV)</td>
<td>1.795</td>
<td>0.092</td>
<td>Not Supported</td>
<td>0.5065</td>
<td>0.0163</td>
<td>N/A</td>
</tr>
<tr>
<td>COST_-&gt; (DV)</td>
<td>2.327</td>
<td>-2.327</td>
<td>Supported</td>
<td>0.2107</td>
<td>0.0287</td>
<td>N/A</td>
</tr>
<tr>
<td>INNOVATIVENESS-&gt; (DV)</td>
<td>3.872</td>
<td>0.179</td>
<td>Supported</td>
<td>0.2864</td>
<td>0.0879</td>
<td>N/A</td>
</tr>
<tr>
<td>INNOVATIVENESS-&gt;ORG_READ</td>
<td>3.948</td>
<td>0.251</td>
<td>Supported</td>
<td>N/A</td>
<td>0.0663</td>
<td>6.30%</td>
</tr>
<tr>
<td>GOVERNMENT SUPPORT-&gt; (DV)</td>
<td>4.782</td>
<td>0.366</td>
<td>Supported</td>
<td>0.1867</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ORG_READ-&gt; (DV)</td>
<td>8.478</td>
<td>0.362</td>
<td>Supported</td>
<td>0.2975</td>
<td>0.2697</td>
<td>N/A</td>
</tr>
<tr>
<td>RELATIVE_ADVANTAGE-&gt; (DV)</td>
<td>7.118</td>
<td>0.308</td>
<td>Supported</td>
<td>0.2848</td>
<td>0.2417</td>
<td>N/A</td>
</tr>
<tr>
<td>SECURITY-&gt; (DV)</td>
<td>1.357</td>
<td>-0.096</td>
<td>Not Supported</td>
<td>0.3148</td>
<td>0.0139</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Source: Field Data, 2018

From Table 4.2.2.2 above, a path coefficient whose t-statistic value is greater than or equal to 1.96 is deemed to have established statistical significance, hence validating and supporting the associated hypothesized relationship. In regard to this, hypothesized relationships for constructs COMPLEXITY, COST, OWNER INNOVATIVENESS -> (DV); OWNER INNOVATIVENESS -> ORG_READ; GOVERNMENT SUPPORT; ORG_READ -> (DV) and RELATIVE_ADVANTAGE were all supported; whereas that of COMPETITIVE PRESSURE; COMPLEXITY, and SECURITY were not supported, where “DV” means dependent variable. These relationships are discussed in detail in subsequent sections.

4.2.2.3 Assessment of Coefficient of Determination (R²)

In this study, and from Table 4.2.2.2 above, the R² value of 71% means that on average, 71% of the variation in CAIS adoption among SMEs in Ghana is substantially explained by the exogenous variables in the research model (Chin, 1998; Moore, 2013). Nonetheless, as
indicated by Hair et al. (2014), where the research model is a complex one, the $R^2$ values may be biased by the number of complex variables (also called "curse of dimensionality") used in the research model. The adjusted $R^2$ 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 0.70 was attained. Although lesser than the raw $R^2$ value of 0.71 by 1%, it still confirms that variation in CAIS adoption among SMEs is substantially explained by the exogenous variables in the research model.

4.2.3.4 Assessment of Effect Sizes ($f^2$)

This statistic (i.e. effect size) measures the relative importance of exogenous constructs in explaining endogenous constructs (by re-calculating the $R^2$ through the blindfolding). An effect size of 0.02 is small, 0.15 is moderate and 0.35 is substantial (Cohen, 1988). From Table 4.2.2.2 above, effect sizes ranging 0.01-0.02 were recorded for COMPETITIVE PRESSURE, COMPLEXITY, and SECURITY, indicating that their individual contribution to explaining CAIS adoption among SMEs in Ghana is small. GOVERNMENT SUPPORT, ORG_ READ, and RELATIVE_ADVANTAGE have close to strong effect on CAIS adoption among SMEs, as they recorded effect sizes of 0.17, 0.27 and 0.24 respectively. Again, the effect of COST and OWNER INNOVATIVENESS are considered close to moderate as their $f^2$ values stand at 0.03 and 0.09 respectively. The indirect effect size of OWNER INNOVATIVENESS on ORGANIZATIONAL READINESS was 0.07, this is also considered close to moderate. Note that all these scores have been rounded to two decimal places in the discussion.
3.2.2.5 Assessment of Predictive Relevance ($Q^2$)

When PLS-SEM model exhibits predictive relevance, it accurately predicts the data points of indicators in a reflectively measured model. $Q^2$ (predictive relevance) values larger than zero for a construct proves that the construct has predictive relevance (Hair et al., 2014).

As can be seen from Table 4.2.2.2, the cross-validated communality ($Q^2$) statistics was greater than zero (0) for all the constructs, implying that the explanatory variables in the research model have predictive relevance (Fornell & Cha, 1994). Specifically, from Table 4.2.2.2, it can be observed that latent constructs encompassing ADOPTION; COMPETITIVE_PRESSURE-$\rightarrow$(DV); COMPLEXITY-$\rightarrow$(DV); COST-$\rightarrow$(DV); INNOVATIVENESS-$\rightarrow$(DV); GOVERNMENT_SUPPORT-$\rightarrow$(DV); ORG_READ-$\rightarrow$(DV); RELATIVE_ADVANTAGE-$\rightarrow$(DV); and SECURITY-$\rightarrow$(DV) recorded $Q^2$ values of 0.306; 0.4446; 0.5065; 0.2107; 0.2864; 0.1867; 0.2975; 0.2848; and 0.3148 respectively. Clearly, it can be said that all the latent constructs have demonstrated predictive relevance since their Q2 values are greater than Zero.

