INTERNAL CONTROL BENEFITS AND CHALLENGES OF USING COMPUTER-BASED ACCOUNTING INFORMATION SYSTEMS (CAIS): In Selected NGOs in Ethiopia

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SUBMITTED TO ADDIS ABABA UNIVERSITY COLLEGE OF BUSINESS AND ECONOMICS IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF SCIENCE IN ACCOUNTING AND FINANCE

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STATEMENT OF DECLARATION

I, the undersigned graduate student hereby declare that this thesis is my original work and that all sources and material used for this thesis have been acknowledged. This research study is submitted in partial fulfillment of the Degree of Master of Science in Accounting and Finance. No part of this research should be reproduced without my consent or that of Addis Ababa University

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This thesis was submitted to the School of Graduate Studies of Addis Ababa University College of Business and Economics for examination with my approval as a university advisor

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ABSTRACT

This study sought to describe the benefits and challenges of adopting computerized accounting information systems emphasizing internal control aspects. The specific objectives of this study were: identifying the internal control benefits of adopting CAIS, assessing the challenges of using CAIS concerning input, process, storage, output, and personnel controls, and also assessing the relationship among IT knowledge, IT governance, and computer fraud. To realize the research objective, ***10*** *NGOs were selected using purposive sampling. The study followed a parallel convergent mixed-method design with a descriptive research approach.* ***112*** *informants comprising auditors, finance heads, and IT officers participated in the study with a response rate of 90%. Structured interviews were conducted with 10 experienced professionals. The study extensively reviewed works of literature and empirical studies to support the finding. The finding of the study indicated that adoption of CAIS involves internal control benefits as well as challenges. Improvements in internal control are achieved through the use of extra protection provided by the systems such as password and data authentication. Accountability and compliance are also reported to have improved due to use of CAIS. Human related data control challenges were identified. Data input, storage and access challenges were reported to be the major challenge areas. IT governance and IT knowledge are indicated to contribute towards computer fraud detection and strengthening of internal control of organizations. It is hence recommended that managers as designers and implementers of internal control systems should work on the application of IT governance and update employees' IT knowledge on a regular basis. The result of the study is believed to provide insights to accountants, managers, auditors, IT auditors, information system professionals, academicians, government, and regulatory bodies.*

Keywords*: Computerized accounting Information Systems, CAIS, AIS, internal control, computer fraud, IT governance, ITG, IT knowledge, Information Technology, IT, Ethiopia*

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ACRONYMS

AIS	=	Accounting Information Systems
CAIS	=	Computerized Accounting Information Systems
COBIT5	=	Control Objectives for Information and Related Technology version 5
COBIT	=	Control Objectives for Information and Related Technology
COSO	=	Committee of Sponsoring Organization (of the trade way commission)
ERM	=	Enterprise Risk Management
ERP	=	Enterprise Resource Planning
ICFR	=	Internal Control Over Financial Reporting
IGA	=	Income Generating Activity
IP	=	Internet Protocol
IS	=	Information Systems
ISACA	=	Information Systems Audit and Control Association
IT	=	Information Technology
OECD	=	Organization for Economic Co-operation and Development
SEC	=	Securities and Exchange Commission
SME	=	Small and Medium Enterprise
SOX	=	Sarbanes Oxley Act
SPSS	=	Statistical Package for the Social Science

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

As the saying goes on, information is power. It helps us make decisions. Effective and efficient decision-making adds value to organizations in reaching their goals. For any organization, whether profit-making or not, information is a useful resource. Just like other resources of an organization such as capital, raw materials, labor, or human resources, information is also considered a vital resource for the existence of organizations. Information is in fact so vital that we use it even to manage other resources of organizations. Especially during this era of information technology (IT), every modern organization finds it impossible to move an inch without the use of information almost in every aspect of doing business (Gelinas et al., 2017). Managers, decision-makers, or any information user uses information from various sources. A manager may use internally produced information as well as information coming from outside sources.

Part of a managers' role includes safeguarding the assets of an organization. It follows that the design and development of a sound internal control system is the task of managers of an organization. In order to properly control the resources of the organization, managers need different types of information. Accounting information systems provide information that managers use to control both financial and non-financial resources. The way the information is produced and the quality of the information produced by the AIS has a direct relationship with the efficiency of the internal control system in the organization. Al-Dmour (2018) studied the impact of computer-based accounting information systems on the quality of the financial statements and business performance taking the CAIS as a method of internal control mechanism. Al-Dmour stated that there exists a positive relationship between CAIS and the quality of financial reports based on CAIS as an internal control tool.

IT these days is pretty well part of every business. For any organization accounting information system plays a crucial part in producing timely financial information (Rockart & Scott Morton, 1984; Wallman, 1997). Accounting Information Systems produce financial information which is used by decision-makers who are external or internal to the organization. For the information to be reliable, the environment over which the business process is taking place should be adequately controlled. The qualities of financial reports relay on the quality of the computerized accounting information systems (Sugut, 2012).

The general objective of internal control doesn't change with the way organizations handle their data or information processing. The objectives remain the same whether organizations use manual or computerized systems of data or transaction processing. However, computerized accounting information systems call for a different set of policies and procedures. This is because how data is inputted, processed, stored and communicated is different in manual and automated systems.

The financial failures of big corporations in developed nations have been getting major attention in the business world. Corporations such as Enron Corporation, WorldCom, Tyco International, Adelphia Communications were among the major ones that went into disgrace. The failure of these corporations brought stricter regulatory responses as well as a harsh market in the economy. This in turn forced companies to adopt IT resources that are primarily targeted to reduce internal control risks to the minimum level as much as possible. Every business needs a control mechanism that constantly checks the effectiveness and efficiency of operations. The control mechanisms should also be able to reduce the risk of fraud and asset loss.

The COBIT 5 (Control Objectives for Information and Related Technology) framework proposes that firms harmonize, plan and organize IT investments in line with their chosen business strategy (ISACA, 2019). This indicates that organizations should be cautious when choosing and adopting internal control techniques. The internal control techniques include information quality, the COBIT5 or COSO framework, IT and organizational overall controls (IT control is the subset of control activities).

More than ever, today's organizations use information technology to process their financial reporting. As a result, the technology guides the financial reporting processes of these modern

organizations. Automated computer systems initiate, authorize, record, process, and produce reports that are the effects of financial transactions as a final output. Since the technology handles everything, SOX considers the technology as a focal and inseparable element of the financial reporting processes where much attention should be given with regard to control (Hall, 2011).

Organizations need to implement IT governance along with the implementation of computerized accounting systems. This is important since the adoption of the technology or IS should be in line with the organizations strategy. IT governance as a tool aliens choice of technological investments with the strategy of the organization (Lindros , 2017).

Since accounting data and information comes from a CAIS, IT knowledge and skills are considered vital to an accountant‘s career and effective and efficient use of the systems. Interacting with CAIS is one of the most important tasks that accountants perform (Romney & Steinbart, 2015). When compared to traditional manual transaction processing, computerized systems have lots of benefits. Most traditional CAIS researches have focused on the use of technology to enhance decision making, performance and to accomplish other organizational objectives. (Dillard & Youthas, 2001). To use IT in reaching control objectives, organizations (accountants) must know how to protect systems from risks or threats. Therefore, accountants need to have a good understanding of IT and its capabilities together with the risks that come with it (Romney & Steinbart, 2015).

In the general topic of computer-based accounting information systems, various studies have been done around the world. There is a well-developed knowledge base on the topic of CAIS. Benefits of adoption of the systems related to the quality of information produced in the form of financial reports; efficiency of transaction processing, decision making, and implementation strategy; improvements in financial and operational performances; and the relationship between CAIS and ERP systems, and CAIS and IT Governance are just some of the major topics in CAIS research.

Challenges surrounding computer-based accounting information systems have also been studied in the past. Studies have addressed the issue of the high cost involved in the adoption of the

systems, also the regular need for the update of the systems which adds to the cost issue, and also the need for regular provision of training to users (staff) following updates on the system. Computer frauds and security issues such as control breaches, hackers, and virus attacks have also been studied. Information loss, damages to storage devices, and power outages leading to loss of data; storage management issues and practices; and system (software) failures and corruptions are all have been given attention by various researchers and scholars around the world. This research paper attempted to understand internal control benefits and challenges of adopting computer-based accounting information systems together with IT governance, user's IT knowledge and computer fraud.

1.2 Statement of the Problem

The purpose of this research paper is to investigate the benefits as well as the challenges of using computerized accounting information systems. The assessment is done from an internal control perspective. Organizations with computerized accounting information systems in place are able to keep accurate records and manage organizational assets in a better way. These systems are also used by management to ensure that appropriate access and separation of duty controls are in place, holding employees accountable for their interaction with the system. It is obvious that more and more organizations are currently inclined to adopt CAISs in Ethiopia. More money is being invested in CAIS and technology-based infrastructures that go with it.

A full understanding of the benefits and challenges of these systems is so vital. The benefits are the main driving reasons for the adoption of the CAIS, on the other side, the evolution of Information Technology and Computerized Accounting Information Systems brought with it an inherent and new type of risk exposure that concerns the organization's internal control and information security issues. Computerized systems by nature can make organizations vulnerable to specific security issues that are complicated in nature. When we try to compare this with the manual system, the computerized system puts organizations at risk of suffering critical damages.

Accountants are in charge of the computerized accounting information systems and hence are expected to understand the benefits and challenges of employing information technology to handle the accounting tasks. The issue or the problem relates to what level of understanding accountants have about the CAISs other than just using the system as a user. A computerized

accounting information system is an area of interdisciplinary Accounting, Information Systems (IS), and information technology as a whole. Managers also need to have a good understanding of the system as they are the ones who set the controls policies of organizations. Assessing and understanding the internal control risks helps them in establishing new control policies proactively that effectively address the challenges that come with the CAISs.

Therefore, in a computer-based information processing environment, the task of preventing and managing potential internal control issues and related damages requires a good understanding of the risks that are particularly associated with CAISs.

The lack or low practice of IT governance in organizations leads to the inability to detect computer or technology-related frauds. The systems are used to handle every data or information processing and hence it's important to set policies and procedures as to how to use the systems.

Previous researches on computerized accounting information systems have focused on computer-based accounting systems and their impact on performance, financial information quality (Wongsim & Gao, 2011), provision of timely information, ease of information communication between various decision-makers within and outside organizations, adoption of CAIS by SMEs the effect of information technology on the quality of AIS and its financial information (Wisna, 2013), accountants perception of internal control problems that are particularly associated with the use of computerized accounting information systems (Ramadhan et al., 2011) The study by Serkadis (2017) was conducted to investigate the impact of AIS on organizational performance. Ramadhan, Joshi, and Hameed (2011) focused on the perception of accountants on internal control problems that are associated with the use of computer-based accounting information systems. Bekele (2017) on the other hand investigated the effectiveness of computerized accounting systems in measuring and controlling the economic activities of organizations in a timely manner. The study by Bawaneh (2014) examined information securities for CAIS and organizations as a whole in his case study focusing on the banking sector in Jordan. An empirical study conducted by Yenni (2017) focused on understanding AIS user knowledge, AIS quality, and accounting information quality. Studies on the relationship between quality of AIS and quality of accounting information have been done by researchers such as Xu (2009), Salhi, Rostami, and Abdolkadir (2010), Rapina (2014), and Yenni (2015).

As indicated above, there is a gap in previously done researches on the subject of computer-based accounting information systems and internal control. This lead the researcher to investigate the internal control benefits and challenges of using computerized accounting information systems.

With the basic statement of the problem for this thesis being "what are the internal control benefits and challenges that are associated with the use CAIS?", the specific problems are presented in the research question section below in a divided format which is manageable enough to conduct the study.

The research problems that are addressed in this study include what internal control benefits and challenges are faced by NGOs in Ethiopia, how is IT-governance related to the computer-based accounting information systems, the importance of IT knowledge for computer-based accounting information system users, and the issue of computer fraud in computerized accounting systems

1.3 Research Questions

The following research questions are answered through this study:

RQ1. What are the internal control benefits of adopting computerized accounting information systems?

RQ2. What are the practical internal control challenges of adopting computerized accounting information systems in terms of input, process, storage, output, and personnel controls?

RQ3. What is the relevance of user's IT knowledge for internal control under computerized accounting information systems?

RQ.4 What is the relevance of IT Governance for internal control in computerized accounting information systems?

RQ5 What is the use of computerized accounting information systems in preventing computer fraud?

1.4 Research Objectives

1.4.1 General Objective

The general and primary objective of this research was to study the internal control benefits and challenges of using Computer-based Accounting Information Systems in selected NGOs in Ethiopia.

1.4.2 Specific Objectives

Specific objectives of the study include the following:

1. To identify the internal control benefits of using computerized accounting information systems
2. To identify the internal control challenges of using computerized accounting information systems with regard to control over input, process, storage, output, and personnel controls
3. To identify the relevance of user's IT knowledge for use of computerized accounting information systems
4. To identify the relevance of IT governance for use of computerized accounting information systems
5. To identify the use of computerized accounting information systems in computer fraud detection

1.5 Significance of the Study

The study is considered to have a significant contribution in the area of computer-based accounting information systems in the Ethiopian and developing nation context as there are limited studies in this area. This study hopefully contributes towards the study in the area of

CAIS specifically in relation to internal control. The significance of the study is further discussed in detail in the following paragraphs.

First, the result of this study may help managers of NGOs in Ethiopia to identify the various internal control benefits and challenges that may arise in the adoption and use of computer-based accounting information systems. This in turn helps them to update their internal control procedures within their organization so as to reduce risks proactively and overcome existing challenges that are likely to arise in computer-based accounting information systems. The study may help NGOs in Ethiopia that are planning to automate their accounting information system as the study will provide them with the necessary information regarding the internal control benefits and challenges of computerized accounting systems. Second, the study findings may give insight to policymakers in Ethiopia in the field of accounting and information technology in formulating policies, rules and regulations, and IT governance frameworks to govern the use of computer-based accounting information systems in relation to internal control that is particularly in the Ethiopian context. In addition to policy formulation, the finding of the study may contribute towards the development or adjustment to the curriculum at higher education's level that helps in providing adequate knowledge to users of information systems and in particular computer-based accounting systems.

Furthermore, this study contributes towards filling a research gap in the area of computerized accounting information systems with due proper emphasis on internal control in the Ethiopian context. This research paper aims to call attention to the benefit as well as the challenge of employing computerized accounting information systems with regard to internal control. Accounting systems, with their dual output of financial reports for internal and external use and control reports for management, are an integral and important part of a society's information system, particularly for charity organizations (NGOs) having significant social responsibility and public accountability.

The quality and reliability of financial reports (Information Systems) determine in large part the rate at which economic development of emerging nation advance (ACCA, 2012). The focus on internal control problems of computerized accounting information systems is crucial since more and more organizations are moving towards the use of computers to process their data and

produce financial reports. This study may inspire academicians for further study and as a reference for researchers and professional practitioners both in the fields of accounting and information technology. The study will add to the existing body of literature.

1.6 Scope of the Study

This study assessed the internal control benefits and challenges of using computerized accounting information systems. Accordingly, the scope of this study is limited to the study objectives stated earlier. Among the different principles of accounting information systems such as control, relevance, flexibility, cost-benefit, and compatibility principles this study is delimited to the internal control benefits and challenges of using CAISs. The study focused on internal control under the modern computerized accounting information system in selected NGOs in Ethiopia. The study is delimited geographically to NGOs that are located in Addis Ababa. The selection of the specific NGOs was made among the ones that already have computerized accounting information systems in place. Furthermore, the study is down-scaled and limited to NGOs that intensively used computer-based accounting systems for the past 5 years.

1.7 Limitation of the Study

This study is not without limitations. First, the study focuses on part of NGOs that are charity organizations. This represents just the slight portion of non-government organizations in Ethiopia. The study doesn't cover the wide spectrum of NGOs which includes professional associations, labor unions, trade unions, cultural associations, clubs, and others that are considered to be under the NGO umbrella. Hence generalization is limited to NGOs working in the charity sector and to the organizations that are intensively using CAIS.

Second, the internal control benefit and challenge of using computerized accounting information systems have a broad spectrum and it varies to some extent from organization to organization depending upon the specific CAIS and whether the CAIS is a stand-alone system or part of a bigger ERP system. Apart from the difference in the type of computer systems or software used, there are other components to internal control such as the control environment, the rules, and procedures, the attitude of the management and board towards control activities (the culture of

the organization), availability of information and effective communication of that information is a paramount effect on internal control. Therefore, generalization is limited to the basic functionality of the computerized accounting information systems as a means of control mechanism. Focusing on the he basic functionality allows a room for variation in the design of the various CAISs that are used by the different organizations and also to take account of the differences that exist in organizational culture and the corresponding internal control environment.

Third, the lack of previous research regarding Computer-based Accounting Information Systems specifically from point of view of internal control issues was considered a major limitation. Furthermore, the lack of related research made on the topic in the context of developing economies such as Ethiopia made it difficult to relate findings and not be able to compare the content with other researchers who conducted research. Finding a baseline study on computer-based accounting systems with regard to internal control was a major limitation. The study used related studies which mainly focus on computer-based accounting information systems in relation to the quality of financial reporting, performance, computer fraud, and information security and IT Governance studies.

Fourth, the research followed the parallel convergent data analysis method under the mixed-method design. The data coming from the qualitative and quantitative database were analyzed separately and then compared using the side-by-side method of analysis where technically the integration happened through merging results or findings coming from the two separate arms of the study. The result section of this paper presented the results of analysis coming from the two different databases while the discussion section presented the discussions comparing results of the analysis. The limitation appears as the results are integrated. Differences occur as the comparisons situations don't exactly produce clear convergence or divergence all the time.

1.8 Organization of the Study

This study is organized into five different chapters. The introduction which is the first chapter, offers the background information, the research problems, objectives, research question, justification or significance of the study, the scope of the study, and research limitations.

Chapter two, literature review, deals with a review of works of literature that are relevant to the research problem. This section gives an extensive literature study on the benefits and challenges organizations face when they adopt accounting information systems as a way to enhance internal control. Theoretical and empirical reviews are included here. The research gap, conclusion, and empirical model are presented following the literature review.

The third chapter outlines the research method and procedure used in this research. This section of the paper states the research design, methodology, overview of the sampling method, and the method used for data collection. All in all, it gives a general overview of the study.

The fourth chapter presents the findings, results of data analysis, and discussions in detail. In this chapter results in the form of graphs and tables are included. Qualitative and quantitative analysis are presented separately along with separate summary for the two analyses.

Chapter five which is the final chapter begins with a summary of the major research findings and goes to conclusions and recommendations. The summary of major findings is presented in three sections representing internal control benefits and challenges of using CAIS and the use of CAIS with IT knowledge, IT governance and computer fraud. Recommendations presented recommendation for practice and recommendation for future research.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter provides insight into the impact of computerized accounting information systems on the internal control environment and how it has become a point of discussion in recent years with the world going digital. Stakeholders like investors, Banks, government, regulatory bodies, management, and employees of an organization are keen on the information generated by the accounting information systems. To rely on the information, these stakeholders need to know the accuracy of the information. The accuracy of the information is related to the internal control over which the financial reporting takes place.

When organizations adopt information technology or CAIS to handle their financial reporting, the issue of internal control over financial reporting goes a little deeper than the process of converting transaction-level economic events into financial reports. Rather it includes internal control issues that come with the technology itself. Application control should also be in place in order to have accurate and reliable financial information. The application controls relate to the specific way the AISs handle the processing of financial reporting.

This section of the paper reviews both conceptual and empirical literature about internal control benefits and challenges of adopting computerized accounting information systems. The empirical review covered past researches conducted in the area of computerized accounting information systems and internal control concerns related to computer-based systems. The outcomes of these past studies are highlighted. The research gap and conceptual framework are presented at the end of this chapter.

2.2 Theoretical Review

To provide theoretical support to the concepts in the study, some topics are reviewed in this chapter. Included are the definitions and concepts of Accounting, AIS, CAIS, features of CAIS, internal control and its components, benefits and challenges associated with deploying CAIS from an internal control standpoint, IT governance, and the governance frameworks such as

COSO, COBIT 5, and SOX, IT knowledge and finally the fraud triangle that explains why fraud happens.