The effect size of $Q^2$ (known as $q^2$) is another statistic that can be used to assess the predictive relevance of the structural model, however, such criterion has met with objections concerning its conceptual basis of operation, hence not considered in this study (Hair et al., 2014).
4.3 DISCUSSION OF HYPOTHESES RELATIONSHIPS

Using a two-tailed test with a significance level of 5%, a path coefficient is deemed significant if its corresponding t-statistics is larger than 1.96 (Hair et al., 2014). The results of the bootstrap test are interpreted for the TOE estimate below.

Fig: 4.3 Adapted Bootstrap results

Source: Field Data, 2018.
4.3.1 TECHNOLOGICAL DETERMINANTS OF CAIS ADOPTION

4.3.1.1 Relative Advantage and CAIS Adoption

Hypothesis (H1): There is a significant positive relationship between Relative Advantage and CAIS adoption among SMEs.

Relative advantage established a significant positive relationship with CAIS adoption at 5% significance level with a t-statistic of 7.11 (second highest in the model), and a path coefficient (β) of 0.308. We therefore fail to reject H1.

As per the estimated result in Fig 4.3 above, it is observed that when the inherent benefits (relative advantage) associated with adopting a CAIS technology is enhanced by 1 unit, SMEs adoption of the innovation will significantly increase by 30.3%, all things being equal. A t-statistics value of 7.11 implies that the observed positive relationship was not due to random chance, we therefore fail to reject H1 and accept that the higher the benefits of CAIS technology, the higher the likelihood of SMEs adopting it, all other factors being constant. This confirms prior studies by Wan and Ali (2013) who found that relative advantage influences CAIS adoption among SMEs in Malaysia. In 2015, a study conducted by Nyang’au (2015) in Kenya also concluded that relative advantage has a significant positive influence on CAIS adoption. Again the construct “relative advantage” recorded an effect size (f²) of 0.3, implying that relative advantage makes a moderate (or close to strong) contribution towards explaining CAIS technology adoption among SMEs in Ghana, compared to other constructs in the Model (Cohen, 1988). A Stone-Geisser’s Q² value of 0.2848, which is greater than zero (0) suggest that relative advantage has predictive relevance in the structural model of this study.
4.3.1.2 Complexity and CAIS Adoption

Hypothesis (H2): *There is a significant positive relationship between ease of use and CAIS adoption among SMEs.*

Ease of use (Complexity), although demonstrated a positive relationship with CAIS adoption (see Fig 4.3), such relationship was insignificant at 5% significance level; as it recorded a t-statistics value of 1.795 (which is below 1.96), and a path coefficient (β) of 0.092. We therefore fail to accept H2.

Complexity, as used in this study, refers to the ease with which a technology can be understood and applied. From Fig 4.3, a positive coefficient (β) of 0.092 signifies that, when the ease with which SMEs can learn and implement a new CAIS technology improves by 1 unit, the likelihood of CAIS adoption increases by 9.2%, other factors held constant; a reverse in the same direction is true. Nonetheless, it is noteworthy that results of the study suggest that such observed relationship may be due to random chance (coincidence or error) as the t-statistics value of 1.792 does not meet the minimum acceptable level of 1.96 (Hair et al., 2014) to warrant a significant relationship. We therefore fail to accept H2. In terms of effect size (f²), complexity is found to have a weak effect (relative to other exogenous constructs) on SMEs decision to adopt CAIS as its f² (effect size) stands at a small level of 0.0163 (Cohen, 1988).

Again, although not supported, complexity has predictive relevance in the research model since its Q² value is greater than zero (see Table 4.2.2.2). These findings are contrary to earlier findings by Grandon and Pearson (2004), and Gwangwava et al. (2012). This may be due to the fact that most of the respondents who reported to have adopted CAIS technology were mainly making use of Word processing packages like Microsoft Excel whose level of difficulty is relatively low compared to well integrated and complex accounting systems like Tally, Sage, QuickBooks.
4.3.1.3 Cost and CAIS Adoption

Hypothesis (H₃): *Cost has a significant negative influence on CAIS adoption among SMEs.*

With a path coefficient (β) of 0.119 and t-statistics value of 2.327, Cost established a significant negative relationship with CAIS adoption at a 5% significance level. We therefore fail to reject hypotheses 3.

As per the estimated results in Fig. 4.3, a path coefficient (β) of 0.119 implies that if the cost of adopting CAIS increases by $1, the likelihood of SMEs adopting it will decrease by 11.9% when all other factors are held constant. A t-statistic value of 2.327 (thus above the threshold of 1.96) implies that the relationship observed between cost and CAIS adoption cannot be attributed to random chance, hence we fail to reject H₃ and accept that when the cost of CAIS is high, SMEs are less likely to adopt them. Nonetheless, the relative impact of cost as an exogenous construct explaining CAIS adoption is only close to moderate, thus having recorded an effect size of 0.03 which Cohen (1988) describes as small. Despite having a small effect size, cost has predictive relevance as its Q² value is greater than zero (Stone-Geisser, 1974). This result is in line with findings by Nyang’au (2015) in the Kenyan context, as well as findings by Irefin et al. (2012) in the Nigerian context. The result, however, contradicts the findings by Adebayor et al. (2013) in the Nigerian Context. This suggests that more studies into the mechanisms through which cost can influence technology adoption in the SME context are needed.

4.3.1.4 Security Risk and CAIS Adoption

Hypothesis (H₄): *There is a significant negative relationship between Risk Concern and CAIS adoption among SMEs.*
A negative path coefficient ($\beta$) of -0.096 confirms the first part of the hypothesis that security risk relates negatively with CAIS adoption. However, with a t- Statistic of 1.357, such relationship is considered insignificant at 5% significance level. So we fail to accept $H_4$.

The model estimate depicts a negative path coefficient ($\beta$) of -0.096 between security risk and CAIS adoption. This means that when the security risk associated with CAIS adoption (E.g. privacy issues, system breakdown, etc.) is high by 1 unit, SMEs will be less likely to adopt the CAIS technology by 9.6%, all things being equal. Following the guideline outlined by Hair et al. (2014), t-statistics value of 1.36 that the construct recorded is below the acceptable level of 1.96 to establish a significant relationship. We therefore fail to accept $H_4$ on this ground. Again, in terms of effect size, security risk scored an $f^2$ of 0.02. This implies that the contribution of security risk as an exogenous construct in explaining CAIS adoption among SMEs is small, in accordance with Cohen’s (1988) criteria. However, a Stone-Geisser's $Q^2$ value of 0.3148 which is greater than zero (0) suggest that security risk has predictive relevance. Earlier findings by Ngadiman et al. (2014) that, risks associated with adopting CAIS (e.g. Privacy breaches and data compromise) significantly influence actual adoption has been contradicted by the findings of this study.
4.3.2 ORGANIZATIONAL DETERMINANTS OF CAIS ADOPTION

4.3.2.1 Testing for the Mediation effect of Organizational Readiness

Preacher and Hays’ (2008) bootstrapping approach to mediation analysis require that three conditions be met in order to establish a mediation effect (see chapter three for further details), study results related to these conditions are presented below:

Table 4.3.2.1 Mediation Analysis (5% sig)

<table>
<thead>
<tr>
<th>Path</th>
<th>Path Coefficient (β)</th>
<th>T statistics</th>
<th>P Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct without mediator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owner Innovativeness → Adoption</td>
<td>0.253</td>
<td>5.8415</td>
<td>0</td>
</tr>
<tr>
<td>Indirect with Mediator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owner Innovativeness → Adoption</td>
<td>0.179</td>
<td>3.872</td>
<td>0.0001</td>
</tr>
<tr>
<td>Owner Innovativeness → Org. Readiness</td>
<td>0.251</td>
<td>3.948</td>
<td>0.0002</td>
</tr>
<tr>
<td>Org. Readiness → Adoption</td>
<td>0.362</td>
<td>8.478</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Field Data, 2018

The First Condition for Mediation requires the existence of significant direct influence. In Table 4.3.2.1 above, the direct path relationship was estimated via bootstrapping without the mediator, and the results reveal that the direct path from *owner innovativeness → CAIS adoption* is statistically significant at 5% significance level (with a t-statistic value of 5.84); hence the first condition for mediation is met, we consider the next criterion.

The Second condition for Mediation also requires the existence of significant indirect influence. Results in Table 4.3.2.1 above shows that the indirect path relationship after introducing the mediator variable is statistically significant at 5% significance level (with a t-statistic of 8.478). Therefore, this proves that the inclusion of *organizational readiness* (in the
research model) as a mediator is meaningful. We then proceed with the final condition necessary for mediation analysis.

The Final condition for Mediation involves the assessment of Variance Accounted For (VAF). After establishing that mediation effect is probable, we then calculate the VAF (variance accounted for) to assess the strength of the mediation effect. The VAF is arrived at by dividing the coefficient of the indirect effect by the total effect. In the study, the VAF was 33.7% and since it falls within the range of 20%-80%, it can be concluded based on Hayes and Preacher’s (2008) criterion that Organizational Readiness is a Partial Mediator between Owner Innovativeness and CAIS Adoption (see chapter three for discussion on approach to mediation analysis). Hypotheses regarding the mediating effect are discussed below.

4.3.2.2 Organizational Readiness and CAIS Adoption

Hypothesis (H₅): Organizational Readiness significantly mediates the positive relationship between Owner Innovativeness and CAIS adoption among SMEs.

The results confirmed the hypothesis to the effect that organizational readiness positively and significantly mediates the relationship between owner innovativeness and CAIS adoption. A mediating path coefficient of 0.362 and t statistics value of 4.782 at 5% significance level proves this. We therefore fail to reject H₅

From Table 4.2.2.2 and Fig 4.3 above, it is observed that a one-unit improvement in SMEs readiness towards adopting CAIS will lead to a statistically significant increase in the likelihood of actual adoption by 36.2%, provided that the extent of organizational readiness is significantly influenced by owner innovativeness. We therefore conclude, based on the results in Table 4.2.2.2, and Table 4.3.2.1, that organizational readiness is a channel through which
owner innovativeness can influence CAIS adoption. It is noteworthy that the mediating effect of organizational readiness recorded the highest effect size ($f^2$) in the structural model, as it recorded an effect size ($f^2$) of 0.2697. Moreover, a $Q^2$ value of 0.2975 suggests that Organizational readiness as an exogenous variable has predictive relevance. This finding is novel as far as technology adoption studies are concerned. This is because almost all (if not all) previous studies (see Thong, 1999; Quaddus & Woodside, 2015) have focussed on the direct relationship between owner innovativeness and technology adoption, without due consideration for potential mediating effect (i.e. with organizational readiness being the mediator).

### 4.3.2.3 Owner Innovativeness and Organizational Readiness

Hypothesis ($H_6$): Owner Innovativeness has a significant positive influence on Organizational Readiness.

Owner innovativeness established a significant positive relationship with organizational readiness; with a path coefficient of 0.251 and a t-statistic value of 3.948 at 5% significance level. We therefore fail to reject $H_6$.