2.2.1 Accounting and Information Systems

Accounting is a dynamic field of study. Its concepts, theories, principles, way of practice, and teachings are all together in constant change and development (Kiesso & Weygandt, 1995). Based on the definition by Robert (2008), "accounting is the process of collecting, categorizing, determining, developing, and communicating economic information to allow informed judgments and decisions by users of the information". Romney and Steinbart (2018) stated accounting is a system in itself by definition since it collects and records financial data, store, process the data so as to produce information as an output to users.

As stated by Romey et al. (2021, p. 36), "by definition accounting is an information system". An information system is a means by which collection, inputting, processing of data, and managing, controlling, and outputting of information is achieved in an organized manner that enables organizations to achieve their objectives and goals (Romney et al., 1997). Based on this definition information systems have components such as goal and objectives, inputs, outputs, data storage, process, instructions and procedures, users, and control measures.

As defined by Ralph and George (2010) information systems (IS) is a set of interconnected subsystems that collect input, process, or manipulate the input, store and communicate the processed input as an output or information and supply a corrective response in a form of feedback to the system as a whole. A system can be manual or computerized (computer-based information systems). The role of an information system is to provide decision-makers with the information they need to control their organization (Elizabeth, 2008). Information systems are now a day almost everywhere in every profession that you can think of (Ralph & George, 2012). The feedback system in the information system helps organizations to achieve their goals and objectives in addition to the advantages it gives in the forms of speed and accuracy (Ralph & George, 2012).

Both the manual and computer-based accounting practices relate to systems theory. As stated by Gareth and Jennifer (2016) it was Daniel Katz, Robert Kahn, and James Thompson who first established and introduced the concept of system in the 1960s. They developed and introduced a

framework for an open-ended system that receives input, processes the input and generates output, and recycles. Accounting, both manual and computer-based relates to this type of open system. According to Gareth and Jennifer (2016), the open system as the name itself indicates receives information as input from external sources. This makes the system dependent on input sources.

The accounting activity as a process has three distinct but interrelated parts working for a common goal. These major activities are the input activity, processing, and output activities. Both the manual as well as the computer-based accounting system takes in economic data or transactions and source document as input. The processing subsystem is represented by the accountants, account officers, and the accounting software handling the conversion of accounting data into reports. The report which is in the form of financial statements is the output of the system. The accounting system is presented in the model below.

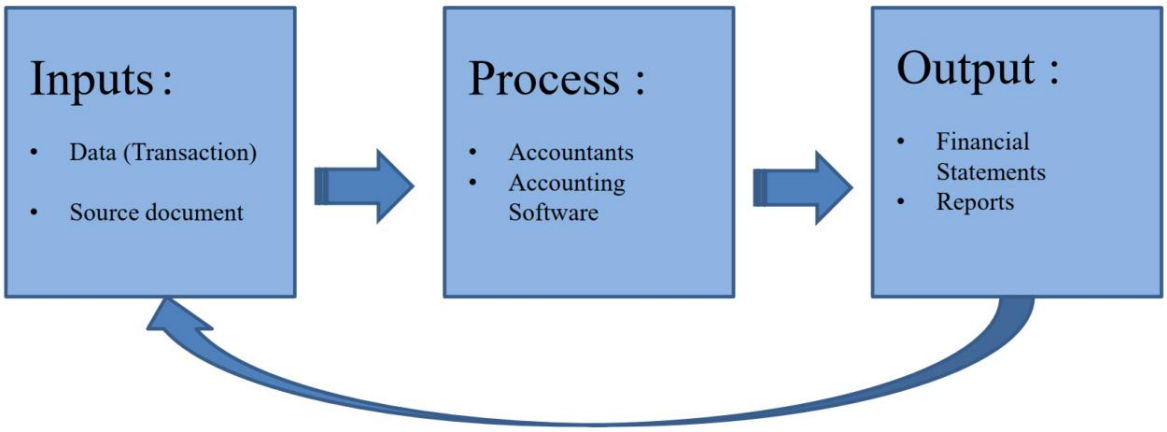

Figure 1: The Accounting System Model

Source: Adopted from the work of Frimpong et al. (2018)

As described by Robert et al. (1980) system is a group of interrelated yet distinct elements or parts that are working to achieve a common goal. According to Gareth and Jennifer (2016), an information system is used by management in order to enhance the planning, organizing, and controlling functions or activities within organizations.

Since the 14th-century accounting has been a "system" by itself. The deployment and use of information technology to handle accounting activities such as the collection, processing of data,

and production and communication of financial information among different users is a recent reality and trend in the accounting profession. IT has brought a profound influence on the accounting field, yet it has only increased the need for human judgment (Robert L. H., 2008).

2.2.1.1 Accounting Information Systems (AIS)

Bodnar and Hopwood (2013), define Accounting Information System as "a collection of resources, such as people and equipment, designed to transform financial and other data into information." Data, according to Romney and Steinbart (2015), Gelinas et al. (2017), and Hall (2011), are facts that are collected, recorded, stored, and processed by information systems to produce information. The information produced by the accounting information systems is then shared among the different users and decision-makers. Daniela et al (2013) suggest that the main objectives of accounting information systems are supporting the decision-making process and strengthening accountability to internal and external stakeholders. Robert (2008) also stated that a well-designed accounting information system can considerably improve decision-making in organizations by responding to most of the components of financial accounting standards, rules, and regulations.

As stated by Boczko (2012) the common idea in most definitions of accounting information systems centers around two common interconnected objectives:

1. Information provision to users, thereby facilitating the decision-making process through the provision of useful information
2. Assist the decision-making process and facilitate or strengthen internal control

According to Romney, Steinbart, Scott, and David (2021) system is a set of methods that are presented in detailed procedures to be carrying out specific tasks in a routine manner and thereby solve problems. They are intended to accomplish a task and also achieve goals and purposes. Most systems, including accounting information systems, are made up of subsystems that are distinct and smaller but work together for a common goal. Most accounting information systems have five components: input, process, output, storage, and internal control (Robert L. H., 2008).

Accounting has been said to be the language of business. If this holds true, then accounting information systems is the intellect behind the language which happens to be the information

producing tool for that language of accounting (Romney & Steinbart, 2018). AISs carry out data transformations whether they are manual systems or computerized ones. An accounting information system can be a manual paper and pencil system or a complex IT-intensive system or anywhere in between. This is because the process is quite the same for all while the approach can be different. The information technology and the software are equally used as a tool as in the case of paper and pencil in the manual case.

2.2.1.2 Computerized Accounting Information System (CAIS)

Computerized accounting information systems are currently found in the software market as prebuilt packages. They are supplied by big software suppliers such as Microsoft, Sage Group, and Oracle Corporation. Organizations usually configure and customize these prebuilt software packages to match their preferences and business process. Small businesses often use accounting software having lower costs such as QuickBooks, SAP Business One, and Peachtree (Sage). Accounting software for midsize enterprises includes QuickBooks Enterprise and SAP Business All-in-One. Large-scale accounting systems would use enterprise software such as SAP Business Suite and Oracle E-Business Suite (Kay & Ovlia, 2014).

2.2.1.3 Aims of Computerized Accounting Systems

Any computerized accounting information system aims to ensure transactions are properly, authorized, recorded, and processed in their completeness on time (Romney et al., 2021).

2.2.1.4 Enterprise Resource Planning Systems and CAIS

Large organizations usually use an ERP system under which the CAISs are integrated as a subsystem handling the financial activities of the organization. The ERP systems are deployed in order to complement the connectivity and link between different business systems in organizations. CAIS is therefore linked with the ERP system which gives centralization of the systems than having distinct systems functioning in an isolated manner. In integrated enterprise systems, data is shared among different functional areas in the organization. This allows the same information to be accessed and used by different departments across the entire organization (Kay & Ovlia, 2014).

According to Daniela et al. (2013), there are three levels in the basic model of an accounting information system. These are basic, intermediate, and top levels. Elementary data that are

produced by the business operation are collected by the operational accounting information system at the basic level. The intermediate level is responsible for the organization of the elementary data that are collected at the basic level. It's here at this level the data are restructured according to the financial accounting standards in order to produce or issue the financial statements and other additional related information. The management accounting system is found at the top level. This is where management and strategic decision-makers get their further processed and tailored information from the data contained in the operation and financial statements.

Enterprise software goes beyond resource planning. IT embraces all the information processing demands of the whole enterprise. Enterprise software packages join together the various business functions, utilities, and transaction processing and administration in the enterprise system (Kay & Ovlia, 2014). These days integration of the two levels namely the basic and the intermediate levels which assimilate the operational and financial accounting parts is embedded and done through the deployment of ERP systems. The main goal of ERP systems is the integration or assimilation of accounting with the process. IT plays a major role in the achievement of the integration of operational and financial accounting information within the ERP systems (Daniela et al., 2013).

Previously, organizations had to develop sophisticated user interfaces which provide connectivity and communication among the different information systems used by the organization. In a centralized ERP system, information systems like AIS, management information systems (MIS), supply chain management (SCM), operation/ production systems (OPS), customer relationship management (CRM), and human resource management (HRM) are all integrated under the ERP as component or subsystem that work together to achieve a common goal (Romney & Steinbart, Accounting Information Systems, 2015). These components or parts are integrated together and are able to access the same data in order to perform complex business processes (Gelinas et al., 2017). Integration of different functionalities and establishment of a central database are the two significant characteristics of this type of ERP system (Bagranoff et al., 2010).

Today in the developed world, Cloud-based computing or computerized accounting information systems are increasingly becoming common for both SMEs and large organizations. With the adoption of computerized accounting information systems, many businesses have benefited by removing low-level skills such as transactional and operational accounting responsibilities.

2.2.2 Internal Control and Computer-based Accounting Systems

2.2.3.1 Internal Control

According to Moeller (2010), internal control is defined as a process. Management, the board of directors, and other personals are the ones who design internal control. The internal control as a process is designed to provide enhanced operations, reliable financial reports, and compliance with applicable laws and regulations. Everyone in the organization has the responsibility for the effeteness of internal control. Turner, Weickgenannt, and Copeland (2017) also define internal controls as a set of procedures and policies adopted within an organization to safeguard its assets, check the accuracy and reliability of its data, promote operational efficiency, and encourage adherence to prescribed managerial practices.

COSO's definition of internal control is by far the best definition of internal control in today's digital world. According to COSO (2019), internal control is a process designed, initiated, and realized by an entity's top management, board, and directors so as to provide assurance of realization of objectives with regard to effectiveness and efficiency of operations, reliable financial reporting, and compliance to rules and regulations that are applicable. COSO takes internal control beyond the accounting and finance matter to the bigger and wider enterprise process that includes IT. IT is embedded in almost all processes of organizations.

The chief executive officer and other principal officers in the organization are responsible for the design and direction of the internal control as a process. The control over financial reporting is undertaken and initiated by the organization's board of directors, different level management, and other personnel. As stated by SEC, the purpose of setting internal control over financial reporting is to deliver reasonable assurance regarding the reliability of financial reporting (SEC, 2008). The internal control over financial reporting helps to keep the organization in line with the

compliance requirement. The financial reporting compliance requirement calls for the agreement to accounting principles, policies, and procedures (Ramos, 2008).

The Sarbanes-Oxley Act (SOX) made significant changes to many features of the financial reporting procedure. One of those changes is a requirement that management provides a report that contains an assessment of an organization's internal control over its financial reporting (SEC, 2008).

2.2.3.2 Controls in Computer-based Accounting Systems

In general, both the manual and the computer base accounting information system follow the basic principles of internal control. However, the computer-based accounting information system uses different procedures and techniques to address internal control problems. The internal control issue for the computerized accounting system is different from the manual-based accounting system. Therefore it calls for the use of specific techniques and procedures to appropriately handle the internal control issues that are associated with the use of CAIS. In the manual system, the control focus is on the employee's attitude and in the recording stage of transaction processing. On the other hand, in the computer-based accounting system, internal control goes beyond human behaviors and the process of transaction recording. In the CAIS, there is a need for special issues concerning software and hardware the issue of internal control. Management achieves internal control through the application of control procedures and policies. Designers of computer systems incorporate system controls and security in every segment of the system. The system controls and securities are not just for the software only but include the hardware, database systems, networked communications, and communications over the internet as well. The basic areas covered in the design of control are error prevention and detection in the input stage, and correction, plans for possible disasters, recovery through the application of the disaster plan, and system control in general (Ralph & George, 2010, p. 543).

2.2.3 Benefits of Adopting CAIS

As it is explained by Stratton (1981), the purpose of processing financial activities using computer technology through general or specific application software such as CAISs is to enable correct recording of economic events in the ledger and thereby to ensure the provision of the reliable report at the end. Gosawork et al. (2014) stated that CAISs have a crucial role in the

implementation of internal control. According to Al-Dalabih (2018) and Ali (2011), the internal control objective is among the sub-objectives of a computerized accounting information system that help the system in achieving its general objective of providing financial information to its users. CAISs has three main advantages over manual accounting systems: first and foremost CAISs simplify the overall accounting process through automation, second, they are less prone to error than the manual system, and finally, CAISs provide real-time reports that can help managers and other stakeholders to have updated information about the financial status of the organization (Manchilot, 2018).

According to Mndzebele (2019), the benefits of computerized accounting information systems can be evaluated by the contribution it is making in improving the decision-making process, quality of the accounting information, internal control efficiency, and by how much the system has facilitated the organizational transactions processing capability. Computerized Accounting information systems assist companies to measure the risk of some actions. The systems give warnings proactively predicting the future by analyzing trends using statistical application software (Mndzebele, 2019).

Computerized accounting information system has provided substantial benefits for accountant and their organization in general. An accounting information system substantially reduces the amount of time that was needed by accountants to prepare and issue financial reports to interested parties such as management, investors, stakeholders, and government. The adoption of CAIS also improves the quality of financial information provided by the organization. Features of quality information include its accuracy, timeliness, cost-effectiveness, reliability, completeness, and accessibility.

The main advantages of the use of AIS in an organization as outlined by Grande, Estebanez, and Colomina (2011) are better adaptation or flexibility to a changing business environment, better transactions management, increased competitiveness, better information flow among different levels of staff and improved external relationships for the organization. Cost-effectiveness, time effectiveness, accuracy, and portability of AIS data in relation to easy access can also be mentioned as advantages of AISs.

2.2.4 Challenges of Adopting CAIS

The challenge that comes with CAISs adoption is mostly associated with the very nature of the system itself which is the information technology. According to Korvin, Shipley, and Omer (2004), IT brings a special opportunity to tackle planning and strategic business problems at the same time it also brings with it room for new threats that exposes the internal control to risk. Threats and risks of computer accounting frauds are parts of the challenge of adopting CAIS in relation to internal control. One of the objectives of adopting or deploying Computerized Accounting Information systems is to control the activities of organizations through appropriate design that enables continuous review and auditing of the system that is deployed (Romney & Steinbart, Accounting Information Systems, 2015). Section 404 of SOX requires auditors to attest and report on the assessment of internal control by management (SEC, 2008) and (Ramos, 2008).

Advances in hardware and software engineering and design have lightened many of the traditional internal control issues about reliability, timeliness, and accuracy of data. Modern computers and new software packages have embedded hardware controls or system control and a number of application controls. According to Allen (1977, pp. 52-62) early on during the transition period into computerized accounting information processing, there was a misleading sense of better security amongst many organizations, with most of them thinking that computers were fraud-proof. Accordingly, the risks and threats to the organization's accounting information systems were frequently misjudged and considered improbable. Nevertheless, with technology progressing quickly through numerous stages of use, there is growing fear about the potential for disastrous problems that information technology has instilled (Davis C. , 1997, pp. 28-34).

There is remarkable spread and use of computers throughout organizations. Following this, the distribution of data among a large number of employees is made through local area networks (LAN). While wide-area networks (WAN) are used to communicate with external stakeholders that need to access information and also for the organization to reach out to the outside world. This means that the CAISs are no more isolated but rather interconnected with a wide variety of users which brings a change to the accounting system's environment which in turn brought substantial changes to the nature of internal control risks (Korvin et al., 2004).

Embedded controls within the CAISs are not able to avoid the need for internal control measures that must be particularly designed and implemented to manage the continually changing internal control security needs of organizations. The control procedures alone don't guarantee against possible threats, instead, the selection or design and implementation of the procedures based on the specific threat faced by the CAIS is important (Romney & Steinbart, 2015).

According to Wilkinson and Cerullo (1997), controls are important whether the AIS is manual or computer-based. Controls can be classified as a general control, application control, and security measures. The focus of this study is on application control which includes input control, process control, storage control, output control, and personnel control. Controls can be classified based on their risk aversion character as a protective, detective, and corrective controls. For effective internal control, these categories of controls should work together in an interconnected manner (Wilkinson & Cerullo, 1997).

The figure below describes the accounting process step by step. Internal control should be there at every stage of the process so that the output of the system reflects accurate and reliable information about the organization. Following the figure, the internal control issues at each stage are discussed in brief.

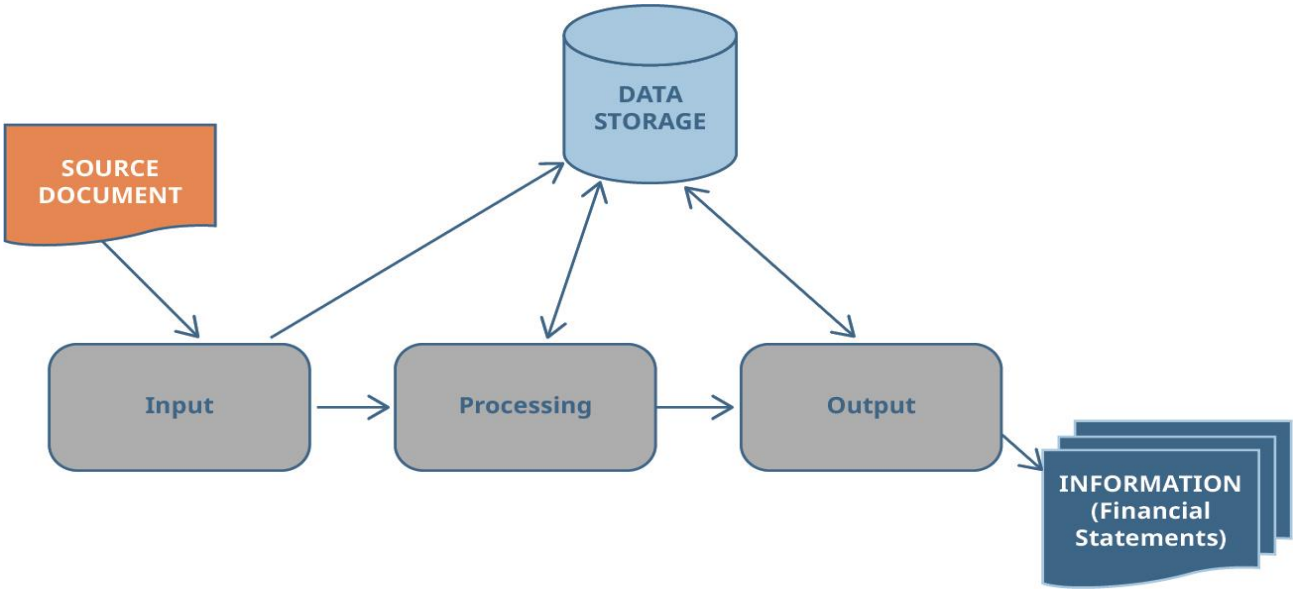

Figure 2: Steps in the Accounting Process

Source: www.opentextbc.ca

2.2.4.1. Input Control Problems

According to Turner et al. (2017, p. 131) input controls are in place to avoid the “garbage in” in the input stage and at the same time to avoid the “garbage out” at the output stage of any computer-based information system. If input control is not in place, the output of the CAIS will not be useful or reliable. To avoid GIGO (garbage in, garbage out) there needs to be proper input control in place. According to Ralph and George (2010, p. 543), input controls prevent both accidental and fraudulent entry of bad data into the system. Input control concerns such as the invisibility of input data, entry of unauthorized transactions, and inputting of bad data accidentally are discussed below.

Input data invisibility

Retrieving source documents is not easy even if the entry of input data into the computer was based on the source document. Most of the time the source documents are retained for a limited short time of period due to the document retention policy (Arens et al., 2012). When the source document is no more retained, the data on the computer system becomes invisible and the data will be in a format that is machine-readable. This creates room for perpetrators to initiate invisible data lacking source documents which is a factious transaction. To overcome this problem physical control is necessary at workstations to ensure that only authorized personnel is initiating recording of transactions on a computer system. Furthermore, the transactions should be linked with specific personnel and specific workstation and the time the input was initiated.