From Table 4.2.2.2 above, the direct path coefficient of 0.251 between Owner Innovativeness and Organizational readiness implies that SME firms will be more prepared (ready) to adopt CAIS technology by 25.1% when the level of owner innovativeness improves by 1 unit, all things being equal. Again, a t-statistics value of 3.948 implies that such observed relationship was not due to chance, but statistically significant, we therefore fail to reject $H_6$. The effect of Owner innovativeness on SMEs readiness to adopt CAIS is regarded as close to moderate since its effect size ($f^2$) of 0.0879 is considered small (Cohen, 1988). Moreover, the $Q^2$ of the construct was greater than zero, implying that owner innovativeness has predictive relevance.
as far as organizational readiness is concerned. It is difficult to situate this observed indirect relationship within literature, as almost all previous studies have focussed on the direct relationship between Owner innovativeness and technology (e.g. Thong, 1999; Quaddus & Woodside, 2015).

4.3.2.4 Owner Innovativeness and CAIS Adoption

Hypothesis (H7): Owner Innovativeness has a significant positive influence on CAIS adoption among SMEs.

Owner innovativeness shows a significant, direct positive influence on CAIS adoption at 5% significance level; with a path coefficient (β) of 0.179 and a t-statistics Value of 3.872. We therefore fail to reject (H7).

As per Fig 4.3, the path coefficient (β) of 0.179 and t-Statistics value of 3.872 means SMEs whose owners are highly innovative are also more likely to adopt CAIS technology. Speaking to the results in Fig 4.3, it can be inferred that CAIS adoption among SMEs is likely to improve by 17.9% following a one-unit improvement in owner innovativeness, all other factors held fixed. Accordingly, owner innovativeness has a close to moderate effect on CAIS adoption among SMEs, with an effect size of 0.3. Thus effect sizes of 0.02, 0.15, and 0.35 are described by Cohen (1988) as small, moderate and substantial respectively. Owner innovativeness also demonstrates predictive relevance as its Q² value is greater than zero. This finding corroborates with previous findings by Thong (1999), Ismail (2003), Al-Qirim (2007) and Mohd et al. (2012). However, this result contradicts earlier findings by Quaddus and Woodside (2015), whose study concluded that owner innovativeness does have any significant direct influence on technology adoption at the firm level.
4.3.3 ENVIRONMENTAL DETERMINANTS OF CAIS ADOPTION

4.3.3.1 Government Support and CAIS adoption
Hypothesis (H₈): Government support has a significant positive influence on CAIS adoption among SMEs.

The results demonstrate a positive significant relationship between government support and organizational readiness at 5% significance level. A path coefficient (β) of 0.36 and a t-statistics value of 4.78 therefore, suggest that we fail to reject Hypotheses H₈.

Government Support as seen from Fig 4.3 shows a positive path coefficient (β) of 0.36. This means that the likelihood of CAIS adoption by SMEs will increase by 36% if government support to that effect increases by 1 unit, all other factors held constant. Again, a t-statistics value of 4.78 (above the minimum required level 1.96) at 5% significance level suggest that such observed relationship was not due to random chance, but was statistically significant. We therefore fail to reject H₈. Moreover, an f² of 0.17 suggests that government support makes a close to moderate contribution towards explaining the variation in CAIS adoption among SMEs in Ghana. More importantly, a Q² of 0.1867 proves that Government Support has predictive relevance in the research model. This result confirms earlier findings of Wan et al. (2013), Awiagah et al. (2016), and Martinsons (2008).

4.3.3.2 Competitive Pressure and CAIS Adoption
Hypotheses (H₉): Competitive pressure has a significant positive influence on CAIS adoption among SMEs

Judging by a positive path coefficient (β) of 0.11, Competitive pressure is said to have demonstrated a positive relationship with CAIS adoption just as hypothesized. However, with
a t-statistics value of 1.51, such a relationship was insignificant at 5% significance level. We therefore fail to accept $H_9$.

The estimates in Fig 4.3 shows that when there is a one-unit increase in competitive pressure (in SMEs business environment), the likelihood of CAIS adoption also increases by 11.9%, all factors held fixed. At 5% significance level in a two-tailed test, this relationship is found to be insignificant, hence, we fail to accept $H_9$. This result contradicts earlier findings by Awiagah et al. (2016), who in a study, concluded that competitive pressure has a statistically significant influence on technology adoption in the Ghanaian context. Although Competitive pressure failed to establish a statistically significant relationship with CAIS adoption, it had predictive relevance as its $Q^2$ value of 0.1867 is greater than Zero.

### 4.4 CHAPTER SUMMARY

The chapter began by demonstrating internal consistency reliability and discriminant validity of the outer model. It then proceeded with the evaluation of the Inner model by assessing the variance inflation factors, the coefficient of determination, path significance, effect sizes and predictive relevance of the structural model. After establishing that both the Inner and Outer models were reliable and valid, the chapter then proceeded by discussing the hypothesized relationships and drawing inferences from literature. The final results are that under the technological context of the TOE framework, Relative Advantage and Cost established a significant relationship with CAIS adoption, whereas complexity and Security did not. Under the Organizational Context, all hypothesized relationships were found to be significant, whereas only Government Support established a significant relationship with CAIS adoption under the Environment dimension of the TOE framework.
CHAPTER FIVE
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.0 INTRODUCTION
This is the concluding chapter of the study and it presents a summary of the study, major findings, conclusions, and recommendations.