Unauthorized transaction

Computers systems are known for allowing easy access to data as well as easy use of data. This advantage of computerized accounting information systems can turn in to challenge when it is used by the wrong hand for illegitimate use. A perpetrator may initiate an unauthorized transaction through the use of the computer system. The system should exhaustively run the checks for all authorizations procedures in place. Organizations should develop various internal control mechanisms such as physical access control on the computer systems. Physical control or security is locking and limiting access to the computer systems within the organization. Further access control for an authorized individual includes role-based authority which allows specific individuals or users of the system either to read (view), write (add), or delete (remove). The latter

two role-based access controls provide authorization for modification and alteration of data or information (Lumen Learning , 2017).

Inputting incorrect data by an unfamiliar user

Computerized accounting system users are not always familiar with the system and they may put wrong data or erroneous ones and may also respond wrongly to the system. A computer system's logical capability enables the detection of various types of errors (Wilkinson & Cerullo, 1997). Every computerized transaction processing system incorporates logical tests that discover errors through the comparison of incoming data against pre-established validity standards.

2.2.4.2. Process Control Problems

Process control focuses on the modification and manipulation of data inputted into the system for processing. The process control goal is to produce a good and clear audit trail that clearly shows the documented changes and updates made on general ledger account balances. The audit trail tracks back through activity logs to the source document as a way of proof (Bagranoff et al., 2010). The activity logs which make up the audit trail will have value and serve as evidence only if they are regularly checked and evaluated to identify attempted attacks (Romney et al., 2021). Process control challenges also involve meddling with the software that is being used to process data.

Lack of judgment

The computer lacks judgment and common sense. Computers only perform tasks based on the instructions stored in them and they have a zero IQ and have no knowledge of their own that can enable them to make decisions (Toppr, n.d.).

Segregation of duty and centralized data

Bagranoff et al. (2010, p. 360) described segregation of duty as means management uses to assign tasks to employees in a way the work of one employee is checked by another employee. Separating responsibilities such as authorization and recording of transactions and custody functions is important in implementing internal control (Romney et al., 2021, p. 338). In a networked environment with centralized data, it is challenging to control data access and limiting proper authorization.

Speed can be misused

Computers process data within fractions of seconds. This speed can be used to commit fraud. In the manual system, it takes a long time to manipulate and change data in files (Ramadhan et al., 2011). Therefore, there need to be control mechanisms to prevent misuse of computers' high speed to manipulate data.

Potential process error

Even though errors in the input stage are greatly reduced due to the use of computer-based accounting systems, another type of error involving the processing of data within the system can occur. This type of error can happen due to poor system design or when there is a problem with the hardware and operating system.

Audit trail (activity log)

An audit trail is a path that connects the stepping stones used when recording and posting transactions up to the endpoint after the completion of the processing of the data. It is used to show how the transaction was recorded on the computer and one can go forward and backward to check the validity of transactions from the initial stage of input to the final output stage (Romney et al., 2021, p. 65). The audit trail of the activity log can give information about the transaction; the user who initiated and updated it, when the transaction and its updating happened, and also tell which application software was used to process the transaction including the IP address of the user. The potential of loss of audit log is among the challenges organizations face. Since audit trails are considered good practice in terms of compliance, losing them would indicate that there might be noncompliance issues (Audit Board , 2021).

2.2.4.3. Storage Control Problems

Storage or backup control is about keeping data away from the system so as to use it later. The storage control challenges involve issues of keeping the data in a safe place so as to limit access by authorized personnel. Data storage calls for continuous checking of data integrity with what is currently being used on computers and updating the data accordingly so as not to lose integration with software or system (Anomah & Agyabeng, 2013).

Stored data either in the system or the backup data can be lost. Data loss is a major problem for companies that intensively use computer systems. The loss of data interrupts the day-to-day activity of the organization. The data recovery process takes much time and resources and the

chance of recovery in most cases is minimum. The main causes of data loss include system corruption, hard drive crashes, human error, and failure in software. Apart from these major causes of data loss, there are various other causes such as power outage, virus, hardware formatting, hard disk damage, computer theft, natural disaster, etc. (Consolidated Technologies , 2021).

2.2.4.4. Output Control Problems

Outputs are very important to an accounting information system as it is the main goal of having an accounting information system (Bagranoff et al., 2010). The output of an accounting information system is important because it contains information that is used by management and other users for decision-making purposes. Output controls are not just programming routines; instead, they are a combination of detailed procedures followed to control misuse of information by an unauthenticated user. The output control is there to make sure the information is not lost, misallocated, and distorted (Hall, 2011, p. 812). The challenge here includes misuse of system output, controlling people who are remotely accessing the screen, and also unauthorized copying of output.

Not checking computer outputs

One problem of output control is that information users trust that the computer output is correct and that they don't check the information.

Output information not being able to reflect the reality

Sometimes the output information may fail to reflect the real situation where the organization stands. The recorded and stored information on the computer system needs to be checked with the real-world situation of the organization.

2.2.4.5. Personnel Control Problems

The people component of the information system ranges from the professional information system designers and creators such as programmers who are more equipped with technical skills to the users of the system who may not have adequate IT knowledge. The information system users are the major part of the human part of the system. Hence, they need to have the knowledge to efficiently and effectively use the system.

Only authorized personnel should be allowed to access certain parts of the system in order to prevent computer fraud and accidental mistakes and damage that can cause loss of data. Personnel control can be implemented through the use of ID numbers, smart cards, and passwords that enable only authenticated personnel to have particular access to the system records and information stored in the system (Ralph & George, 2012, p. 543).

The following diagram depicts the internal control challenges of a computerized accounting information system in terms of input, process, storage, and output controls.

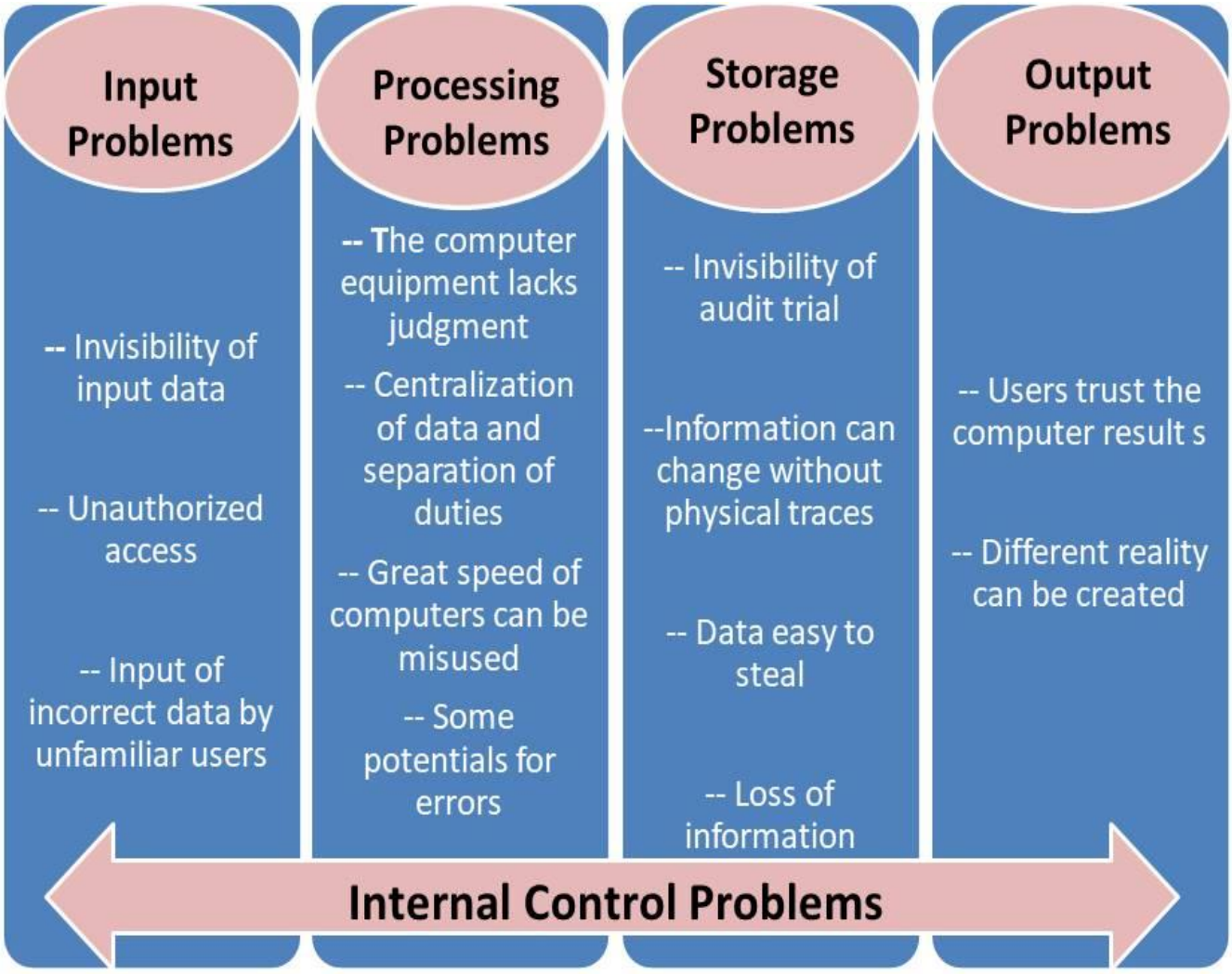

Figure 3: Internal Control Problems of CAISs

Source: Adapted (with some modification) from the work of (Ramadhan et al., 2011)

2.2.5 Computerized Accounting Information System and IT Knowledge, IT Governance and Computer Fraud

Accounting information as an information system has five components: the hardware, the software, the telecommunication, the database, and the storage, and finally the human resources and the procedures (Davis B. , 2020). Hence, the topics that cover the human aspect (IT knowledge of users and Fraud) are included as part of this study. IT governance relates to procedures and how the system as a whole is governed for effective and efficient use of the system and to guide users as to how to use it. IT governance is a means of IT risk mitigation. Being also part of the corporate governance, IT governance is a way to manage the IT of the organization in order to arrive at improved and better value from the IT investment (IT Governance, 2019). According to Calder and Watkins (2005, p. 3), IT governance is the framework by which organization achieve their objectives and meet their strategy through structured and organized use of their information technology. IT governance offers control of information technology as well as oversight. Therefore the researcher brought the topic of IT governance into this study.

2.2.5.1 IT Knowledge

Within many organizations, accountants take the major share in designing internal control and they are also the core implementers of internal control objects. Professionally, accountants have a big role in minimizing risks that can negatively affect the financial reputation and ranking of their organization. Accountants are usually experts in controls systems that can reduce risks in the following broad categories:

- The risk that assets will be stolen or misused
- The risk of errors in accounting data or information
- The risk of fraudulent activity by employees, managers, customers, or vendors
- The risks that are related to the use of IT systems, such as
    - Erroneous input of data
    - Erroneous processing of data

- Erroneous output of data
- Manipulation of stored data
- IT-related or Computer fraud
- Computer security breaches (Turner et al., 2017)

When accountants are competent enough to use computer-based accounting information systems, the CAIS will be effectively utilized. This will enable organizations to manage the challenges of adopting CAIS while realizing the expected benefits.

2.2.5.2 IT Governance

IT governance is a general concept linking to the decision-making rights and accountability for promoting appropriate behavior in the use of IT (Hall, 2008, p. 728).

According to OECD (2019), governance of enterprise IT is the set of processes and procedures to direct and control an enterprise. The details of assignments and distributions of responsibilities and authorizations among the various stakeholders or partakers in the organization are stated and configured by the corporate governance structure in the organization. The structure of the corporate governance consists of BoDs (Board of Directors), managers, shareholders, and other stakeholders. Corporate governance specifies and lists the rules and regulations by which the partakers make decisions in the organization.

As stated by Eddy et al. (2009) organizations direct and control their IT through a system of IT governance policies. The IT governance structure lays down the allocation of rights and responsibilities among different partakers in the organization and it describes the rules and regulations as to how to make a decision on IT. Board, business, and IT managers are the partakers or participants of the distribution of rules and procedures that are set out by the IT governance policies or frameworks. Through the provision of this structure set by IT governance, organizations monitor their performance and also attain their objectives.

IT governance deals with the way IT is deployed or used and controlled in organizations. IT governance is part of enterprise governance or corporate governance. The following includes major components of IT governance:

- IT control: IT control objectives, cost control, quality of information (compliance, availability, confidentiality, maintainability, and flexibility);
- IT decision-making authority: who makes decisions on IT investments;
- IT responsibility: responsibility for the achievement of IT control objectives;
- IT supervision: who is in charge of the supervision or oversight of IT governance;
- IT integrity: reliability of systems that deliver reliable information;
- IT accountability: reporting and communicating on the quality of organizations IT governance (Eddy et al., 2009)

Information is a key resource for all enterprises. Organizations rely heavily on technology to process their data into information. Information and information technologies are inseparable. The information, as well as the information technology, needs to be governed and managed properly. Mengistu et al. (2015) emphasize that for organizations to appropriately establish and support business strategies, they need to use IT governance as a tool to manage the structure of their IT and its process as well.

According to Bernard (2016), more than ever, organizations need to achieve increased:

- Value creation throughout their IT
- User satisfaction with IT arrangements and services
- Compliance with relevant laws, regulations, and policies

2.2.5.2.1 COBIT 5

COBIT 5 is a governance and management framework for information and related technology. This framework considers stakeholder needs with regard to information and technology. The framework is intended for all organizations using IT. Several global business misfortunes around the world over the last few decades have brought the term governance to the forefront of business thinking.

Organizations accomplish their IT governance and also execute and manage their objectives through the COBIT framework. The framework allows them to generate prime value from

information technology by upholding a balance in realizing benefits, managing risk, and balancing resources. Additional benefits include the following but are not limited to:

- Maintain high-quality information that can support business decisions
- Achieve goals and realize business benefits through effective use of IT
- Achieve operational excellence or efficiency through the reliable application of technology
- Keep IT-related risk at an acceptable low level
- Improve or optimize the cost of information technology services
- Support compliance with relevant laws, regulations, and policies (Bernard, 2016)

2.2.5.2.2 The COSO Model

In 1985 the U.S. established the National Commission on Fraudulent Financial Reporting, known as the Treadway Commission. The commission was established in order to investigate the causes of fraud in financial reporting and to make recommendations to reduce it. Later, the Committee of Sponsoring Organization of the Treadway Commission (COSO) was established under the supervision of the Treadway Commission (Pfister, 2009).

COSO is a voluntary organization created to provide companies with recommendations and guidelines to improve efficiency in internal control. COSO developed an integrated framework in the year 1992 (Boczko, 2012). The COSO framework provides a general standard or framework for the assessment of internal control over financial reporting (ICFR). Even though the framework originated from the US by SEC, it is used by organizations all over the world.

The COSO integrated framework provided guidance for top management to improve their control in organizations in order to achieve objectives that related to the business. COSO defines internal control as a process, brought into function by an entity's board of directors, management, and other personnel, designed to deliver reasonable assurance regarding the accomplishment of objectives related to operations, reporting, and compliance (Schandi & Foster, 2019).

The COSO internal control framework which states and lists the internal accounting control standard or framework defines internal control as follows:

Internal control is a process, effected by an entity's board of directors, management, and other personnel, designed to provide reasonable assurance regarding the achievement of objectives in the following categories:

- Effectiveness and efficiency of operations
- Reliability of financial reporting
- Compliance with applicable laws and regulations. (Moeller, 2007; Moeller, 2010)

The updated version of the SOX was released in the year 2013 to make the framework more applicable for organizations with a complex environment. The internal control framework consists of five major components which are control environment, risk assessment, control activities, information and communication, and monitoring. In order to create effective internal control, management must make sure that all five components are present and operate together in a harmonized way (McNally, 2013).

The following figure shows the five components of internal control that are explained in the COSO framework are as follows:

Figure 4: The COSO Cube

Internal Control-Integrated Framework, Executive Summary, 2019 (Schandi & Foster, 2019)

It is important to focus on two elements of the COSO model, namely control environment and risk assessment in relation to this paper. Based on the literature review it is obvious that control environment is a complex element in internal control because it includes a lot of aspects, such as culture, competence, and segregation of duties in an organization, and, as Lightle et al. (2009) mentioned that it supports other components. Furthermore, risk assessment is important because it is a process that involves communication between employees and management and helps identify and minimize risks in the organization. (Rosenkrans & Ahlin, 2015), suggests that the control environment component can be seen as a setting in which other components are located and therefore a weak control environment leads to internal control risks. When measures are taken to minimize risks it can improve the control environment which in turn makes the organization less vulnerable to potential threats.

The COSO ERM control activities layers represent the major areas where AIS issues and concerns fit in this framework. The control activities materials discuss risk-related issues associated with both general and application controls.

Application controls then refer to specific processes in an IT environment. An enterprise may have an IT policy requiring that all IT new applications must be installed with a certain level of security and transaction balancing procedures. If we can determine that these general procedures are effective and working, the assumption will be that they are working for each specific application used within that IT infrastructure. This distinction between the general or pervasive IT control procedures and those that are specific to an application is a basic element necessary in understanding IT controls and risks.

When compared with traditional manual systems, computerized systems have many benefits. For example, they reduce the human error associated with manual controls, save time for businesses, and allow for easy data access. On the other hand, they have disadvantages as well (Welch et al., 2011).

2.2.5.3 CAIS, Fraud and the Fraud Triangle

The reason to bring issues of fraud here is that the accounting profession is highly related to ethics. Accountants need to be committed to ethics. The topic of fraud is hence brought forward in order to show that accountants need to understand what fraud is and the reasons why people are compelled to it. Professional ethics is not something one can get overnight or just through

education; rather it requires developing a sense of it through the course of one's career (Mintz, 2021).

Fraud has various meanings based on different concepts, meanings and understanding as a social theory or concept. A more general definition of fraud is given by Kanu and Okorafor (2013, as cited in Agboare, 2021). Turner et al. (2017) defined fraud as theft, intentional deception, concealment, and conversion to the personal gain of another's money, physical assets, data, or information. Bondnar and Hopwood (2013) further point out that excessive cost, deficient revenues, loss of assets, inaccurate accounting, wrong business interruption, statutory sanctions, and competitive disadvantage may all result from fraud and embezzlement.

According to Silverstone et al. (2012, p. 21), fraud usually can be perpetrated by individuals such as management, owners, members, users, customers, agents, volunteers, and anyone having a relationship with the organization. Customer fraud involves the provision of wrong information and accessing information without proper authorization through a customer interface. Management fraud involves financial statement fraud (Silverstone et al., 2012; Kranacher & (Dick) Riley, 2020).

In the literature, there is a concept named "fraud triangle" which stems from Donald Cressey's hypothesis (Cressey, 1973). The fraud triangle has three legs namely, pressure, opportunity, and rationalization. These three factors should simultaneously be present for an individual to commit fraud. Pressure is the first factor that initiates the crime. The perpetrator may have some financial problems that cannot be solved through legitimate means. The fraud triangle depicts the three conditions that must exist for the fraud to take place (Kay & Ovlia, 2014).

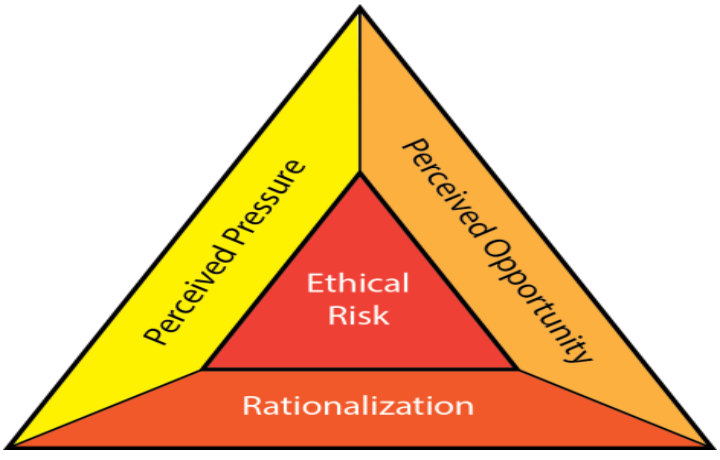

Figure 5: Fraud Triangle

Organizations with weak control or managements having a careless attitude towards internal control would usually provide an opportunity for perpetrators. As noted by Donald Cressey (1973) fraud will occur when the perpetrator, who has the low moral strength to resist the temptation to commit the fraud, is offered the opportunity. According to Welch et al. (2011), the widespread use of computer technologies in organizations increases the organization's risk of computer fraud. They stated that data and information in computerized systems were less secure than those in manual systems. Turner, Weickgenannt, and Copeland (2017, p. 138) also stated that computer systems can easily be misused for fraudulent activities unless management puts controls to safeguard computer software and hardware just like any asset of the organization.

The fraud triangle is embedded in the international auditing standard ISA 240 and also in other professional auditing standards around the world such as in ASA 240 of Australia and SAS 99 0f USA (PCAOB, 2005; IAASB, 2009). The fraud triangle describes reasons for committing fraud from a single individual standpoint (Dorminey et al., 2010). However recent researches indicate collusion in fraudulent activities. Collusion is when two or multiple perpetrators work together to make financial statement frauds. Financial statement frauds are taking place through the involvement of more than one perpetrator (Albrecht, 2008). The collusion can be made by both internal and external perpetrators cooperating for a fraudulent purpose. According to Wilkinson and Cerullo (1997), this type of fraud is difficult to counteract even if there is a strong system of internal control.

Further developments have been made to the fraud triangle by scholars such as Rezaee (2019). The development includes the promotion of the fraud triangle into the fraud diamond and fraud pentagon. The fraud diamond includes a fourth angle which represents capability. According to Rezaee (2019), the capability is linked to knowledge of the accounting system. The perpetrator needs to have adequate knowledge of the computer-based accounting information system to commit the fraud. Therefore opportunity, pressure, and rationalizations which are the legs of the fraud triangle are not enough and an additional fourth component is required.

The fraud pentagon model further adds accountability as the fifth component to the fraud diamond. The accountability component indicates that the perpetrator of the fraudulent activity will pay for the crime at the end either through criminal penalty or capital punishment. Accountability is, therefore, more related to compliance, enforcement, prevention, and detection

of fraudulent acts. According to Crowe Global (2011), the accountability element in the pentagon fraud model is represented as arrogance. Arrogance is described as the attitude of superiority towards authority owned and wrongly thinking that the organization's rules, regulations, and policies do not apply to the perpetrator as a member and employee of the organization.

The following diagrams show the fraud diamond and the fraud pentagon models.

Figure 6: Fraud Diamond and Fraud Pentagon models

Traditional AIS research has focused on the use of technology to enhance decision making, performance and to accomplish other organizational objectives (Dillard & Youthas, 2001). The fundamental role of Computerized Accounting Information Systems in any organization is generating quality accounting information (Azhar, 2017). Hoitash et al. (2009) and Mndzebele (2019) suggested that if companies are able to adjust their computerized systems of internal control mechanism according to their Computerized Accounting Information Systems, they will be able to ensure the reliability of financial information processing and improve the control measures of the effectiveness of the financial information reliability.

A study on AIS and internal control by Mndzebele (2019) clearly shows that AIS contributes towards better internal control. The study also mentions that AIS assists in complying with

accounting standards, laws, and regulations as well. This also enhances the main objective of any accounting information system which is generating quality financial information.

On the other hand, there are frauds that are particularly inherent to computer-based systems. The danger of computer fraud is one of the major disadvantages of the computer-based accounting system. According to Kunz and Wilson (2004), computer fraud is part of the bigger computer crime and it uses electronic resources to commit illegal acts and provides fraudulent information as a way to mislead or deceit users.

According to Cordes (2007), computer fraud is defined as:

> Computer fraud refers to the input, alteration, deletion, or suppression of the computer data or programs or other considerations in the data processing that affects the result of processing and causes economic losses or appropriation of another person's property with the intention of gaining illegal economic benefits for oneself or others.

Program fraud is making changes to program modules and manipulation of programs that are not authorized with the intention of making illegal acts. When the maintenance of the original program is done by the original programmer, the chance of program fraud becomes high. This is because the programmer can easily conceal the fraudulent code among the many codes that are legitimate. This can be resolved by having a different programmer for the maintenance service so that detection of program fraud will be possible (Hall, 2008).

Unfortunately, there are fraudulent or unethical issues that are related to computer-based accounting systems. The systems are often used to assist in conducting unethical activity (Turner et al., 2017). As Turner et al. point out, the computer is used as an instrument to quickly and efficiently commit a fraud that could have been conducted without a computer's involvement in the fraudulent activity. This is an abuse of computer speed for an unethical act.

According to the Ethiopian Proclamation No 958 (2016, p. 9104), the use of information communication technology is vulnerable to various types of security threats and it needs to be protected and proper security measures should be in place. Crimes against computer systems and data include illegal access (unauthorized access) to the whole or any part of the system or network, illegal interception of non-public computer, interference with computer systems

without authorization or over and beyond what is authorized, triggering damage to computer and distraction of data, criminal acts associated to the usage of computer devices and data manipulations, computer-related falsification and forgery, and electronic identity theft (Proclamation No. 958, 2016).

2.3 Empirical Review

In this section, various past studies are systemically examined and reviewed to address and understand the topic of interest of this paper. Accordingly, reviews of studies made across the world are presented. Studies conducted in Ethiopia are presented in a separate section titled, studies in Ethiopia. the discussion of the review follows a format where the research areas and problems are presented followed by the methodology and ends with findings and conclusions made by each study.

Al-Dmour (2018), investigated the reliability of the accounting information systems regarding performance with the mediating role of quality of financial reporting. The study bases the accounting information system as a method of internal control mechanism in evaluating the performance of the organizations. Publicly listed companies in Jordan were part of the study in which 239 responses were collected through the use of a questionnaire. The finding of the study indicated that the use of the computer-based accounting information system has a significant and direct (positive) effect on business performance. From the results obtained, the study indicated that the relationship between the CAIS and business performance is much significant than the relationship between the CAIS and quality of financial reporting. Even though the significance of the relationship between CAIS and quality of financial reporting is found to be less than that of CAIS and business performance, the study revealed that there exists a positive relationship between the two (CAIS and quality of financial reporting).

In their literature review Hla and Teru (2015), attempted to examine the efficiency of computer-based accounting information systems on achieving organizational goals such as increasing business efficiency and competitiveness. They used secondary data for their examination. The finding of their examination indicated that in order to maintain the qualities (benefits) of computer-based accounting systems in terms of achieving organizational goals, there needs to be a sound internal control system in the organization. following this, the CAIS are found to be

efficient in facilitating decision making, internal control, quality of financial information, provision of adequate, accurate, and relevant information for decision making and planning purposes. The study concludes that if organizations need to align their internal control system with the consideration of their computer-based accounting information system in order to maintain the benefits of the systems.

In their conference proceeding Wang et al. (2011), presented how information technology impacts the internal control of organizations. They conducted an empirical study on listed companies in China. The findings of the study revealed that the use of technology helped the organization in becoming efficient and effective in terms of performance through the use of information technology. The result also indicated compliance with the law has increased as a result of improved internal control. However, no significant improvements have been observed regarding the reliability of financial reports. The study conclusion pointed out that the use of information technology has brought the integration of various system flows such as information flow, capital flow, and logistics. This integration helped in achieving internal control objectives.

Ahmad (2012) studied the various problems that arise at the integration of the accounting function with information technology. The problems and issues of the computer-based accounting information system were pointed out from point of view of certified public accountants working on the systems in Jordan. Problems identified include the presence of risks involving hackers, virus attacks, loss of information, high cost involving the adoption of the systems, need for regular update of the systems, need for regular provision of training to staff, risks related to computer fraud, the difficulty of identification of errors made by a human, and the systems being too complex to understand. The study recommended different preventive and detective methods of risk management. The study also indicated ways to tackle issues of information loss-related problems that are caused by power failures. The study concluded that even though there are various issues concerning CAIS, the challenges are manageable ones if organizations' set up proactive procedures and manage to put those procedures into practice.

Naranjo-Gil (2004) conducted a study on the role played by sophisticated computer-based accounting information systems in strategic management. The study examined the alignment of the CAIS design with the strategy of the organization. The study made use of the data collected

from 112 informants from 4 public hospitals in Spain. The study finding indicated that the design of the CAIS is related to the implementation of organizational strategies and also enhances performance. Designing CAIS taking strategies of the organization into consideration has shown to improve organizational performance. This indicated that CAIS has a mediating role or function between strategy and performance of the organization. The effect of CAIS on performance was found to be through strategy. The analysis (ANOVA) of the study clearly showed low performance when the design of the AIS is not in line with the strategy of the organization.

Liew (2019) directed an investigation on the relationship between IT and management control. The investigation focused on what IT can and can not provide for management control and how IT can be used effectively to support management control. To find out the true effect of IT on management control, the study used a firm as a case where both IT and management control are extensively used. the study made use of the comparison between paper-based management control systems and IT or computer-based management control systems. The finding of this case study indicated the benefits that IT can provide are offered to those that made good use of the technology. The study further provided an insight on how to better use IT to achieve objectives of management control. The study also made suggestions as to how firms should train their employees to use IT in the best way that ensures the achievement of their objectives through effective utilization of management control objectives.

Lutui and ‘Ahokovi (2018) conducted research on the relevance of internal control on a computerized accounting information system. The study discussed that dependence on computers can lead to a bigger problem in terms of internal control issues that may arise as a result of the technology. Further, the study discussed in detail the concepts of internal control in a computer-based accounting system. The finding of the study indicates that internal control in the accounting systems has an important role in the prevention and detection of fraudulent acts. In addition to this the study indicated that apart from compliance with the law and preventing fraud, organizations can benefit from internal control in terms of improving business, effectiveness, and efficiency at the same time. The study made a recommendation concerning the provision of continuous training to employees to keep them up to date with technological advancement in order to maintain the safety and security of information.

In their study, Ardiansah and Indah (2021)**,** investigated the maturity level of computer-based accounting systems in small and medium-sized enterprises empirical evidence in Indonesia. A survey of 120 SMEs was conducted using a questionnaire. A correlation test was done on the analysis of the data. The finding showed clearly that the maturity level of CAIS is below optimal. Key maturity activities are significantly related to planning and organization and measurement.

Corsi et al. (2017) in a case study studied the integration of management control systems through digital platforms. The study aimed to investigate the contribution of information technology to a management control system. The study showed that the IT platform supported most components of a management control system. This enabled organizations to reach a higher level of integration of administration processes and information flows. Based on the study and the literature review, the investigation confirms that IT improves management control systems in terms of communication, knowledge management, and information sharing and flow.

Trinandha et al. (2018) studied the potential impact of computerized accounting information systems on computer accounting fraud. A total of 232 respondents participated in the study. The participants are drawn from the population of all cooperatives in the city of Java in Indonesia using the purposive and convenience sampling method. The data collection was administered using a questionnaire designed using 5 points Likert scale. The finding of the research indicated that the use of computerized accounting information systems has the effect of unlocking opportunities to commit computer accounting fraud.

The study by Rahman et al. (2015) investigated the obstacles and implementation of accounting software in Small and Medium Enterprises (SMEs) in the case of Southeast Asian (Bangladesh) perspective. 300 SMEs were involved in the study. The result of the study suggested proper application of the computer accounting systems ensured strong responsibility and accountability of the SMEs. It also indicated the implementation of the systems helps SME owners and policymakers to better understand the performance and development of the SMEs through ease of access to information. the finding also indicated that the SMEs can decrease their operational cost and increase their profitability and gain a competitive advantage through the use of computer-based accounting systems.

Fitriati and Susanto (2017) conducted research aiming to measure the influence of top management support on accounting information systems quality and the influence of quality of accounting information system on quality of accounting information. Samples were taken through a random sampling technique from the population of higher education in Mohammediyah, Indonesia. The result showed that the accounting information system quality can be reflected by its relevance, accuracy, timeliness, and completeness features. On the other hand, it was found out from the study that the quality of the accounting information system was improved by effective application of internal control and top management support

In their analytical study, Al-waeli et al. (2020) studied the effect of accounting information systems on financial performance with the mediating character of internal control in Iraqi industrial companies. The study collected information from 90 study participants representing 19 industrial companies in Iraqi. The result showed timeliness, accuracy, and verifiability had a significant effect on financial performance. The result indicated that computer-based AIS has no significant effect on the relevance of financial performance. On the other hand, the result showed that internal control had a moderating role in achieving the desirable characteristics of CAIS which are presented in the paper as timeliness, relevance, accuracy, verifiability, and better financial performance. Based on the finding, the paper recommended that management gives special attention to internal control as a means to improve performance through the use of computer-based accounting information systems.

In his study, Abu-Musa (2004) investigated the adequacy of security across Banks in Egypt. The study addressed the issue of security from points of safeguarding data and also CAIS used by banks. The study made use of a control checklist to measure the adequacy of security. The checklists were proposed by the researcher based on previous studies conducted by various researchers under the topic of interest. The study used the census to study the Banks in Egypt. The result indicated that the majority of the banks in Egypt had adequate security over their computer-based accounting information systems. The result also indicated that the banks achieved this level of security because they work closely on technical and procedural issues so as to keep the computer-based accounting systems efficient in terms of security controls.

Abu-Musa (2005) conducted another empirical study on Saudi organizations to examine the substantial perception of the perceived risk of computer-based accounting information systems in

developing countries. Based on the finding of this study, almost half of the Saudi organizations adopting CAIS have suffered damages as a result of a breach of security in their computer-based accounting systems. The statistical analysis also indicated that there was both intentional and unintentional entry of bad data into the system. Suppression and destruction of output, distribution of information to the wrong and unauthenticated user were the major perceived threats to computerized accounting information systems. The study recommended that the security measures should be increased for the areas mentioned above and that it is important to raise awareness regarding security issues in computer-based accounting information systems.

The study conducted by Soudani (2012) investigated the usefulness of accounting information systems for effective organizational performance. The study was conducted on 74 firms listed on Dubai Financial Market (DFM). The effect of accounting information systems was analyzed through the use of economic and profitability indicators such as return on asset (ROA) and return on equity (ROE). Based on the findings accounting information systems are found to be useful for the effectiveness of organizational performance. The finding indicated that AIS was the most important factor in firms that are listed in the DFM. The study found AIS to be an important factor in enhancing organizational performs through collection, processing, storing financial data in ways that are convenient for decision making, performance evaluation, internal control, and facilitating transaction processing.

The study by Al-Dalabih (2018) focuses on the use of computer-based accounting systems in improving the quality of financial data contained in financial reports. The study was conducted on service companies that are listed on the stock market exchange in Amman. The study involved 70 participants representing various service companies based in Amman. The study made use of questionnaires to gather data. The result that came out indicated the use of computer-based accounting systems has a significant positive effect on financial data quality. The recommendations focused on advising the stock market listed companies to keep their eye on continual updates on the technology so as to maintain the quality of financial data and as it is the main tool to evaluate their performance.

Ayereby (2018) studied factors that contribute to a data breach by internal parties of organizations. The investigation intended to provide management with ways to strategically minimize data breaches by an employee. The research was conducted on selected management

and employees of business sectors and government offices in Ivory Coast. The study followed a mixed-methods approach and data were collected through interviews, open-ended questions, and questionnaires. The result of the study showed that management plays a big role in preventing and minimizing data breaches through various ways such as creating awareness of data security, providing training to employees, following compliance with security regulations, designing and implementing systems that are efficient in detection and prevention of security or data breach. The study concludes that managers have to understand the level of data security in their organization as well us should evaluate the risk appetite of their organization.

Ramadhan, Joshi, and Hameed (2011) studied the perception of accountants in Bahrain about internal control problems associated with the use of computerized accounting systems. The finding indicated that the accountants believe that there is some kind of internal control problems associated with a computerized accounting information system. The study was conducted on accountants working in 100 firms. The result also showed that the major kind of problem was that information can be changed easily in computer-based systems without any physical trace. The accountants also believed that the problem can be overcome with means such as proper authorization to computers and systems, assigning proper responsibility regarding information storage to avoid backup files from getting on the wrong hand, segregation of duty, and running tests to identify notable problems with the system itself. The finding identified the types of control problems the accountants perceived differ according to the nature of the business.

Edison et al. (2012) researched to evaluate factors influencing the adoption of accounting information systems by small to medium enterprises in Chinhoyi. 72 SMEs out 0f 100 were selected for the study. The research objective was to identify benefits to the SMEs in AIS adoption and to establish the factors that influence non-adoption by the SMEs and thereby to determine the effect on SMEs of not adopting the AIS in Zimbabwe. The researchers collected data through questionnaires and personal interviews revealed that non adoption of AIS results in poor quality of financial information. On the other hand, the finding indicated that the adoption of AIS has no effect on the competitive advantage of SMEs.

Rotich (2017) studied the impact of computer-based accounting information systems on the effectiveness of manufacturing firms in Kenya. The study used descriptive design and used a

questionnaire as a means of data collection instrument. 51 Kenyan manufacturing firms took part in this study. The study findings indicated that the use of computer-based accounting systems improved the efficiency of the manufactures. The improvements are observed from decision-making, management efficiency, and process controlling aspects. The paper recommends that manufacturing firms can increase their profitability through efficiency, better decision-making, and adaptability in changing environments through the adoption of a good computerized accounting information system.

In their study, Anomah and Agyabeng (2013) tried to highlight the challenges that auditors face as audit risk due to the use of computer-based accounting information systems by their clients and also the need for accountants and auditors to equip themselves with what the computer-based accounting environment of today's world requires. The study made use of a vast literature review and empirical knowledge to study the topic of interest. The finding of the study indicated that both accountants and auditors need to have practical knowledge of information technology in order to effectively perform their tasks. The task of internal control or fraud detection may be highly related to management than auditors and accountants. But still, auditors need to have a full understanding of their technology-intensive environment to do a risk assessment. The study recommended that accountants and auditors need to upgrade their knowledge and skill following the fast-paced IT sector.

Itang (2020) in his study tried to develop a new measurement based on the structural characteristics of computerized accounting systems. Quality of the computer systems and their effectiveness was given attention in terms of structural characteristics of the systems mainly focusing on internal control, database, data processing, and technology. 384 chartered accountants were involved in this study. The accountants are members of the institute of chartered accountants of Nigeria. The result concluded that the measurement developed was reliable enough to assess the quality of computerized accounting systems. The research called for further research to check the validity of the measurement developed by the researcher.

The study by Beke (2010) put forward that there is an improvement in accounting quality and decision-making associated with the use of AISs to process financial information. The study found out the way information is recorded and stored in a computerized accounting information

system allowing easy access to information for decision-making purposes. Beke (2010) discussed that AISs tended to have standardized forms of data processing which is provided by the information system which is in support of Pollock and Cornford (2014) who argued that AISs also provide an opportunity to update procedures and align the procedures with the current and best practice.

In his study Appiah (2014) examined the conception, motivation, benefits, and challenges concerning the use of computer-based accounting systems by state-owned enterprises in developing countries. The case study included four state-owned enterprises in Ghana. The study showed that there are factors which are internal (such as data processing cost, the volume of data, IT and Knowledge of decision-makers) and external (such as competition and innovation) and factors that contribute to the adoption of the computer-based accounting information systems. The study also observed that the computer-based accounting systems were not integrated enough with other computer-based information systems within the state-owned enterprises that would have enabled them to have better communication. This resulted in an inability to share financial information in real-time terms. The researcher found speed, efficiency, accuracy, and customer satisfaction to be among the benefits of adopting CAIS in the state-owned enterprise. The study also indicated that there is a strong relationship between employees and the challenge of adopting the CAIS. The study recommended that managers need to limit information access so as to avoid human error.

2.4 Studies in Ethiopia

Manchilot (2019) studied the determinants of computerized accounting information system adoption by hospitals in Addis Ababa, Ethiopia. The purpose of this paper was to identify factors affecting the adoption of computer-based accounting information systems by hospitals from the perspective of cost-benefit, company size, human resources, and management commitment. The study collected data from 52 hospitals based in Addis Ababa. The finding of this study revealed that the adoption of computerized accounting information systems is significantly affected by the perception of ease of use of the systems, having competent human resources, and commitment by management to adopt the system. The effect of cost-benefit and company size on the adoption decision of CAISs were found to be insignificant. Companies having committed managers have a

higher inclination towards the adoption of computer-based accounting systems. Higher benefit in excess of cost is also a driving force for the adoption of the systems.