5.1 RESEARCH SUMMARY
The study sought to investigate factors (within the TOE and DOI theoretical frameworks) that influence the adoption of computerized accounting information systems (CAIS) among SMEs. The Quantitative research design was employed in the study and the structural equation modelling technique was adopted in analysing hypothesized relationships. The initial model specification involved 28 measurement variables, however, nine (9) of these variables were eliminated as they could not satisfy validity and reliability assumptions encompassing internal consistency reliability, convergent validity and discriminant validity. The structural model was assessed by means of the coefficient of determination ($R^2$), effect sizes ($f^2$), predictive relevance ($Q^2$), and the inner variance inflation factors (VIF). The research model explained about 71% of the variation in CAIS adoption among SMEs in Ghana (i.e. an $R^2$ of 71%). Moreover, since all the constructs recorded VIFs (variance inflation factors) lesser than five (5), it can be assumed that the result of the study is valid and not biased by issues pertaining to multicollinearity (Hair et al., 2014). Other tests of predictive relevance such as the cross-validated communality ($Q^2$), and effect size ($f^2$) produced satisfactory results. Among the nine hypotheses, relative advantage, cost, government support, owner innovativeness, and organizational readiness established a significant relationship with CAIS adoption.
5.2 SUMMARY OF RESEARCH FINDINGS

The main research findings are summarized in line with the three constructs of the TOE theoretical framework (i.e. Technology-Organization-Environment framework). It is also noteworthy that the research objectives were premised on the constructs of the TOE framework. Research objective one relates to the technological dimension of the TOE framework. Research objective two and three, on the other hand, relates to the Organizational dimension of the TOE framework whereas research objective four relates to the environmental dimension of the TOE framework. In essence, the findings of the study are summarised as follows:

I. Findings related to Technological Determinants of CAIS adoption,
II. Findings related to Organizational Determinants of CAIS adoption, and
III. Findings related to Environmental Determinants of CAIS adoption.

5.2.1 TECHNOLOGICAL DETERMINANTS OF CAIS ADOPTION.

Findings on the technological determinants of CAIS adoption relates to study objective one. These are discussed below.

5.2.1.1 Relative Advantage and CAIS Adoption

The study found that positive perceptions of SMEs about the benefits of CAIS provide an incentive to adopt the innovation. Among SMEs who have already adopted CAIS technology, it was found that most firms adopted CAIS because it improves accounts receivables and payables tracking, inventory management, timeliness of reporting accounts, among others. Accordingly, among SMEs who plan to adopt CAIS in the near future (Non-Adopters), the study found that the decision to adopt CAIS was greatly influenced by the perceived benefits
of CAIS systems over manual accounting systems. It is noteworthy that Relative Advantage was found to be the second strongest determinant of CAIS adoption after organizational readiness. This finding is supported by the earlier finding of Thong (1999), and Rahayu and Day (2015). Research finding by Appiah et al. (2014) also corroborate with the finding of this study as far as relative advantage is concerned. Appiah et al. (2014) found that “relative advantage” influences CAIS adoption among state Owned enterprises in developing economies.

5.2.1.2 Cost and CAIS Adoption

The study found that SMEs are more likely to adopt an affordable CAIS technology compared to a relatively expensive one. Notably, cost of initial acquisition, as well as operating and maintenance costs were found to drive adoption of CAIS among SMEs. This finding corroborates with findings by Senyo, Effah, and Addae (2016), and Thong (1999) who found that usually, SMEs in developing countries tend not to be financially sound and hence, are more likely to adopt a relatively less expensive technology.

5.2.1.3 Complexity, Security risk and CAIS Adoption

It is noteworthy that Complexity, which measures the ease with which SMEs can use CAIS technology was not found to have any strong influence on adoption. This was expected as most SMEs included in the study had adopted simple word processing application like Microsoft Excel in performing accounting function. Security risk (which measured the extent to which potential negative consequences of CAIS technology can influence adoption) was also not found to have any strong influence CAIS adoption.
5.2.2 ORGANIZATIONAL DETERMINANTS OF CAIS ADOPTION

Research findings on organizational determinants of CAIS adoption relate to study objective two and three. Whereas section 5.2.2.1 addresses study objective two, section 5.2.2.2 addresses study objective three. Research findings in relation to the organizational context of the TOE framework are discussed below.

5.2.2.1 The Direct influence of Owner Innovativeness on CAIS adoption

The study found that SMEs whose owners are more innovative and have good skills in the use of computers are more likely to adopt CAIS technology than otherwise. The reason is that such owners are more likely to be aware of the potential benefits of using computers in performing accounting functions in business. This finding is in line with findings by Thong (1999), and Rahayu and Day (2015) who found that owner innovativeness has a direct influence on CAIS adoption.

5.2.2.2 The Mediating Effect “Organizational Readiness” between “Owner Innovativeness” and “CAIS adoption”

The study found that Owner Innovativeness has an indirect influence on CAIS adoption through organizational readiness (thus, organizational readiness mediates the relationship between owner innovativeness and CAIS adoption). By implication, this means that when an owner is technologically inclined, He will ensure that resources that are required (e.g. financial resources, and technology infrastructure) to adopt a particular technology are available in the firm, and availability of such resources would imply that the firm is ready to adopt a particular innovation (CAIS) and hence, subsequent adoption. The indirect influence of owner innovativeness on CAIS adoption was found to be the strongest driver of CAIS adoption among SMEs in Ghana. This finding of the study appears to be novel, and the first (if not among the few) as far as technology adoption is concerned. This is because previous studies (e.g. Thong,
1999; Rahayu & Day, 2015; Quaddus & Woodside, 2015) only considered the direct influence of owner innovativeness on technology adoption and not the indirect influence through organizational readiness.

5.2.3 ENVIRONMENTAL DETERMINANTS OF CAIS ADOPTION

Research findings on the environmental determinants of CAIS adoption relate to study objective four. Research findings in relation to the environmental context of the TOE framework are discussed below.

5.2.3.1 Government Support and CAIS adoption

The study found that SMEs are more likely to adopt CAIS technology if the government supports them in one way or the other. Notably, such support could either be financial (where the government subsidizes the cost of technology adoption) or regulatory (where the government ensures a favourable regulatory environment exist to support technology adoption- e.g. laws preventing cybercrime, tax exemptions for the cost of ICT training 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 SMEs.