Yehualashet (2020) in his study appraised the production cycle of accounting information systems. In his exploratory research, he studied the feat and failure of the application of accounting information systems in selected manufacturing firms in Ethiopia. Using the purposive sampling method the researcher collected primary and secondary data through interviews, questionnaires, censuses, and organizational records. The study found out that financial information is the key information source for most of the manufacturing firms' activities. Since financial information is the product of accounting information systems, the system is a crucial part of the operational activities and management decisions of manufacturing firms. Having a well-designed and developed accounting information system is hence important for effective planning, process, and controlling in manufacturing firms. The study also discovered that accounting information systems improve organizations' capacity to produce quality and timely financial information. communication of financial information among decision-makers is also mentioned as a major finding of the study. The study indicated that the establishment of accounting information systems in manufacturing firms in Ethiopia requires top management support, finance, and qualified human capital. Finally, the study recommends decision-makers at the top should be encouraged to establish an accounting information system as long as the cost-benefit analysis allows it and there is a qualified human power.

Serkadis (2017) studied the impact of accounting information systems on organizational performance in a case study of a pharmaceutical fund and supply agency. The study followed an explanatory research method and used both primary and secondary sources of data. Correlation and linear regression were used to study the relationship that existed between the study variables. The result indicated that an accounting information system has a positive and significant impact on inventory management, financial statement, customer welfare, and organizational performance. The study found out that accounting information system has a negative relationship with operating cost. Then, the study recommended the use of an accounting information system to enhance organizational performance.

A study conducted by Gosawork et al. (2014) investigated the impact of computerized accounting information systems on quality administration in the case study of the Commercial

Bank of Ethiopia. The research used primary data that was collected through questionnaires and interview methods. The study identified the existence of a knowledge gap on how to use computer-based accounting systems by management in the Commerical Bank of Ethiopia. The finding indicated that a computerized accounting system is a major component in the achievement of organizational goals in the case of CBE. The study recommended that there should be continuous training for management staff to increase technical awareness. In addition to this, the study made recommendations that updating the CAISs will improve competitiveness.

Kalid (2018), conducted a study that investigated the underlying reasons why IT governance is low among the Ethiopian Banking sector. A total of 136 professionals participated in the study from the bank sector. From empirical studies, the researcher proposed 12 underlying reasons for low ITG in Ethiopian Banks. Out of the proposed reasons, improvements were recommended on IT performance management, IT resource management, IT strategy committee, corporate performance measurement, corporate communications, senior management involvement, and compliance culture within organizations. Cost, complexity, top management support, and external pressure were some of the major challenges identified as a cause for low ITG.

Melese (2021) studied what effects ERP systems have on internal control in Ethiopian private Banks. the study evaluated the effect of the information system of ERP on the effectiveness of internal control. The study was conducted following a descriptive case study on two purposively selected banks in Addis Ababa. A total of 66 participants were involved in the qualitative study. The finding of this study indicated that the quality of the information systems of ERPs has a positive significant impact on internal control. the service quality of the ERP system is also found to have a positive significant effect on internal control. based on the findings, the researcher recommended to bank managers to focus on system quality of information systems and quality of service in order to have effective and efficient internal control.

2.5 Research Gap

Hla and Teru (2015) stated that establishing and maintaining sound internal control is a mandatory precondition for the achievement of organizational objectives through the use of computer-based accounting systems. The use of CAIS as a tool to achieve an organizational goal can be best described in terms of the contribution and facilitation of organizational performance.

This is indicated in the study conducted by Al-Dmour (2018) which stated that the use of CAIS is reported to have a significant and direct (positive) effect on business performance. Serkadis (2017) also reported that the use of CAIS improves organizational performance through cost reduction. According to Naranjo-Gil (2004), to achieve the organizational objective through the use of CAIS, the design and selection of the computer systems should be in line with the organizational goal. The alignment of the technology selection with the organizational goal will direct the organization towards improvement in organizational performance. The result of the study by Rahman et al. (2015) also showed that the proper application of CAISs improved the performance of SMEs through cost reduction which improved the competitive advantages of the organizations which eventually contributed towards profit maximization.

Hu and Wang (2011) indicated that the use of CAISs improved internal control. The integration of various standalone systems which is achieved by the use of CAIS is identified in their study as a factor that contributed towards improved internal control. In agreement with this Corsi et al. (2017) stated that the IT platform supports components of management control which enables organizations to reach high levels of integration. Lutui and 'Ahokovi (2018) pointed out, to prevent unauthorized access and also to limit access to authorized users, the CAISs need to have an effective built-in internal control system. However, the adoption of the CAISs doesn't always guarantee the potential advantage of improving internal control. Liew (2019) argues that organizations that benefited from IT in achieving management control objectives are the ones that make use of the systems effectively. There is also a similar finding outlined by Abue-Musa (2004) which states that to achieve adequate security control, organizations need to work closely on technical as well as procedural issues of internal control. Further emphasizing the importance of sound internal control, Al-Waeli et al. (2020) discussed that internal control has a moderating role in achieving the desirable characteristics of CAISs which they presented in their paper concerning the quality of information such as timeliness, relevance, accuracy, and verifiability.
On the other hand, studies by Trinandha et al. (2018) indicated that the use of CAISs has the effect of unlocking opportunities to commit computer accounting frauds. Rotich (2017) argues that the use of CAIS improves efficiency thereby the performance of the organization. The efficiency improvements are observed in terms of decision-making, management efficiency, and process control mechanisms aspects. In agreement with Rotich's finding, Beke (2010) stated that

the way information is stored in the CAIS by itself allows easy access to information which facilitates the decision-making process.

Based on the empirical review, previous researches have discussed CAIS concerning its impact on performance (Naranjo-Gil, 2004; Al-Dmour, 2018; Fekade, 2017; & Soudani, 2012), profitability (Rahman et al., 2015), the impact of CAIS on financial performance with the role of internal control (Al-waeli et al., 2020), AIS, and ethics researches (Guragai et al., 2017; Dillard & Youthas, 2001; Alles, 2020; & Smith, 2016). Some studies discussed the topic of CAIS with improved decision-making (Gordon et al., 1978; Beke, 2010; & Hla & Teru, 2015). Discussions are made about CAIS and the Auditing of CAISs by Dillard & Youthas (2001). Studies on the impact of the use of computer-based accounting systems with due regard to financial data quality (Al-Dalabih, 2018); studies such as those by (Anomah & Agyabeng, 2013 & Ahmad, 2012) also investigated the risks posed to internal control in a computer-based accounting system from a standpoint of auditors and providers of accounting training. Studies by (Corsi et al., 2017 & Liew, 2019) addressed the relationship between CAIS and management control systems whereas the relevance of the built-in control system within the CAISs is studied by (Lutui & ‘Ahokovi, 2018). Top management support and improvement on the application of CAIS are discussed by (Fitriati & Susanto, 2017). Hence, previous studies did not directly address the issue of internal control with the adoption of computer-based accounting information systems. Studies on security control of computer-based accounting information systems were made in the banking sector where the use of CAIS is heavy (Abu-Musa, 2004; 2005).

Studies such as the one conducted by Al-waeli et al. (2020) addressed the role of internal control concerning the computer-based accounting system, But the study considered internal control in a mediating role between financial performance and use of CAIS and not as a topic of interest on its own. The impact of information technology on internal control has been studied by Wang et al. (2011) while computer fraud, control breach, and human factors to reduce threats to security have been studied by (Ayereby, 2018 & Trinandha et al., 2018). Kereta (2018) outlined in his study why there is low IT governance in Ethiopian Banks. Lutui & ‘Ahokovi (2018) studied the relevance of the control embedded within the computerized accounting information systems. CAIS is also discussed in relation to SMEs (Rahman et al., 2015 & Ardiansah & Indah, 2021).

Studies about the impact of information technology on internal control are attempted in papers such as by (Wang et al., 2011 & Ramadhan et al., 2011). Kasssa (2021), studied the effect of ERP systems on internal control and the result indicated that the quality of the information systems comprised in the bigger ERP systems has a positive and significant impact on internal control.

Factors influencing the adoption of CAIS are discussed by (Ayele, 2020; Edison et al., 2012; & Tilahun, 2018;), the impact of the adoption of CAIS on the effectiveness of manufacturing firms is studied by (Rotich, 2017). The study by Yenni (2017) focused on knowledge of AIS users, quality of the AIS, and its output. The same researcher also studied the implication of information systems and user satisfaction. Effects of information system quality on internal control have been studied by Kassa (2021) in ERP systems used by Banks. Computer-based accounting information systems users' knowledge gap was identified in a study conducted by Fikadu et al. (2014).

Likewise, the discussion presented in the empirical review shows the benefits and challenges of adopting computer-based accounting information systems concerning efficiency and effectiveness in doing the accounting task and getting real-time reports. Apart from that benefits of CAIS in relation to the quality of financial reporting and how CAIS facilitates decision-making and competitiveness for different organizations.

Furthermore, these studies focus on the positive impacts or improvements made because of the adoption of CAIS. Challenges are also mostly associated with first-time adoption or implementation challenges of CAIS. This research addressed the knowledge gap in connection with the internal control benefits and challenges of adopting computerized accounting information systems. Apart from this, based on the empirical review most of the studies are conducted for commercial organizations and most banks. The contribution to the economic activities and social impact that is being provided by NGOs or charity organizations has been overlooked. NGOs contribute largely to the growth of the economy through the support they provide to the community, employment opportunities, and the foreign currency they bring into the nations. This research hopefully contributes in extending what has been investigated in sectors such as bank into the non for profit sector.

2.5 Summary of Literature Review

Author	Year	Title	Category	Document type	Finding(s)
Al-Dmour	2018	The Impact of the Reliability of the Accounting Information System upon the Business Performance via the Mediating role of the Quality of Financial Reporting	CAIS, Business Performance and Financial Reporting	Journal Article	Use of the computer-based accounting information system is reported to have significant and direct (positive) effect on business performance while there is less significant relationship between the CAIS and quality of financial reporting when compared to business performance
Hla & Teru	2015	Efficiency of Accounting Information System and Performance Measures: Literature Review	CAIS and organizational goal	Journal Article	The study indicated that in order to achieve goals through the use of computer-based accounting information systems, there needs to be a good internal control system.
Hu, & Wang	2011	The Impacts of Information Technology on Internal Control: An Empirical Study	CAIS and internal control	Conference Proceeding	Internal control is reported to have improved. The use of CAIS brought integration among the various stand-alone systems and this improved the internal control system of the organization.
Ahmad	2012	Problems and Internal Control Issues in AIS from the View Point of Jordanian Certified Public Accountants	CAIS and its risks and challenges	Journal Article	The finding reveled that even though there are various issues concerning CAIS, the challenges are manageable ones if organizations' set up proactive procedures and manage to put those procedures into in to practice.
Naranjo-Gil	2004	The Role of Sophisticated Accounting System In Strategy Management	CAIS, strategy, & performance	Journal Article	The finding indicated that when the design of CAIS is in line with the strategy of the organization, organizational performance improves
Liew	2019	Enhancing and Enabling Management Control Systems Through Information Technology: The Essential Roles of Internal Transparency and Global Transparency	MCS, IT and Internal control,	Journal Article	The finding of the study showed that the organizations who benefited from IT in achieving management control objectives are the ones that effectively make use of the technology. The adoption of the technology alone doesn't improve internal control.

Lutui & 'Ahokovi	2018	The Relevance of a Good Internal Control System in a Computerized Accounting Information Systems	The relevance of internal control in computerized accounting system	Conference Proceeding	Studied the relevance of internal control to computerized accounting systems. The study discussed that computer-based accounting information systems should have effective internal control to prevent access by unauthorized users and also to limit access by authorized users.
Ardiansah & Indah	2021	Investigating the Maturity Level of Computer Based Accounting Systems in Small and Medium Sized Enterprises: Empirical Evidence in Indonesia	Maturity of CAIS in SMEs	Journal Article	The maturity level of computer-based accounting information systems in SMEs is found to be below optimal in a survey conducted on 120 SMEs in Indonesia.
Corsi et al.		Studied the integeration of Management Control System through Digital Platforms	Management control system, IT platforms	Journal Article	The result indicated that IT platform supported components of management control systems enabling organizations to reach high level of integeration
Trinandha et al.	2018	Studied the potential impact of computerized accounting information systems on computer accounting fraud	CAIS and computer fraud	Journal Article	The finding of the research indicated that the use of computerized accounting information systems has the effect of unlocking opportunities to commit computer accounting fraud.
Rahman et al.	2015	Investigated the obstacles and implementation of accounting software in Small and Medium Enterprises (SMEs)	CAIS challenge and SMEs	Journal Article	The result of the study suggested proper application of the computer accounting systems ensured strong responsibility and accountability of the SMEs, the finding also indicated that the SMEs can decrease their operational cost and increase their profitability and gain a competitive advantage
Fitriati and Susanto	2017	Measuring the influence of top management support on accounting information systems quality and the influence of quality of accounting information system on quality of accounting information	Top mgt support, AIS quality, and Information Quality	Journal Article	It was found out from the study that the quality of the accounting information system was improved by effective application of internal control and top management support

Al-waeli et al.	2020	The impact of accounting information systems on financial performance with the moderating role of internal control	CAIS and financial performance	Journal Article	The result indicated that computer-based AIS have no significant effect on the relevance of financial performance. On the other hand, internal control had a moderating role in achieving the desirable characteristics of CAIS which are presented in the paper as timeliness, relevance, accuracy, verifiability, and better financial performance.
Abu-Musa	2004	Investigating the security Control of CAIS in an Emerging Economy An empirical study on the Egyptian Banking Industry	CAIS, and security controls	Journal Article	The result indicated that the majority of the banks had adequate security over their CAIS. The result also indicated that the banks achieved this level of security because they work closely on technical and procedural issues so as to keep the CAISs efficient in terms of security controls.
Abu-Musa	2005	Investigating the Perceived Threats of CAISs in Developing Countries: An Empirical Study on Saudi Organizations	CAIS and IT risks	Journal Article	Based on the finding of this study, almost half of the Saudi organizations adopting CAIS have suffered damages as a result of a breach of security in their computer-based accounting systems.
Soudani	2012	The Usefulness of an Accounting Information Systems for Effective Organizational Performance	CAIS and organizational performance	Journal Article	The study found AIS to be an important factor in enhancing organizational performs through collection, processing, storing financial data in ways that are convenient for decision making, performance evaluation, internal control, and facilitating transaction processing.
Al-Dalabih	2018	The Impact of the Use of Accounting Information systems on the Quality of Financial Data	CAIS and quality of financial information	Journal Article	The result that came out indicated the use of computer-based accounting systems has a significant positive effect on financial data quality.
Ayereby	2018	Overcoming Data Breaches and Human Factors in Minimizing Threats to Cyber-Security Ecosystems	Data breaches and threats, human factors,	Journal Article	The result of the study showed that management plays a big role in preventing and minimizing data breaches through various ways such as creating awareness, providing training, following compliance, designing and implementing systems that are efficient in detection and prevention breach

Ramadhan et al.	2011	Accountant's Perception of Internal Control Problems Associated with the Use of Computerized Accounting Systems: Evidence from Bahrain	Internal control, accountants perception, CAIS	Journal Article	The finding indicated that the accountants believe that there is some kind of internal control problems associated with CAISs. The finding identified the types of control problems the accountants perceived differ according to the nature of the business
Edison et al.	2012	Evaluation of Factors Influencing Adoption of Accounting Information System by Small to Medium Enterprise in Chinhoyi	Adoption factors of CAIS, SMEs	Journal Article	The finding revealed that non adoption of AIS results in poor quality of financial information. On the other hand, the adoption of AIS has no effect on the competitive advantage of SMEs.
Rotich	2017	The Impact of Accounting Information Systems on Effectiveness of Manufacturing Firms in Kenya	CAIS impact on firm effectiveness	Journal Article	The study findings indicated that the use of computer-based accounting systems improved the efficiency of the manufactures. The improvements are observed from decision-making, management efficiency, and process controlling aspects
Anomah & Agyabeng	2013	Evaluating Internal Controls in a Computerized Work Environment- a Risk to Audit Professionals and a Challenge to Accountancy Training Providers	Internal control evaluation in CAIS environment (auditing profession)	Journal Article	The finding of the study indicated that both accountants and auditors need to have practical knowledge of information technology in order to effectively perform their tasks. The study recommended that accountants and auditors need to upgrade their knowledge and skill following the fast-paced IT sector.
Itang	2020	Computerized Accounting Systems: Measuring Structural Characteristics	Structure of CAIS in terms of quality and effectiveness concerning internal control	Journal Article	The result concluded that the measurement developed was reliable enough to assess the quality of computerized accounting systems. The research called for further research to check the validity of the measurement developed by the researcher.

Beke	2010	Review of International Accounting Information System	AIS	Journal Article	The study found out the way information is recorded and stored in a computerized accounting information system allowing easy access to information for decision-making purposes.
Appiah	2014	Computerized Accounting Information Systems: Lessons in State-Owned Enterprise in Developing Economies	CAIS, State owned enterprises, and developing economy	Journal Article	The study showed that there are factors which are internal (such as data processing cost, the volume of data, IT and Knowledge of decision-makers) and external (such as competition and innovation) and factors that contribute to the adoption of the computer-based accounting information systems
Manchilot	2018	Determinants of Computerized Accounting Information System Adoption by Hospitals in Addis Ababa, Ethiopia	Determinant of CAIS adoption	Journal Article	The finding of this study revealed that the adoption of CAIS is significantly affected by the perception of ease of use of the systems, having competent human resources, and commitment by management to adopt the system.
Yehualashet	2020	An Appraisal of the Production Cycle of Accounting Information System Feat and Failure. The Case of Manufacturing Firms in Ethiopia	Production cycle of CAIS	Master's thesis [Unpub]	The study found out that financial information is the key information source for most of the manufacturing firms' activities. Since financial information is the product of accounting information systems, the system is a crucial part of the operational activities and management decisions of manufacturing firms.
Serkadis	2017	The Impact of Accounting Information System on Organizational Performance: A Case Study on Pharmaceutical Fund And Supply Agency	CAIS and organizational performance	Master's thesis [Unpub]	The study found out that accounting information system has a negative relationship with operating cost. Then, the study recommended the use of an accounting information system to enhance organizational performance.

Gosawork et al.	2014	Accounting Information Systems and Its Impact on Administration; In the Case of Commercial Bank of Ethiopia	AIS and administrati on	Master's thesis [Unpub]	The study identified the existence of a knowledge gap on how to use CAIS by management in the Commercial Bank of Ethiopia. The finding indicated that a CAIS is a major component in the achievement of organizational goals in the case of CBE
Kalid	2018	Underlining Reasons and Challenges for Low IT Governance in Banking Sector of Ethiopia: Towards Developing IT Governance Implementation Strategy	Reasons for low IT Gov,	Master's thesis [Unpub]	Cost, complexity, top management support, and external pressure were some of the major challenges identified as a cause for low ITG
Melese	2021	The Effect of Enterprise Resource Planning (ERP) Implementation on the Effectiveness of Internal Control of Selected Private Commercial Banks in Ethiopia	ERP and internal control	Master's thesis [Unpub]	The finding of this study indicated that the quality of the information systems of ERPs has a positive significant impact on internal control.

CHAPTER THREE
METHODOLOGY

3.1 Introduction

This chapter sets out various stages and phases that were followed to complete the study on the internal control benefits and challenges of adopting computer-based accounting information systems. It outlines the research methodology that is used in answering the research questions. The research methodology includes target population and sampling technique, research design and approach, source and instrument of data collection and its procedures, and data analysis procedures.

The investigation of the internal control benefits and challenges of adopting CAIS is approached based on the pragmatist epistemological standpoint which focuses on the practical meaning of knowledge in solving problems in order to attain informed future practices (Creswell J. W., 2013, p. 28). This worldview is usually characterized by a mixed-method approach. The pragmatism paradigm claims to tie the gap between the scientific method and structuralism orientation of older approaches to research and the naturalistic methods and freewheeling and unrestricted orientation of newer approaches (Creswell, 2014; Venkatesh et al.,2016; Creswell & Plano Clark, 2018b). Pragmatist epistemology views knowledge based on experiences of multiple realities and not as a single point of view or reality (Morgan, 2014).