5.2.3.2 Competitive Pressure and CAIS adoption

The study found that competition in SMEs’ business environment (such as those from direct competitors, trading partners, among others) does not influence CAIS adoption. This finding contradicts earlier findings by Al-Qirim (2007), and Battisti et al. (2007). However, it corroborates with recent findings by Rahayu and day (2015).
5.3 CONCLUSIONS OF THE STUDY

5.3.1 Technological Determinants of CAIS Adoption

First, the study concludes that lack of knowledge and insufficient awareness of the potential benefits of CAIS adoption prevents SMEs from adopting the technology.

Secondly, Cost (i.e. acquisition, implementation, and maintenance cost) is a deterrent to adoption of CAIS technology among SMEs. SMEs in Ghana usually face challenges with respect to investing funds towards acquisition and application of innovation, and this unfavourable situation often sets back their effort to adopt needed ICT innovations like CAIS (Awiagah et al., 2016).

5.3.2 Organizational Determinants of CAIS Adoption

First, the study concludes that lack of requisite technological infrastructure (e.g. computers, employees with technical know-how etc.) hampers SMEs readiness toward adopting CAIS systems.

Secondly, the level of SME Owner innovativeness and knowledge in ICT are strong drivers of CAIS adoption.

5.3.4 Environmental Determinants of CAIS Adoption

The study concludes that government support aimed at enhancing technology adoption among SMEs has a positive influence on CAIS adoption in the Ghanaian context. Such support as identified in the study encompasses subsidization of the cost of CAIS adoption and regulatory support.
5.4 RECOMMENDATIONS OF STUDY

The study makes recommendations to inform Policy, Practitioners, and Academia as follows:

5.4.1 Recommendations to Policy

Government interventions aimed at improving technology adoption among SMEs should place more emphasis on ICT education, training, and awareness creation programs among key decision makers of SMEs. ICT education will increase knowledge about the potential benefits of CAIS adoption, hence leading to subsequent adoption.

Secondly, just as the Singaporean Government ratified the Small Enterprise Computerization Program (SECP), which encourages and assist small businesses to become more competitive through the application of ICT in their operations, the Government of Ghana can have a similar ICT policy specifically aimed at addressing issues pertaining to ICT adoption among SMEs. Although the National Information and Communication Technology for Accelerated Development Policy was introduced in 2003 with the primary aim of engineering an ICT-led socio-economic development process in Ghana, such policy was broad and not adapted to the specific needs of SMEs.

5.4.2 Recommendations to Practitioners

First, based on the findings that SMEs are less likely to adopt an expensive CAIS technology, it is recommended that SMEs consider CAIS technology on the basis of SaaS (Software-as-a-service), also known as cloud accounting. This is because ample empirical evidence suggests that cloud accounting systems are far 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. 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 to locally host a CAIS technology. Besides, CAIS vendors are entreated to craft out flexible payment terms that favour the conditions of SMEs. Such payment terms should not impact negatively on the cash flow of SMEs, not forgetting the potential of financial institutions offering flexible loans to support SMEs adoption of CAIS.

Secondly, based on the finding that Relative Advantage influences CAIS adoption, it is recommended that CAIS vendors should first gain knowledge about SME’s desired attributes of a CAIS system, and factor such concerns into the design and development of CAIS technology. Doing this will enhance the likelihood of patronage by SMEs since there is no reason to adopt a technology that is not perceived as being beneficial to the adopter. In addition, it is recommended that marketing effort of CAIS vendors should be targeted at SMEs with innovative CEOs. Moreover, such active marketing efforts should emphasize the perceived benefits of CAIS by clearly demonstrating the impact of CAIS technology on productivity, profitability, improved business processes among others.

Thirdly, based on the finding that organizational readiness (in the form of technical know-how) influences CAIS adoption, the study recommends that SMEs 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.

5.4.3 Recommendation to Theory

This study, if not the first, is among the few studies to have explored the role of organizational readiness in mediating the relationship between owner innovativeness and technology adoption. This study therefore represents a new theoretical opening for further studies as far as AIS research is concerned. Moreover, using integrated theories to investigate CAIS adoption is something that is rare in the literature. It is therefore recommended that future studies build on the conceptual framework of this study (i.e. adapted TOE Model), by examining the interrelationships among constructs of different theoretical frameworks, in
so as to establish the determinants of CAIS adoption. Specific directions for future studies are provided below.

5.5 LIMITATIONS AND DIRECTIONS FOR FUTURE STUDIES

Firstly, the study emphasized Computerized Accounting Information Systems in general, without singling out any specific accounting information system (like Computer Assisted Auditing Techniques). Future studies are therefore entreated to extend this study by examining the technological, organizational and environmental determinants of a specific accounting information system.

Secondly, this study employed a quantitative design and as such could not gather in-depth knowledge as to why respondents provided certain responses pertaining to CAIS adoption. As such, future studies are entreated to consider a qualitative design in regard to the phenomena under consideration.

Thirdly, the study was cross-sectional in nature and as such, a longitudinal study in respect to this study area can help establish the determinants of CAIS adoption over several periods.

Lastly, it is also recommended that future studies devote attention to integrating different but consistent theoretical frameworks in studying technology adoption at the SME level, frameworks like the UTAUT model and TAM model have proven to be effective in explaining technology diffusion and may be considered.
REFERENCES


Rowe, F. (2014). What literature review is not: diversity, boundaries and recommendations.


APPENDIX A: QUESTIONNAIRE

UNIVERSITY OF GHANA BUSINESS SCHOOL
DEPARTMENT OF ACCOUNTING

RESEARCH TITLE:

“COMPUTERISED ACCOUNTING INFORMATION SYSTEMS ADOPTION IN A DEVELOPING COUNTRY”

Date: ……………….  