3.2 Research Design

According to Sekaran (2003), the research design lays the overall approach that we choose to incorporate the different parts of the research in a clear and logical manner. As the research design consists of the scheme for the gathering, measuring, and analysis of the data in the study, it displays how much planning has been done in order to successfully carry out the research and address the research problem (Yenni, 2017). According to Mathukutty and Badrinarayan (2010), a research design as a procedures plan adopted by the researcher is to answer a research question objectively, accurately, validly, and economically.

The objective of the research is to identify the benefits and challenges of adopting CAISs in NGOs with due regard to their internal control. The method of study chosen for this study is a mixed-method approach. The mixed-method approach is particularly chosen in order to achieve the objectives of the study in a rich and detailed manner. The mixed-method approach which combines the components of both the qualitative and quantitative research approaches has become customary among information system studies in recent times (Venkatesh et al., 2016). The fact that the mixed-method approach combines elements of both the qualitative and quantitative methods of study gives the opportunity for the researcher to triangulate the data coming from both arms of the study. Besides, the mixed method is known to minimize limitations and maximize the advantages of using either of the two methods used alone (Creswell & Creswell, 2018). The mixed-method is more than a combination of two methods; it is known to give the synergetic effect of having a sum that is greater than its parts like the effect of joining two hands to do a task (Creswell, 2020; Almalki, 2016)

Under the mixed-method approach, this study followed the convergent design in which data coming from the qualitative and quantitative arms are analyzed separately and the results of the analysis are compared and discussed. As stated by Creswell (2014, p. 219), Creswell and Creswell (2018), and Creswell and Plano Clark (2018, p. 112), convergent mixed design is a method that allows the researchers to collect both qualitative and quantitative data, analyze them separately and compare results coming with the core aim of reaching at complete understand and a way to check responses are in harmony that in a way checks validity on both sides.

The mixed-method approach is found to be appropriate for this study as the researcher holds pragmatic knowledge claim where various data are collected through a mixed-method approach to reach a better understanding of the research problem. The researcher believes that the data collected through qualitative or quantitative methods alone may fail to provide a stronger inference than the mixed-method approach (Creswell & Plano Clark, 2018, pp. 83,207). Instead, the mixed-method approach provides a better opportunity for coming up with more useful information to do good analysis which is robust and that enables to come up with richer inference (Venkatesh et al., 2016).

3.3 Research Approach

The study follows a parallel convergent mixed-method design. Both qualitative and quantitative data were collected and analyzed to understand internal control benefits and challenges of using CAISs. The convergent design was used for the integration of the data collected through qualitative and quantitative methods. The researcher gave equal weight for the data that are coming from the two sources: quantitative and qualitative. The mixed-method is chosen for this study so that it will be possible to incorporate the participant's experience within the context of internal control and accounting information system in terms of benefits and challenges. This gives chance to include detailed stories or perspectives from experienced professionals that are working hands-on with the systems. In addition to this, the researcher's pragmatic world view called for the use of a mixed method which enables to benefit from the use of multiple methods.

Regarding time or sequence of data collection, the study also used concurrent design for the collection of data which enables the collection of both types of data in a single visit. This is in part because time was considered a limitation to making frequent visits to the 10 geographically dispersed research sites. On the other hand, the concurrent approach helps in coming up with richer data in a short time than the sequential approach and it is more practical to undertake (Saunders et al., 2016). The data coming from the two databases are analyzed separately and then compared to make an inference. The result of the analysis is presented within the discussion section of this paper.

The purpose of this research is to investigate what benefits and challenges are involved in the use of computerized accounting information systems in relation to internal control in selected NGOs in Ethiopia. In order to achieve this, the descriptive research design is adopted and it followed specific methods of problem identification and literature review. The descriptive study approach gives an opportunity to obtain a good understanding of the adoption and use of CAISs in terms of internal control benefits and challenges. The descriptive research design is used since it is the best way to investigate the full nature of the phenomenon as it exists at the time of the study and also to answer the "what" questions of this study.

3.4 Population and Sampling Technique

3.4.1 Target Population

According to a recent resource from CCRDA Ethiopia (Consortium of Christian Relief and Development Association), currently, there are around 350 registered local and international NGOs in Ethiopia. CCRDA, which is previously known as CRDA is an association of NGOs and Civil Society Organizations (CSOs). Using the non-probability purposive or judgmental sampling method, 10 NGOs are taken as a target population for the purpose of this study. Purposive sampling helps to generate meaningful insights by selecting the most informative participants that are satisfactory to their specific needs. In purposive sampling, we look for information from a specific target group that can provide the information that has some desired criteria set by the researcher (Sekaran, 2003). These NGOs have a well-established computerized accounting information system (CAIS) and they use the system intensively. The intensive usage of CAIS in these NGOs matched the purpose of this research. Additionally, the selected NGOs have similar characteristics in terms of their geographical location, governance structure and regulatory adherence, and regional base which will enable them to have similar ecological validity for a given industry to hold and supports the generalization of the finding of the study to the population.

3.4.2 Sampling Method

This study employed a non-probability, purposive sampling technique. In the first stage, an accessible target population was selected from the total target population of the study. The selection of the accessible target population was based on the purposive or judgmental sampling method. According to Anaekwe (2002), purposive sampling is selected for some purpose or reason in mind. This method of sampling is helpful for instances where we want to include a target sample quickly and where probability sampling is not the basic issue. The accessible target population was selected in accordance with the aim of the study which is to study NGOs that use AIS intensively to its fullest level.

In the second stage of the sampling, experts working for hands on the computerized AIS are selected as respondents. This helps to gather the right type of data from persons with identified experience and expertise in the area (Anaekwe, 2002). Most of the time, we assemble such a

sample under the umbrellas of a "section of experts". One obvious reason for choosing the experts for this study is because it is always considered best to include the views and practical experiences of the people who have the specified skill set or expertise in the area under study.

Purposive sampling was used to select the sample NGOs. From the total 350 target populations of NGOs in Ethiopia, **10** NGOs were selected in the first stage based on the purpose of the study. The selected **10** NGOs have been using fully automated AIS for the past 5+ years and this was taken as a criterion to back the judgment made by the researcher while conducting the selection based on purposive sampling. This study aimed to do an in-depth study using a mixed-method approach and the **10** NGOs are selected because they can provide rich information for the topic of interest under study. Based on expert sampling which is a subgroup of purposive sampling, a total of **112** informants were selected as a participant of the study from all the employees of the **10** selected target NGOs. These 112 informants are accountants, auditors, IT Officers, and managers. The participants are regular users of computer-based accounting information systems and IT professionals.

The study followed a purposive or judgmental sampling method for the first stage and then all the experts working on CAISs are selected to participate in the study as it is usually customary to follow this step after purposive sampling methods and as the study specifically called for it.

3.4.3 Sample Size

Selected NGOs		**Selected NGOs**	
Action Aid Ethiopia	12	AHOPE Ethiopia	10
World Vision Ethiopia	14	Pact Ethiopia	10
Menschen für Menschen	10	Christian Aid Ethiopia	12
GIZ Ethiopia	13	PSI Ethiopia	10
Plan International Ethiopia	10	A Glimmer of Hope Foundation	11
Total	**59**		**53**
Grand Total			**112**

Table 1: Sample Size

3.5 Source and Instrument of Data Collection

Both quantitative and qualitative data are collected from primary sources. The data are collected using a questionnaire and a self-administered structured interview (Annex III, Sections 1-4). The questionnaires contain both open-ended and closed-ended questions in order to gain better-level findings related to the objective of the research. Gillham (2000, p. 5) explains that a greater degree of discovery can be achieved through the use of open-ended questions in the questionnaire. The number of open-ended questions is limited (only 3 questions) to a manageable size. This is because if not limited, it makes analysis and answering difficult for the researcher and respondents. According to Gillhan (2000), open-ended questions need to be used occasionally as they are more difficult to analyze and troublesome to answer.

The individuals participating in the interview are the same individuals that participated in the questionnaire. A total of **10** individuals representing the 10 NGOs were interviewed. The data analysis for the qualitative arm employed phenomenology or heuristic analysis which usually calls for 3 up to 10 participants so as to do analysis and come up with adequate and reasonable inference (Creswell & Creswell, 2018a, p. 262). A total of 8 structured interview questions were asked during the interview. The questions were broadly presented without specifically linking to either literature or the research question rather it was directed towards what the respondent experienced and in what situations those experiences did occur.

The 10 interviews that were conducted took nearly 5hr in total. Each interview took around 30 minutes and four of the interviews were audio-recorded. The rest of the interviewees were not comfortable enough to be tape-recorded. Two of the interviews were conducted by telephone as the interviewee happened to be working from home because of the COVID 19 pandemic which required a new work schedule for the participating NGOs. A fewer number of respondents participated in the interview than the questionnaire. As mentioned earlier in this section of the paper, the reason for having fewer number of participants in the qualitative data is due to the fact that the interview as a data collection tool for the qualitative arm is used to give a detailed and in-depth perspective rather than generalization purpose as in the case of the data coming from the quantitative database. The selection of the interviewee followed the purposive sampling

technique. The purposive sampling method allowed the selection of the most experienced practitioner in the area of computerized accounting information systems.

The questionnaires are designed in a way to be measured using 5 degrees Likert scale consisting of points where **1** = Strongly Disagree **2** = Disagree **3** = Neither agree nor Disagree **4** = Agree **5** = Strongly Agree. The questions in the questionnaire are presented in four categories: the first section collects demographic data, the second section is dedicated to internal control benefits of adopting CAIS, the third section is used to collect data about internal control challenges of adopting CAIS while the fourth section is dedicated to questions concerning IT knowledge, IT governance and fraud in relation to the use of CAIS. The collected data is employed to support the specific objectives of the study.

A structured face-to-face interview was made with experienced and leading experts with deep knowledge and involvement in the area of CAIS to enhance the richness and quality of the data. The interview is chosen to be structured so as to get responses that are easy to summarize and then analyze. According to Kenneth and Bruce (2011, p. 272) in a structured interview, identical questions are asked in similar order to obtain consistent and harmonious responses that help in driving summary and for ease of analysis. In addition to this, the researcher had a well-built knowledge that enabled the development of the interview questions that a structured interview calls for. Interview with the sample interviewee was conducted by a face-to-face method except for two cases where the interview took place through telephone. The face-to-face approach gives chance to nonverbal communication that gives rise to further clarification for ideas and areas that need more explanation from both the participant and the researcher (Sue, Greener; Ventus Publishing Aps, 2008, p. 89).

The methods the researcher used for data collection are gathering data by physical presence and distributing questionnaires and conducting a self-administered interview with the respondents who are an employee of NGOs participating in the study.

The same participants are used for both quantitative and qualitative data collection as the purpose of the use of mixed-method is to compare results coming from both sources. The more similar the respondents are, the better the comparison is going to be (Creswell & Creswell, 2018a). The concepts are the same for both qualitative and quantitative arms of the study. This approach is

considered because the results coming from both qualitative and quantitative sides are to be compared later for discussion purposes.

3.6 Method of Data Analysis

Both quantitative and qualitative data analysis methods were made to analyze the collected data. Quantitative data involved descriptive statistical methods of data analysis. Data from the questionnaire were entered into the computer using Statistical Package for Social Science (SPSS) version 26. This involved coding close-ended items in order to run simple descriptive analyses to get reports on data status.

Qualitative data that was in audio format was converted into text. The transcript was read and re-read and a short summary was produced. The conversion of data format and summary of the information collected through the interview was realized in part through mechanical techniques which included the use of data analysis software such as ATLAS.ti and Quirkos. These two DAS packages assisted the researcher to organize data, easily locate and access data, and easily map concepts for visualization purposes (Creswell J. W., 2013, pp. 201-210). Among the various qualitative data analysis methods, phenomenology (heuristic) analysis was undertaken to do the analysis on the data gathered through interviews. In addition, narrative analysis was undertaken in combination. Phenomenological or heuristic analysis focuses only on the participant's experience disregarding the researcher's knowledge, experience, or drawings (Embree, 2011; Creswell J. W., 2013, p. 76; Shudak, 2018). The use of narrative analysis was important as the experience of the participants were used to address the research question. The stories and responses of the participants which were in formats such as audio and text were analyzed through objective and systematic content analysis coupled with conceptual analysis (Sekaran & Bougie, 2016, p. 350; Bordens & Abbott, 2011, p. 246).

The data integration followed a side-by-side comparison after separate analysis of the two databases has been made using the parallel convergent mixed-method design. Therefore, the integration happened after a separate analysis has been made for the two databases. Hence, the results of the data coming from the quantitative database are compared with the result coming

from the qualitative database and discussed in the discussion of major findings section of the study. As stated by Creswell and Creswell, (2018a, p. 301), the convergent mixed method followed three stages where in the first quantitative data were analyzed; in the second, qualitative data were analyzed, and finally, the integrations of the two analyses were made in a side-by-side discussion of major findings.

As mentioned above the research followed methodological triangulation, in addition to the data source and data collection method triangulations, to come up with rich inference that provides a sufficiently detailed understanding of the topic of interest. Methodological triangulation enables researchers to bring together different methods in order to study a topic of interest (Campbell & Fiske, 1959, as cited in Denzin, 1987; Webb et al., 1966). The method triangulation allows using different data collection methods and also analysis methods. Even though phenomenological analysis is undertaken, using triangulation the researcher enters into the study in the right way through interpretation with minimum researcher interference.

3.7 Triangulation

Method triangulation followed by triangulations of data collection method and data source was made. The data coming from qualitative and quantitative were collected simultaneously through the use of concurrent data collection method, and both of the data types were given equal weight. The data was collected from 10 geographically dispersed NGOs that are located in Addis Ababa. The study used a convergent mixed-method approach followed by concurrent data collection methods. Considering the research design and the fact that both of the data types were given equal weight, the study evidently has used method, data source, and data collection triangulations.

3.8 Data Quality Assurance

Data quality and assurance can be seen in terms of validity and reliability. Reliability and validity are the two most critical and essential highlights within the assessment of any estimation instrument or apparatus for a great inquire (Mohajan, 2017).

3.8.1 Reliability

Reliability concerns the degree to which estimation is repeatable and reliable. This implies that the same information will be collected each time in the repeated perception of the same phenomena. In this manner, the response and the reaction of the representatives will be reliable and this is often the way the reliability of the responder will be guaranteed (Mohajan, 2017).

Based on the recommendation of (Cronbach, 1951), Alpha values are used to test the reliability of data collection instruments used in this study. Analysis for Alpha value was made for every category of questions. To be judged reliable Alpha values should not be less than 0.6 for the statements in the instruments (Sekaran, 2003). Accordingly, all the statements under each category were subjected to the Alpha test and checked to be well above **0.6**(the result of the Alpha test is given in a table in the following chapter which is results and discussion).

3.8.2 Validity

Validity or inference quality concerns the degree to which data collection instrument is crafted or developed in such a way that it is really measuring what it is supposed to measure in line with the inquiry of the research. It is also concerned with making sure that there are no logical errors in drawing conclusions from the data (Garson, Validity and Reliability, 2016). The legitimacy will be guaranteed by making beyond any doubt the testing methods would be free from predisposition by giving each subject in the literature review a rise to the opportunity to score. The questions have been formulated based on the research question. The questionnaire is developed in such a way that it has high construct validity. Experts in the field of computerized accounting information systems and accounting and finance instructors in different organizations were contacted and the part of the questionnaire was modified based on comments.

The questionnaire and the interview are comprehensive enough to cover all the factors being measured. The comparisons made between the results of the analysis made separately on qualitative and quantitative data will help to validate both the qualitative and quantitative data. According to Creswell and Plano Clark (2018b, p. 112), if open-ended qualitative questions are administered, validation can be obtained by comparing and checking the similarity of responses of one set of results or finding with the other set of results. In addition to this comparison of

results of separate analyses, a comparison is made between the conceptual system and what has been said by others for approval (Mohajan, 2017).

The inherent issue of validity that arises from the mixed-method approach itself is addressed by using the same concept for both qualitative and quantitative sides so as not to end up having incomparable results. The other issue is the unequal size of participants. As mentioned above in the source and instrument of data collection section of this paper, the purpose of selecting the mixed method is to give more an in-depth perspective through the use of qualitative approach while the quantitative helps in coming up to generalization on the population. The methodological triangulation used in this research is also in a way to increase the credibility of the study results apart from gaining an in-depth understanding of the study. The research question is addressed through the use of mixed methods and different data sets were collected from each method.

On the other hand, the mixed-method approach itself provides a way to increase validity through increasing confidence in mixing methods and data and coming up with similar findings (Sekaran & Bougie, 2016, p. 106).

3.8.3 Pilot Test

Pilot (field) testing, which is a preliminary study on part or minority of the study sample, was conducted before administering the questionnaire and interview on the total study sample. The pilot study was made among 12 selected respondents in the sample representing the participating NGOs. Following the pilot testing, the questions were formulated taking into consideration of the valuable and basic facts and comments obtained during running the pilot test. In addition to improving the consistency of the items in the data collection instruments, the format of the instrument was also improved. The main reason behind running the pilot test was to develop content validity through initial testing of the instruments of data collection (Creswell & Creswell, 2018a). Apart from this, the pilot test helped in identifying how much time and effort was actually needed to collect data and do the study.

3.9 Ethical Considerations

The respondents were given a letter (Annex I, Information Sheet) which explained the purpose of the study in detail so that they will be comfortable to give their response. All participants were asked to voluntarily participate in the data collection by collaborating in filling the questionnaire and responding. By doing so, the respondents were protected from any harm and more importantly, their views were kept confidential and anonymous (Annex II, Consent Form). The participants also had the freedom and option to withdraw from the study at any point in time if they feel uncomfortable. Moreover, the questionnaire had no connection with the respondents since the research is intended for academic purposes only.

CHAPTER FOUR
RESULTS AND DISCUSSIONS

4.1 Introduction

Chapter three presented the research approach and methodologies that are adapted for this study. Consequently based on the outlines of the previous chapter, in this chapter results and discussions of the data collected for the study from the selected NGOs is presented. The data that was collected through the use of questionnaires and interview were analyzed and the findings are interpreted in this section. The purpose of the study was to identify internal control benefits and challenges associated with the use of computerized accounting information systems: in selected NGOs in Ethiopia. The researcher made use of SPSS version 26 software for the data analysis and used statistical tables and figures to display data.

The analysis of the qualitative and quantitative data are made separately and presented accordingly in different sub-sections below. A summary of the analysis is also made at the end of the qualitative and quantitative analysis.

4.2 Quantitative Data Analysis

In this study, a mixed-method was undertaken as a research approach. Based on this, data was gathered through qualitative and quantitative methods of data collection methods. As it is clearly outlined in the research design earlier in the previous chapter closed-ended questions were used as a quantitative data collection tool (Annex III, Sections 1, 2 & 3). The questionnaire has been successfully administered. The analysis of the data collected using the questionnaire is presented in this section.

4.2.1 Response Rate

A total of 112 questionnaires were distributed as a means of data collection instrument to 10 NGOs according to the number of respondents in the specific organizations. A total of 101 questionnaires were returned fully completed while 3 were dully answered and 8 were not returned at all. This made the response rate to be around 90%. A high response rate was expected since the questionnaire was personally administered by the researcher. Originally 12 organizations were selected as a sample for the study. Later on at the data collection stage of the

research, 2 organizations refused to cooperate and participate in the research. The reason for their refusal was COVID-19. Both organizations politely explained that because of the pandemic their staff is working in shifts and working at home to minimize contact and keep distance as much as possible.

The following table shows the response from the NGOs. From a total of 112 questionnaires, 101 were fully completed and returned. As is shown in this table that the rates of response among the participating NGOs show that there is domination by any NGO over the other and that the rate is representative.