Dear Madam/Sir,

I am Enusah Abdulai, undertaking a study leading to the award of Master of Philosophy (MPhil) in Accounting at the University of Ghana Business School. This survey asks for your opinion about the factors that influence adoption of computerised accounting information systems among SMEs and 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?

☐ Yes, I agree  ☐ No, I disagree

PREAMBLE: Computerised Accounting Information Systems (herein called “CAIS”) as used in this context refers to the application of computers to perform accounting functions in a business. This includes but not limited to the use of computers to manage debtors (account receivables), creditors (account payables), inventory, preparation of accounting statements (E.g. financial reporting), and maintenance of personal and impersonal accounts among others. The mere use of computers or phones to check business bank account balance does not fit this criterion, unless such a function is an integral part of your firm’s accounting software.

Remember there is no right or wrong answer, both answers (negative or positive) are equally important
SECTION A: AWARENESS

Section A: Level of adoption: (please fill in or circle the appropriate option that applies to you)

1. How many of your staff (country wide) are employed Full time or Full time equivalent?

2. Have you ever heard of Computerised Accounting Information Systems (CAIS)?
   [a] Never heard   [b] Heard, but yet to consider it   [c] Plan to evaluate in the near future   [d] In the process of evaluating   [e] already using one

3. For accounting purposes, which of the following does your firm use?
   [a] Only manual Accounting Systems (paper work only)
   [b] Both manual and computerized accounting Systems (Both paper work and computers)
   [c] Fully computerized accounting systems (computers only)
   [d] Fully computerized accounting systems with links to internet-based applications
   [e] Cloud accounting only (Internet based accounting applications only)

4. If your firm has adopted CAIS, kindly indicate the type and name of the software your firm uses
   [a] Off the shelf accounting software, Name……………………………………………
   [b] Customized Accounting software, Name……………………………………………
   [c] My firm doesn’t use computers to perform accounting functions

5. Which of the following Accounting Tasks do you use computers in performing in your company? (you can tick more than one response for this particular question)

<table>
<thead>
<tr>
<th>□ Internal Control</th>
<th>□ Inventory Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ General Ledger</td>
<td>□ Payroll</td>
</tr>
<tr>
<td>□ Accounts Receivable</td>
<td>□ Financial Reporting</td>
</tr>
<tr>
<td>□ Accounts Payable</td>
<td></td>
</tr>
<tr>
<td>□ My firm doesn’t use computers to perform accounting functions</td>
<td></td>
</tr>
</tbody>
</table>

6. For how long has your firm been using computers in performing accounting functions?
   [a] Below one year
   [b] within 1-3 years
   [c] within 4-7 years
   [e] My firm doesn’t use computers to perform accounting functions
   [d] Others, specify…………

SECTION B: DETERMINANTS OF CAIS ADOPTION

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**Instruction:**
The following questions ask you about your perception of using computers to perform accounting functions. Kindly indicate the extent to which you agree to the following set of questions.

Note: (CAIS = Computerised Accounting Information Systems)

<table>
<thead>
<tr>
<th>1= Strongly disagree</th>
<th>2=Disagree</th>
<th>3=Neutral</th>
<th>4=Agree</th>
<th>5=Strongly Agree</th>
</tr>
</thead>
</table>

### TECHNOLOGY

1. Using computers to perform accounting functions will lead to cost and time savings  
2. Using computers to perform accounting functions can provide accurate and reliable accounting information to support decision making  
3. Using computers to perform accounting function will lead to improved internal control function  
4. Using computers to perform accounting function improves quality of accounting reports  
5. Using computers to perform accounting function makes me concern about data security, e.g. Viruses  
6. Using computers to perform accounting functions make me concern about reliability issues (E.g. breakdown of computers, no internet access etc.)  
7. Using computers to perform accounting functions make me concern about potential damage to hardware infrastructure.  
8. Learning to use computers in performing accounting functions seems easier  
9. Computerised Accounting information systems are easy to interact with  
10. Computerised Accounting information systems do not require too much time in training  
11. I would not use computers to perform accounting functions if the initial cost of adoption is high  
12. I would not use computers to perform accounting functions if the operating and maintenance cost is high  
13. Cost of CAIS software renewal is expensive

### ORGANIZATION

1. My/Our firm has the required Technology Infrastructure that support CAIS usage  
2. My/Our firm has employees capable of using computerised accounting systems  
3. My/Our firm has the financial resources to adopt computerised accounting systems

### ENVIRONMENT

1. Rivalry in our industry is intense  
2. Competitors who have adopted CAIS are perceived favorably by trade contacts (e.g. suppliers and customers)  
3. Competitive conditions in our industry necessitates CAIS adoption  
4. The extent to which Government demonstrates commitment to promote ICT application like CAIS in our industry is high.  
5. Government subsidies would move my firm to adopt CAIS  
6. In using computers for our firms accounting functions, I believe there are effective laws to protect user privacy.

### OWNER INNOVATIVENESS

1. I have original ideas  
2. I would sooner create something new than improve something existing  
4. I have practical experience in the use of computers  
5. Others, Specify

### ADOPTION

- I Encourage adoption of CAIS  
- I Encourage extensive use of CAIS  
- I Encourage integration of CAIS with other functional areas of business
SECTION C: Respondent Profile
(please fill in or circle the appropriate option that applies to you)

1. What is your firm’s Main Business Activity? ........................................

2. What is your Business location in Ghana? (Indicate region and City/town)
   ...........................................................................................................

3. What is the Legal status of your firm?
   [a] Sole proprietorship [b] Partnership [c] Limited Liability Company
   [d] Others, Specify .................................................................