Selected NGOs		%	Selected NGOs		%
Action Aid Ethiopia	**11**	**11%**	AHOPE Ethiopia	**10**	**10%**
World Vision Ethiopia	**12**	**12%**	Pact Ethiopia	**9**	**9%**
Menschen für Menschen	**10**	**10%**	Christian Aid Ethiopia	**12**	**12%**
GIZ Ethiopia	**9**	**9%**	PSI Ethiopia	**10**	**10%**
Plan International Ethiopia	**10**	**10%**	A Glimmer of Hope Foundation	**8**	**8%**
Total	**52**			**49**	
Grand Total				**101**	

Table 2: Response from NGOs

4.2.2 Demographic Profile of Respondents

Table 3**:** Age of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-25	10	9.9	9.9	9.9
	26-35	60	59.4	59.4	69.3
	36-45	24	23.8	23.8	93.1
	46-55	7	6.9	6.9	100.0
	Total	101	100.0	100.0	

Source: SPSS field data, 2021

The above respondent's age frequency table shows that 59.41% of the respondents are in the age range of 26-35 years. 23.76% of them are in the range between 36 and 45 years. This shows that the majority (above 80%) of the staff in the participating NGOs are aged between 26 and 45 which is a young and considered energetic task force. 9.90% of the respondents belong to the range of 18-25 years, while only 6.93% are in the range of 46-55 years.

Table 4: Gender of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	54	53.5	53.5	53.5
	Female	47	46.5	46.5	100.0
	Total	101	100.0	100.0	

Source: SPSS field data, 2021

53.47% of the research respondents are male while the rest 46.53% are female.

Table 5: Marital Status of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Single	55	54.5	54.5	54.5
	Married	46	45.5	45.5	100.0
	Total	101	100.0	100.0	

Source: SPSS field data, 2021

The result shows that 54% of the respondents are single while 46% of them are married.

Table 6: Field of Study of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Accounting	73	72.3	72.3	72.3
	IT	28	27.7	27.7	100.0
	Total	101	100.0	100.0	

Source: SPSS field data, 2021

The majority of the research participants are from the accounting profession which is 72% while the remaining 28% represents professionals in the information technology field.

Table 7: Level of Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Degree	61	60.4	60.4	60.4
	Masters	40	39.6	39.6	100.0
	Total	101	100.0	100.0	

Source: SPSS field data, 2021

The table shows that 39.60% of the respondents have a Master's degree while 60.40% hold a first degree. Based on the data collected, there were no diploma and Ph.D. holders among the respondents.

Table 8: Professional Qualification

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ACCA	2	2.0	2.0	2.0
	Other	23	22.8	22.8	24.8
	None	76	75.2	75.2	100.0
	Total	101	100.0	100.0	

Source: SPSS field data, 2021

Only 25% of the participants are qualified professionals while the remaining 75% of respondents are not. From this data, we can see that there are only a few qualified accountants.

Table 9: Area of Practice

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Auditing	23	22.8	**22.8**	22.8
	Accounting and Finance	38	37.6	**37.6**	60.4
	IT	28	27.7	**27.7**	88.1
	CAIS	12	11.9	**11.9**	100.0
	Total	101	100.0	100.0	

Source: SPSS field data, 2021

Around 12% of the respondents are practicing in the area of CAIS, while almost 23% of them are working as Auditors. About 28% of them are IT personnel and the remaining 38% work in

accounting and finance areas. Almost everyone these days works on computers using professional software to do tasks. Accountants and auditors are no different. Accountants and Finance personnel are the major respondents of this research. Those working directly on the IT and CAIS comprise 40% of the total respondents altogether.

Table 10: Work Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	3	3.0	3.0	3.0
	3	9	8.9	8.9	11.9
	4	14	13.9	13.9	25.7
	5	11	10.9	10.9	36.6
	6	15	14.9	14.9	51.5
	7	10	9.9	9.9	61.4
	8	14	13.9	13.9	75.2
	9	6	5.9	5.9	81.2
	10	9	8.9	8.9	90.1
	11	4	4.0	4.0	94.1
	12	2	2.0	2.0	96.0
	15	2	2.0	2.0	98.0
	16	1	1.0	1.0	99.0
	18	1	1.0	1.0	100.0
	Total	101	100.0	100.0	

Source: SPSS field data, 2021

The work experience of the respondents ranges from 2 to 18 years. 36.63% of them have work experience between 2 and 5 years. 53.46% of the respondents have work experience between 6 and 10 years. 7.92% of the respondents have work experience between 11 and 15 years while only 1.98% of the respondents have work experience above 16 years. In general, more than 60% of the respondents have work experience of more than 5 years.

Table 11: Training Evaluation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	25	24.8	24.8	24.8
	Yes	76	75.2	75.2	100.0
	Total	101	100.0	100.0	

Source: SPSS field data, 2021

The majority of the respondents have received formal training on computerized accounting information systems. Only 25% of the respondents didn't get formal training.

Table 12: Level of Training

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Adequate	29	28.7	28.7	28.7
	Neutral	25	24.8	24.8	53.5
	Adequate	47	46.5	46.5	100.0
	Total	101	100.0	100.0	

Source: SPSS field data, 2021

The majority of the respondents who took formal training believe that the training they had was adequate. Around 29% of the respondents think they got inadequate training while 25% of them were neutral to the question.

In general, the features of the demographic result is reasonable to draw conclusions on the area of accounting information system and internal control in a computerized environment

4.2.3 Reliability Test Result (Cronbach's Test)

Table 13: Reliability Test

S. No	Section Name	No. of Items	Cronbach's Alpha	Reliability Range (α)
1	Internal control benefits of adopting CAIS	11	**.829**	Good
2	Internal control challenges of adopting CAIS	27	**.902**	Excellent

Source: SPSS field data, 2021

Cronbach's alpha is used to check the internal validity between items. Cronbach's Alpha is used as it is the popular method for inter-item validation and that is used for multiple point scales such as the Likert Scale. Internal control benefits of adopting CAIS scored a Cronbach's alpha of 0.829 while the internal control challenge of adopting CAIS gained 0.902, which are both in the

acceptable level of reliability. As the Cronbach's alpha coefficient approaches 1, the reliability of the internal consistency increases (Sekaran & Bougie, 2016, p. 289).

4.2.4 Descriptive Analysis on Internal Control Benefits of Using CAIS

The following table (table 13) presents the statistical result obtained from the data gathered through the questionnaire. The table shows the mean, standard deviation, and other information corresponding to the 11 questions in the questionnaire which specifically address the issues of internal control benefits of adopting computer-based accounting information systems. SECTION-2: Internal Control Benefits of Adopting CAIS

Table 14: Statistics for Internal Control Benefits of Using CAIS

		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11
N	Valid	101	101	101	101	101	101	101	101	101	101	101
	Missing	0	0	0	0	0	0	0	0	0	0	0
Mean		**4.10**	**4.13**	**4.03**	**4.12**	**3.98**	**3.98**	**3.95**	**4.36**	**4.50**	**4.18**	**4.13**
Std. Deviation		**.592**	**.365**	**.330**	**.355**	**.600**	**.707**	**.654**	**.558**	**.559**	**.456**	**.365**
Skewness		-.024	1.602	.573	1.681	.006	-.145	-.169	-.463	-.856	.679	1.602
Std. Error of Skewness		.240	.240	.240	.240	.240	.240	.240	.240	.240	.240	.240
Kurtosis		-.136	2.716	6.453	3.236	-.142	-.477	.013	1.485	1.804	.699	2.716
Std. Error of Kurtosis		.476	.476	.476	.476	.476	.476	.476	.476	.476	.476	.476

Source: SPSS field data, 2021

[**NOTE:** The column headings represented by codes from **B1** up to **B11** are the statements used in the questionnaire to identify internal control benefits of adopting CAIS. **B1**= CAIS is less prone to input error **B2**= CAIS enables to process data with great accuracy **B3**= CAIS improved the reliability of financial data through strengthening the internal control **B4**= CAIS improved compliance to company policy **B5**= CAIS improved compliance to government laws and regulations **B6**= CAIS strengthened control over accounting data and information in terms of unauthorized access **B7**= CAIS improved segregation of duty as a means of internal control **B8**= CAIS improved accountability and internal control **B9**= CAIS prevented unauthorized modification of accounting data **B10**= CAIS strengthened data security controls through audit log **B11**= CAIS provided the necessary information to support control and its evaluation]

The five-point Likert scale has been used for this study as it is most applicable and customary to use in business researches to understand patterns of attitudes among respondents or study participants (Sekaran & Bougie, 2016, p. 218; Kothari, 2014).

To analyze the Likert scale data with the SPSS generated mean, the five-points Likert scale is expressed in terms of interval. The mean score of respondents for the five-point Likert scale is determined by using the maximum and minimum values on the Likert scale which are 1 and 5 (where 1 represents strongly disagree while 5 is for strongly agree). The mean is calculated by deducting 1 from 5 and then dividing the difference by 5 as it happened to be the largest value on the scale used. This gives a mean value of 0.8. then by adding this mean to 1 we get the first interval which represents strongly disagree and it is (1, 1.80). Accordingly, the following table shows the interval for all the five points in the Likert scale.

Table 15: Likert scale

Point	Attitude	Interval
1	Strongly disagree	**(1.00, 1.80)**
2	Disagree	**(1.81, 2.60)**
3	Neither agree nor disagree	**(2.61, 3.40)**
4	Agree	**(3.41, 4.20)**
5	Strongly agree	**(4.21, 5.00)**

Source: www.researchgate.net (posted by (Mohammed, 2016))

Table 13 above shows the statistical result of respondents for internal control benefits of using computerized accounting information systems. The data was collected from 10 NGOs with a total of 101 respondents. Accordingly, CAIS is less prone to input error scored a mean of **4.10**, CAIS enables to process data with great accuracy scored a mean of **4.13**, CAIS improved the reliability of financial data through strengthening the internal control scored a mean of **4.03**,

CAIS improved compliance to company policy scored a mean of **4.12**, CAIS improved compliance to government laws and regulations scored a mean of **3.98**, CAIS strengthened control over accounting data and information in terms of unauthorized access scored a mean of **3.98**, CAIS improved segregation of duty as a means of internal control scored a mean of **3.95**, CAIS improved accountability and internal control scored a mean of **4.36**, CAIS prevented unauthorized modification of accounting data scored a mean of **4.50**, CAIS strengthened data security controls through audit log scored a mean of **4.18**, CAIS provided the necessary information to support control and its evaluation scored a mean of **4.13**. The overall mean score (**4.13**) of respondents indicates that in general, the respondents agreed that there are internal control benefits of adopting computer-based accounting information systems. All the standard deviations for the 11 statements are less than 1.00 indicating that the responses are clustered around the mean value (**4.13**).

Statements with high mean were: CAIS prevented unauthorized modification of accounting data and CAIS improved accountability and internal control. This means the respondents strongly agree to these statements as the interval for strongly agree is (4.21, 5.00) as indicated in table 14. This finding relates to the study by Liew (2019), Mndzebele (2019), Corsi et al. (2017), and Lutui and ‘Ahokovi (2018) which indicated that technology has an important role in internal control and it can ensure the achievement of internal control objectives. Lutui and ‘Ahokovi (2018) further stated that computers or technology can lead to bigger control problems unless there exist proactive measures that can identify potential risks and threats posed by the technology itself. Having a well-designed and developed CAIS is the key to having an effective control system within organizations (Yehualashet, 2020).

Table 16: Frequency table for Internal Control Benefits of Using CAIS

B1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neither Agree Nor Disagree	13	12.9	12.9	12.9
	Agree	65	64.4	64.4	77.2
	Strongly Agree	23	22.8	22.8	100.0
	Total	101	100.0	100.0	

B2	Valid	Neither Agree Nor Disagree	1	1.0	1.0	1.0
		Agree	86	85.1	85.1	86.1
		Strongly Agree	14	13.9	13.9	100.0
		Total	101	100.0	100.0	
B3	Valid	Neither Agree Nor Disagree	4	4.0	4.0	4.0
		Agree	90	89.1	89.1	93.1
		Strongly Agree	7	6.9	6.9	100.0
		Total	101	100.0	100.0	
B4	Valid	Neither Agree Nor Disagree	1	1.0	1.0	1.0
		Agree	87	86.1	86.1	87.1
		Strongly Agree	13	12.9	12.9	100.0
		Total	101	100.0	100.0	
B5	Valid	Neither Agree Nor Disagree	19	18.8	18.8	18.8
		Agree	65	64.4	64.4	83.2
		Strongly Agree	17	16.8	16.8	100.0
		Total	101	100.0	100.0	
B6	Valid	Disagree	1	1.0	1.0	1.0
		Neither Agree Nor Disagree	23	22.8	22.8	23.8
		Agree	54	53.5	53.5	77.2
		Strongly Agree	23	22.8	22.8	100.0
		Total	101	100.0	100.0	
B7	Valid	Disagree	1	1.0	1.0	1.0
		Neither Agree Nor Disagree	21	20.8	20.8	21.8
		Agree	61	60.4	60.4	82.2
		Strongly Agree	18	17.8	17.8	100.0
		Total	101	100.0	100.0	
B8	Valid	Disagree	1	1.0	1.0	1.0
		Neither Agree Nor Disagree	1	1.0	1.0	2.0
		Agree	60	59.4	59.4	61.4
		Strongly Agree	39	38.6	38.6	100.0
		Total	101	100.0	100.0	
B9	Valid	Disagree	1	1.0	1.0	1.0
		Agree	48	47.5	47.5	48.5
		Strongly Agree	52	51.5	51.5	100.0
		Total	101	100.0	100.0	
B10	Valid	Neither Agree Nor Disagree	3	3.0	3.0	3.0
		Agree	77	76.2	76.2	79.2
		Strongly Agree	21	20.8	20.8	100.0
		Total	101	100.0	100.0	
B11	Valid	Neither Agree Nor Disagree	1	1.0	1.0	1.0
		Agree	86	85.1	85.1	86.1
		Strongly Agree	14	13.9	13.9	100.0
		Total	101	100.0	100.0	

[NOTE: The first column is represented by codes from **B1** up to **B11** are the statements used in the questionnaire to identify internal control benefits of adopting CAIS. **B1**= CAIS is less prone to input error **B2**= CAIS enables to process data with great accuracy **B3**= CAIS improved the reliability of financial data through strengthening the internal control **B4**= CAIS improved compliance to company policy **B5**= CAIS improved compliance to government laws and regulations **B6**= CAIS strengthened control over accounting data and information in terms of unauthorized access **B7**= CAIS improved segregation of duty as a means of internal control **B8**= CAIS improved accountability and internal control **B9**= CAIS prevented unauthorized modification of accounting data **B10**= CAIS strengthened data security controls through audit log **B11**= CAIS provided the necessary information to support control and its evaluation**]**

The above table (table 15) shows the frequency of responses for all 11 questions regarding the internal control benefits of adopting computerized accounting information systems. The table shows the responses in terms of percentage and frequency of the responses of 101 study participants.

4.2.5 Descriptive Analysis on Internal Control Challenges of Using CAIS

The tables below present the statistical result for the internal control challenge of using computerized accounting information systems in terms of mean, standard deviation, skewness, and Kurtosis. There were 27 questions relating to control challenges of adopting a computerized accounting information system The analysis is made based on the format of the questionnaire in which the internal control challenges are subdivided as input control challenge(4 questions), process control challenge (5 questions), storage control challenge (6 questions), output control challenge (5 questions), personnel control challenge (3 questions) and finally other control challenges (4 questions).

With the use of mean and standard deviation, discussions of the different challenges are presented after each statistical table. The mean is interpreted based on the intervals given for the Likert scale earlier (Table 14: Likert Scale)

Table 17: Statistics for Input Control Challenge

N=101	Mean	Std. Deviation	Skewness		Kurtosis
	Statistic	Statistic	Statistic	Std. Error	Statistic
Problems of initiating an unauthorized transaction	**2.22**	**.687**	.444	.240	.436
There is a problem of accidental entry of bad data	**1.99**	**.624**	.258	.240	.486
Entering incomplete data to the CAIS	**1.90**	**.575**	-.005	.240	.027
Entry of invisible data that lacks source document	**3.91**	**.602**	.035	.240	-.212

Source: SPSS field data, 2021

From the result shown in the above table, the majority of the respondents agree that there is a high chance of entry of invisible data that lacks a source document (**3.91**). The high mean result also indicates that the response for this statement is different from the other input control challenges and that is considered as a problem among the participating practitioners. When we look into the general response regarding the input control challenge, the average mean (**2.51**) indicated that the respondents disagree that there is an input control challenge when using a computerized accounting information system. Problems of initiating an unauthorized transaction, problems of accidental entry of bad data, and entering incomplete data not considered a problem or challenge to the majority of respondents with mean values of **2.99, 1.99,** and **1.90** respectively, all falling on the disagree interval of (1.81,2.60).

Table 18: Statistics for Process Control Challenge

N=101	Mean	Std. Deviation	Skewness		Kurtosis
	Statistic	Statistic	Statistic	Std. Error	Statistic
Lack of clear audit trial or activity log in CAIS	**3.69**	**.821**	-.588	.240	-.044
Computers lack judgment when things go wrong	**3.90**	**.500**	-.202	.240	.904
Potential errors in the application program	**1.90**	**.539**	1.483	.240	10.696
There is no effective adequate separation of duty in CAIS (because of centralization of data)	**1.96**	**.564**	-.012	.240	.224
Effect of error spread rapidly through files because of CAIS fast processing	**3.85**	**.623**	-.143	.240	.143

Source: SPSS field data, 2021

From the table above the overall mean is calculated to be **3.06** which indicates that respondents neither agree nor disagree on process control challenges. When we take the high mean scores among the process control we see that lack of clear audit trail or activity log (**3.69**) computer's lack of judgment when things go wrong (**3.90**) and computer's fast processing contributing to the fast spread of error (**3.85**) were considered as process control challenge. Potential errors in the application program (**1.90**) and problems associated with centralization of data in terms of

segregation of duty (**1.96**) scored the lowest mean. This implies that the respondents disagreed with these statements.

Table 19: Statistics for Storage Control Challenge

N=101	Mean	Std. Deviation	Skewness		Kurtosis
	Statistic	Statistic	Statistic	Std. Error	Statistic
Invisibility of audit trial (activity log)	**3.97**	**.854**	-1.516	.240	3.412
Information can be altered without physical trace	**4.08**	**.627**	-.058	.240	-.423
Accidental destruction of data by CAIS users	**1.80**	**.566**	-.010	.240	-.179
Intentional destruction of data by employee	**4.03**	**.655**	-.030	.240	-.620
Data is easy to steal in CAIS	**2.50**	**1.188**	.280	.240	-1.137
Loss of data or information	**2.45**	**1.179**	.301	.240	-1.314

Source: SPSS field data, 2021

As shown in Table 18 above, respondents were asked to give their opinion on internal control challenges of adopting computer-based accounting information systems in terms of challenges associated with storage. The overall mean is calculated to be (**3.77**); this means on average respondents agree that the storage control challenges exist in using computer-based accounting systems. Respondents disagree on storage control issues related to loss of data (**2.45**) and that data can easily be stolen in a computer-based accounting system (**2.45**). Destruction of data by users scored a least mean value (**1.80**) among storage challenges and this means respondents strongly disagree. Respondents neither agree nor disagree on the invisibility of the audit trail or activity log (**3.97**). In general, respondents agree that there exists a storage control issue related to the use of computerized accounting information systems, and it is indicated by the overall mean score of (**3.77**). Information can be altered without physical trace scored a mean of **4.08** which shows respondents agree on it. Similarly, the findings of the study by Ramadhan et al. (2011) also show the same result that information can be changed easily in computer systems without much physical evidence and this was reported as a major challenge.

Table 20: Statistics for Output Control Challenge

N=101	Mean	Std. Deviation	Skewness		Kurtosis
	Statistic	Statistic	Statistic	Std. Error	Statistic
Reports get distributed to unauthenticated users in CAIS	**2.53**	**1.045**	.067	.240	-1.180
Unauthorized access to information through sharing of password	**2.61**	**1.200**	.186	.240	-1.161
Fictitious or incorrect output (intentional)	**2.56**	**1.212**	.242	.240	-1.158
Output may fail to reflect the real-world situation because of sophisticated processing of CAIS	**3.78**	**.808**	-.162	.240	-.497
Output from CAIS is assumed to be accurate and usually not checked	**4.21**	**.535**	-.251	.240	2.155

Source: SPSS field data, 2021

The majority of respondents strongly agree that outputs in a computer-based accounting system are accurate (**4.21**). On the other hand, respondents disagree that reports get distributed to unauthenticated users (**2.53**) and that there is factious or incorrect output **(2.56).** the respondents neither agree nor disagree on unauthorized access to information through sharing passwords (**2.61**) while they agree that output may fail to reflect the real-world situation because of sophisticated processing in the computer system (**3.78).** The overall mean score is (**3.18**) which indicates that in general respondents' opinion about output control challenges in CAIS is neither agree nor disagree.