4. How many years has your business been in operation?
   [a] 0-5 years [b] 6-10 years [c] 11-15 years [d] 16-20 years [e] More than 20 years

5. What is your gender? (F/M) .........................................................

6. What is your job Title in the firm? (multiple responses allowed)
   [a] The Owner [b] CEO [c] IT Manager [d] Accountant [e] others, specify .................

7. Please supply the following details;
   Firm’s Email address.................................................................
   Website...................................................................................

End of Questions.
Thanks Very much for your Participation.
APPENDIX B: SMART-PLS3 PATH ESTIMATION OF RESEARCH MODEL
APPENDIX C: SMART-PLS3 BOTSRAP RESULT OF RESEARCH MODEL (T-STATISTIC VALUES)

[Diagram showing the relationships and t-statistic values between variables such as REL_AD3, REL_AD3, COST_A, COST_C, COMPLA_A, COMPLA_B, SECURITY_A, SECURITY_B, INO_B, INO_C, GOV_A, GOV_B, GOVERNMENT SUPPORT, RELATIVE ADVANTAGE, COMPETITIVE PRESSURE, COST, COMPLEXITY, DECISION MAKER INNOVATIVENESS, ORGANIZATIONAL READINESS, and INNO B, INNO C.]
## APPENDIX BC1: VALIDITY AND RELIABILITY

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cronbach's Alpha</th>
<th>rho_A</th>
<th>Composite Reliability</th>
<th>Average Variance Extracted (AVE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DV</td>
<td>0.7312</td>
<td>0.7358</td>
<td>0.8478</td>
<td>0.6502</td>
</tr>
<tr>
<td>COMPETITIVE PREASURE</td>
<td>0.8307</td>
<td>0.8337</td>
<td>0.9219</td>
<td>0.855</td>
</tr>
<tr>
<td>COMPLEXITY</td>
<td>0.8826</td>
<td>0.9835</td>
<td>0.9426</td>
<td>0.8915</td>
</tr>
<tr>
<td>COST_</td>
<td>0.6338</td>
<td>0.7282</td>
<td>0.8383</td>
<td>0.7231</td>
</tr>
<tr>
<td>DECISION MAKER INNOVATIVENESS</td>
<td>0.7097</td>
<td>0.8813</td>
<td>0.8644</td>
<td>0.7624</td>
</tr>
<tr>
<td>GOVERNMENT SUPPORT</td>
<td>0.6229</td>
<td>1.105</td>
<td>0.8126</td>
<td>0.6911</td>
</tr>
<tr>
<td>ORGANIZATIONAL READINESS</td>
<td>0.7106</td>
<td>0.7118</td>
<td>0.8735</td>
<td>0.7754</td>
</tr>
<tr>
<td>RELATIVE_ADVANTAGE</td>
<td>0.7413</td>
<td>1.5843</td>
<td>0.8577</td>
<td>0.7544</td>
</tr>
<tr>
<td>SECURITY</td>
<td>0.7403</td>
<td>0.9488</td>
<td>0.8758</td>
<td>0.7802</td>
</tr>
</tbody>
</table>

## APPENDIX BC2: SUMMARY BOOTSTRAP RESULTS

|                                  | Original Sample (O) | Sample Mean (M) | Standard Deviation (STDEV) | T Statistics (|O/STDEV|) | P Values | STATUS     |
|----------------------------------|---------------------|-----------------|-----------------------------|--------------------------|----------|------------|
| COMPETITIVE PREASURE -> (DV)     | 0.117               | 0.121           | 0.077                       | 1.515                    | 0.130    | REJECTED   |
| COMPLEXITY -> (DV)               | 0.093               | 0.091           | 0.052                       | 1.795                    | 0.073    | REJECTED   |
| COST_ -> (DV)                    | -0.119              | -0.122          | 0.051                       | 2.327                    | 0.020    | SUPPORTED  |
| INNOVATIVENESS -> (DV)           | 0.179               | 0.178           | 0.046                       | 3.872                    | 0.000    | SUPPORTED  |
| INNOVATIVENESS -> ORG_READ       | 0.251               | 0.264           | 0.064                       | 3.948                    | 0.000    | SUPPORTED  |
| GOVERNMENT SUPPORT -> (DV)       | 0.366               | 0.364           | 0.077                       | 4.782                    | 0.000    | SUPPORTED  |
| ORG_READ -> (DV)                 | 0.362               | 0.356           | 0.043                       | 8.478                    | 0.000    | SUPPORTED  |
| RELATIVE_ADVANTAGE -> (DV)       | 0.303               | 0.299           | 0.043                       | 7.118                    | 0.000    | SUPPORTED  |
| SECURITY -> (DV)                 | -0.096              | -0.094          | 0.071                       | 1.357                    | 0.176    | REJECTED   |

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APPENDIX D: DISCRIMINANT VALIDITY: HTMT BAR CHART

APPENDIX E: CROSS LOADINGS

<table>
<thead>
<tr>
<th>CROSS LOADINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(DV)</strong></td>
</tr>
<tr>
<td>ADOPT_A</td>
</tr>
<tr>
<td>ADOPT_B</td>
</tr>
<tr>
<td>ADOPT_C</td>
</tr>
<tr>
<td>COMPLEX_A</td>
</tr>
<tr>
<td>COMPLEX_B</td>
</tr>
<tr>
<td>COMP_PRE_A</td>
</tr>
<tr>
<td>COMP_PRE_B</td>
</tr>
<tr>
<td>COST_A</td>
</tr>
<tr>
<td>COST_C</td>
</tr>
<tr>
<td>GOV_A</td>
</tr>
<tr>
<td>GOV_B</td>
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<tr>
<td>INO_B</td>
</tr>
<tr>
<td>INO_C</td>
</tr>
<tr>
<td>READ_FIN</td>
</tr>
<tr>
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