Table 21: Statistics for Personnel Control Challenge

N=101	Mean	Std. Deviation	Skewness		Kurtosis
	Statistic	Statistic	Statistic	Std. Error	Statistic
Not running a background check while hiring causes computer fraud	**4.08**	**.611**	-.577	.240	1.827
Inadequate training and lack of monitoring of staff working on CAIS can be a reason for accidental breach of control	**2.49**	**1.293**	.500	.240	-1.059
Unauthorized access to data is possible under CAIS because if centralization of data	**2.45**	**1.136**	.388	.240	-1.022

Source: SPSS field data, 2021

As stated in the above table, the personnel control challenge has an overall mean score of (**3.00**) which indicates respondents neither agree nor disagree with the general statement that there is a personnel control challenge. The highest mean score (**4.08**) relates to the problem of not running a background check on employees resulting in computer fraud. Based on this mean value the respondents have agreed to this statement. Inadequate training and lack of staff monitoring can contribute to a breach of control score mean of (**2.49**) and the possibility of accessing data without authorization due to data centralization (**2.45**). Respondents' opinion on both of these statements is disagreeing.

Table 22: Statistics for Other Control Challenge

N=101	Mean	Std. Deviation	Skewness		Kurtosis
	Statistic	Statistic	Statistic	Std. Error	Statistic
Unauthorized access to CAIS by hackers	**2.24**	**.532**	1.794	.240	3.131
Natural disasters (fire, loss of power, etc.)	**2.08**	**.880**	.743	.240	.516
Introduction (entry) of computer virus to the CAIS	**2.83**	**1.201**	.827	.240	-.880
Risk of loss of data during system failure under CAIS	**3.92**	**.945**	-.781	.240	-.139

Source: SPSS field data, 2021

From the table above, respondents disagree on unauthorized access to CAIS by hackers (**2.24**), Natural disasters (**2.08**). While they neither agree nor disagree on the frequent introduction (entry) of computer viruses to the CAIS (**2.83**). The high risk of loss of data during system failure under CAIS (**3.92**) scored the highest mean indicating that the respondents agree to the risk of loss of data during system failure.

4.2.6 Descriptive Analysis on use of CAIS and IT Knowledge, IT Governance and Computer Fraud

The table below shows statistical results of responses collected through questionnaires from respondents concerning use of CAIS and IT knowledge, IT governance and computer-related frauds.

Table 23: Statistics for the use of CAIS and IT Knowledge, IT Governance and Computer Fraud

N=101	Mean	Std. Deviation
IT knowledge of human staff plays an important role in achieving the benefits of adopting CAIS	**4.24**	**.550**
The existence of IT governance is important in achieving internal control goals through the use of CAIS	**4.27**	**.488**
CAIS provides protection against fraud and internal control breaches	**4.10**	**.889**
CAIS contributes towards the detection of frauds	**3.84**	**.596**
Staff working on CAIS have a full picture of security threats that comes with the computer-based system	**4.06**	**.526**
Accounting staffs need to have adequate IT knowledge to minimize accidental entry of bad data	**4.52**	**.576**
Management's IT knowledge has a role in identifying risks to internal control under CAIS	**4.12**	**.516**
Accountants need to have adequate IT knowledge so as to protect digital information as an asset	**4.12**	**.475**

Source: SPSS field data, 2021

Respondents strongly agree that the IT knowledge of human staff plays an important role in achieving the benefits of adopting CAIS (**4.24**), and the standard deviation of **0.550** indicates that the majority of them strongly agree with the statement. The mean score indicates the respondents strongly agree that the existence of IT governance is important in achieving internal control goals through the use of CAIS (**4.27**), and this is also supported by the majority of respondents evidenced by the standard deviation of **0.488.** The majority of respondents strongly agree that accounting staffs need to have adequate IT knowledge to minimize accidental entry of bad data (**4.52**) with a standard deviation of **0.576.**

With a standard deviation of **0.889**, respondents agree that CAIS provides protection against fraud and internal control breaches (**4.10**). This means that the responses slightly deviate from the mean due to variations in opinion among respondents. The majority of the Respondents also

agree that CAIS contributes towards the detection of frauds (**3.84**) and it is shown by a standard deviation of **0.596,** meaning much of the respondent's opinion centers around the mean value scored. Staffs working on CAIS have a full picture of security threats that comes with the computer-based system scored a mean value of (**4.06**) which again indicates respondents agree with this statement. The majority of the respondents believe that staff working on CAIS aware of security threats that come with going digital (**0.526**). The result obtained from participants of this study showed that CAIS contributes towards detection of fraud while this opposes the result obtained from the study conducted by Trinandha et al. (2018) where the findings showed that on the contrary computer systems have the effects of opening doors to new types of computer accounting fraud. On the other end according to the study by Lutui and ‘Ahokovi (2018) the internal control in the accounting information system has a key role in the prevention and detection of accounting fraud in general.

Respondents also agree that management’s IT knowledge has a role in identifying risks to internal control under CAIS (**4.12**) and accountants need to have adequate IT knowledge so as to protect digital information as an asset (**4.12**). Both scored a minimum standard deviation of **0.516** and **0.475** respectively evidencing that there were similar opinions among the majority of respondents. In agreement with this finding, Abu-Musa (2005) reported a recommendation from his finding which states that it is important to raise awareness and update knowledge among accountants who use CAIS in order to minimize security issues.

In agreement with this study, Appiah (2014), Liew (2019) & Anomah and Agyabeng (2013) reported a finding that indicates a strong link between employee knowledge and challenges of adoption and use of computer-based accounting information systems. Rotich (2017) recommends that organizations should have specialized staff working on CAISs. In addition to having specialized professionals, plans for continual updating of their skills should be made. The study by Trinandha et al. (2018) in agreement with this study indicated that the adoption of a computer-based system opens room for computer fraud.

The following table shows the frequency and percentage of response for internal control challenges of using CAIS. The responses are for the 27 questions included in the questionnaire which represented challenges. SECTION-3: Internal Control Challenges of Adopting

Table 24: Frequency table for Internal Control Challenges of Using CAIS

	Strongly Disagree		Disagree		Neither Agree Nor Disagree		Agree		Strongly Agree	
	%	F	%	F	%	F	%	F	%	F
CA1	10.9	11	60.4	60	24.8	25	4.0	4	-	-
CA2	18.8	19	64.4	65	15.8	16	1.0	1	-	-
CA3	21.8	22	66.3	67	11.9	12	-	-	-	-
CA4	-	-	-	-	22.8	23	63.4	64	13.9	14
CB1	-	-	10.9	11	20.8	20	56.4	57	11.9	12
CB2	-	-	17.8	18	74.3	75	-	-	7.9	8
CB3	16.8	17	78.2	79	4.0	4	-	-	1.0	1
CB4	17.8	18	68.3	69	13.9	14	-	-	-	-
CB5	-	-	1.0	1	24.8	25	62.4	63	11.9	12
CC1	3.0	3	4.0	4	7.9	8	63.4	64	21.8	22
CC2	-	-	-	-	15.8	16	60.4	61	23.8	24
CC3	27.8	28	64.4	65	7.9	8	-	-	-	-
CC4	-	-	-	-	19.8	20	57.4	58	22.8	23
CC5	23.8	24	32.7	33	15.8	16	24.8	25	3.0	3
CC6	24.8	25	36.6	37	8.9	9	28.7	29	1.0	1
CD1	17.8	18	34.7	35	23.8	24	23.8	24	-	-
CD2	20.8	21	31.7	32	16.8	17	26.7	27	4.0	4
CD3	22.8	23	31.7	32	15.8	16	25.7	26	4.0	4
CD4	-	-	5.0	5	30.7	31	45.5	46	18.8	19
CD5	-	-	1.0	1	3.0	3	70.3	71	25.7	26
CE1	-	-	2.0	2	8.9	9	68.3	69	20.8	21
CE2	25.7	26	37.6	38	5.9	6	23.8	24	6.9	7
CE3	21.8	22	39.6	40	12.9	13	23.8	24	2.0	2
CF1	1.0	1	78.2	79	16.8	17	4.0	4	-	-
CF2	25.7	26	48.5	49	18.8	19	5.9	6	1.0	1
CF3	2.0	2	59.4	60	7.9	8	14.9	15	15.8	16
CF4	-	-	12.9	13	9.9	10	49.5	50	27.7	28

CA1=Problems of initiating unauthorized transaction, **CA2=**There is problem of accidental entry of bad data, **CA3=**Entering incomplete data to the CAIS, **CA4=**Entry of invisible data that lacks source document, **CB1=**Lack of clear audit trail or activity log in CAIS, **CB2=**Computers lack judgment when things go wrong, **CB3=**Potential errors in the application program, **CB4=**There is no effective adequate separation of duty in CAIS (because of centralization of data), **CB5=**Effect of error spread rapidly through files because of CAIS fast processing, **CC1=**Invisibility of audit trail (activity log), **CC2=**Information can be altered without physical trace, **CC3=**Accidental destruction of data by CAIS users, **CC4=** Intentional destruction of data by employee, **CC5=**Data is easy to steal in CAIS, **CC6=**Loss of data or information, **CD1=**Reports get distributed to unauthenticated users in CAIS, **CD2=**Unauthorized access to information through sharing of password, **CD3=**Fictitious or incorrect output (intentional), **CD4=**Output may fail to reflect the real-world situation because of sophisticated processing of CAIS, **CD5=**Output from CAIS is assumed to be accurate and usually not checked, **CE1=**Not running a background check while hiring causes computer fraud, **CE2=**Inadequate training and lack of monitoring of staff working on CAIS can be a reason for accidental breach of control, **CE3=**Unauthorized access to data is possible under CAIS because if centralization of data, **CF1=**Unauthorized access to CAIS by hackers, **CF2=**Natural disasters (fire, loss of power, etc.), **CF3=**Introduction (entry) of computer virus to the CAIS, **CF4=**Risk of loss of data during system failure under CAIS

The following table shows the frequency and percentage of the data collected on the use of CAIS and ITG, IT knowledge, and computer fraud. A total of 8 questions were included in the questionnaire. SECTION-4: The use of CAIS and IT Knowledge, IT Governance and Computer Fraud

Table 25: Frequency table for the use of CAIS and ITG, IT Knowledge and Computer Fraud

	Strongly Disagree		Disagree		Neither Agree Nor Disagree		Agree		Strongly Agree	
	%	F	%	F	%	F	%	F	%	F
D1	-	-	-	-	5.9	6	64.4	65	29.7	30
D2	-	-	-	-	2.0	2	69.3	70	28.7	29
D3	2.0	2	5.9	6	5.0	5	54.5	56	32.7	33
D4	1.0	1	1.0	1	17.8	18	73.3	74	6.9	7
D5	-	-	-	-	10.9	11	72.3	73	16.8	17
D6	-	-	-	-	4.0	4	39.6	40	56.4	57
D7	-	-	-	-	7.9	8	72.3	73	19.8	20
D8	-	-	-	-	5.9	6	76.2	77	17.8	18

D1=IT knowledge of human staff plays an important role in achieving the benefits of adopting CAIS, **D2=**The existence of IT governance is important in achieving internal control goals through the use of CAIS, **D3=**CAIS provides protection against fraud and internal control breaches, **D4=**CAIS contributes towards detection of frauds, **D5=**Staff working on CAIS have a full picture of security threats that comes with the computer-based system, **D6=**Accounting staffs need to have adequate IT knowledge to minimize accidental entry of bad data, **D7=**Management's IT knowledge have a role in identifying risks to internal control under CAIS, **D8=** Accountants need to have adequate IT knowledge so as to

4.2.7 Summary of Analysis of Quantitative Data

The finding of the study indicated that in general, the respondents agreed that there are internal control benefits of adopting computer-based accounting information systems. The systems are said to be less prone to an error relating to the system itself, and that the systems are mostly accurate in processing data. The internal control is improved and the reliability of financial statements has improved. Further, the system has provided extra control over financial data

through the use of authorized access procedures. The audit log provided strengthened data and information security. It has also improved accountability.

The result of the analysis of the data collected indicates that there are some challenges to using computerized accounting information systems. The problems include the existence of invisible data that lacks source documents and incomplete data entry about a transaction. Problems of initiating unauthorized transactions, entering bad data by accident were low.

Lack of a clear audit trail, computers lacking judgment when things go wrong, and computer's fast processing which contributes to the fast spread of error was mentioned as a challenge. Problems in the application or system and problems of segregation of duty in terms of the centralized system were reported as low challenge areas.

The analysis shows in general there is a storage control issue. The challenges include modification or alteration of data, the invisibility of audit trail, and also loss of data without a physical trace was among the challenges. The analysis showed that the computer outputs of the system are accurate while there still exists intentional alteration and modification of information by users. Problems of distribution of information only to authorized workstations and there is also a problem with the output of not being able to reflect reality.

Regarding personnel control challenges, the analysis shows that not running background checks presented some challenges while unauthorized access due to centralization and inadequate training, and lack of monitoring which can cause accidental information or data breach are considered not a challenge. The risk of data loss because of system failure is considered a problem while information breaches by hackers, data loss due to natural disasters, and loss of data due to virus attacks are considered not a problem.

Having adequate and updated IT knowledge of the users of the system is strongly believed to contribute towards better use of the system and it agreed that it can help in achieving organizational goals effectively. The use of a computer-based accounting system is believed to provide protection against fraud and internal control issues. Respondents agree that the systems can detect fraud and thereby provide protection.

4.3 Qualitative Data Analysis

Following the mixed method approach adopted for this study, a structured interview has been successfully made. The interview contained 8 questions (Annex III, Section 4) that are believed to give a better understanding of the topic of the study which is internal control benefits and challenges associated with the use of computerized accounting information systems. The interview was made with 10 top management personnel representing the 10 participating NGOs. The interviewees were selected based on their years of experience both in accounting, accounting information systems, and managerial level experience which gives a broad spectrum to the topic under study.

Codes are given to the interview responses. Accordingly, the codes run from **R0** to **R9** representing the **10** respondents from the **10** NGOs participating in the study. The responses are also presented in the table corresponding to the codes.

4.3.1 Analysis on Internal Control Benefits of adopting CAIS

As indicated in Table 25 below, respondents have agreed that the adoption of computer-based accounting systems has contributed towards better internal control in terms of various ways such as input control, process control, access control, accountability, and compliance. The answers to the interview question are summarized in a table using an open coding method where shortly sequenced words are used to give the main idea of what has been said.

Table 26**:** Summary of major internal control benefit of adopting CAIS

	Responses to interview Question #1	**Emergent Theme**
R0	*".....apart from physical control that had been in place the use of CAIS includes additional features to the control system in terms of the use of passwords....."*	Internal Control
R1	*".....errors during processing have decreased and hence quality and accuracy of reports increased...."*	Process Control

R2	*"…..data and information security have increased because access by an unauthorized individual is minimized…."*	Access Control
R3	*"…..the system helped to increase compliance with various laws…."*	Compliance
R4	*"….CAIS has improved and strengthened internal control….."*	Internal Control
R5	*"….errors while recording or inputting data has greatly reduced which enhanced the quality and accuracy of published reports…."*	Input Control
R6	*"…..internal control has improved and the efforts made by staff to check if internal control procedures are followed or not has reduced …."*	Internal Control
R7	*"…..accuracy of report increased due to use of CASI….."*	Process Control
R8	*"……the audit log improved internal control and also accountability…."*	Internal Control & Accountability
R9	*"…..CAIS improved accountability and compliance to policy and internal control procedure……"*	Accountability & Compliance

Source: Interview

4.3.2 Analysis on Internal Control Challenges of adopting CAIS

As indicated in Table 26 below, respondents have raised internal control challenges in terms of input, process, completeness, access, authorization, storage, and knowledge challenges. Here also the answers are presented using the open coding approach in a short and summarized way reflecting the main idea of the answers given to the interview questions.

Table 27: Summary of internal control challenge of using CAIS

	Responses to interview questions #2 - #7	**Emergent Theme**
R0	*"……entering incomplete data about the economic event and*	Input control

	entering invisible data without proper source document to support the transaction……"	challenge
R1	*"....setting the policies and procedures that work behind the system which processes every transaction accordingly....."*	Process control challenge
R2	*"....getting assurance about the inclusion of every transaction into the system was the major challenge....."*	Completeness of input data
R3	*".....unauthorized data access by users of the system....."*	Access control
R4	*".....getting complete information out of the system which reflects the reality was a major challenge....."*	Input, process challenges
R5	*"....controlling errors while recording and initiating a transaction in the system...."*	Input challenges
R6	*"...making sure that every recorded and processed data is authorized was a challenge at first...."*	Authorization
R7	*".....stored data can easily get into the wrong hand due to the nature of the technology. This is because data can easily be transferred to external storage and using the internet. In the manual system, it takes time to copy data and to get access to it....."*	Storage challenge
R8	*"....security for backup data was a challenge as it needs to be kept away from the system and making sure it is accessed only by authorized personnel……"*	Storage challenge
R9	*"....employees does not have a clear picture of the internal control environment when using CAIS....."*	Knowledge

Source: Interview

4.3.3 Analysis on the use of CAIS and IT Knowledge, IT Governance and Fraud

Table 27 below presents the summary of interview responses about the use of CAIS and ITG, IT knowledge, and computer fraud.

Table 28: Summary of the use of CAIS and ITG, IT knowledge and Fraud

	Responses to interview questions #8
R0	*"....users of the system should have the skill and knowledge to control the system...."*
R1	*".....The existence of a strong ITG helps reduce the occurrence of computer-related frauds in organizations....."*
R2	*".....IT knowledge is a must for users of the systems such as managers and accountants. When the users have updated knowledge of IT, they can effectively and efficiently make use of the system in all aspects and not just achieve strong internal control....."*
R3	*"……when the users are aware of the specific types of threats that are particularly present in the systems they use, they are better able to proactively act on preventing and minimizing them……"*
R4	*".....only adopting the systems will not contribute towards establishing a strong control environment, the presence of ITG coupled user's knowledge can lead to good internal control system....."*
R5	*"....the system (CAIS) by itself gives better control than the manual AIS in terms of reports such as audit log and history on how transactions are recorded, processed and reported....."*
R6	*"....it is not only accountants that are expected to have IT knowledge, but management also as a user of the information coming from the CAIS must equip themselves with IT*

	skill and knowledge so as to successfully control their environment….."
R7	*"….users of the system needs to update themself in accordance to the ITG current regulation and laws…."*
R8	*".....IT auditors can play greater roles in identifying computer-related frauds and the internal control of the systems…..*
R9	*"…as a user's of the system, accountants, in addition to the skills and knowledge of IT, they need to possess professional ethics…."*

Source: Interview

4.3.4 Summary of Analysis of Qualitative Data

The analysis of the qualitative data collected through interviews and open-ended questions in the questionnaire regarding internal control benefits of adopting computer-based accounting systems shows that all in all respondents agree that the use of the systems has improved their efficiency and effectiveness in terms of internal control. Respondents said that internal control has improved in terms of strengthened security through extra measures such as the use of passwords, input controls, processing control, access, output, and storage controls. The input controls provide controls of data validation and completeness of data that are recorded on the system. The processes control makes sure that no overwriting or deleting of data happens while processing and also avoids errors that can happen when more than one user updates the data in the system. The output control checks the integrity of data that has been processed and reported as an output. This also involves access control where the output is distributed only to the authorized workstation. Reviews and reconciliation of items in the report are made as a way of checking the accuracy and completeness of the reports or outputs. As a storage control, important information is kept in a secure place and accessed and reviewed by authorized staff.

The system is also said to have improved compliance with the law. Respondent explained the auditor's attestation on the test of internal control indicated there exist only non-material and

insignificant noncompliance issues. The cost of compliance with internal control policies and regulation is considered high in terms of having the control system and the skilled human power for its administration. In addition to the IT officers, there is a need for IT security and compliance officers that work independently. The result of a study conducted by Wang et al. (2011) resonates with the opinion that the presence of computer systems increases compliance to internal control policies and procedures.

Accountability is better addressed in the computer systems through the audit log which contains information such as who initiated a specific task in the system. This supports authorization and authentication. Accountability enables to track who committed the violation to the computer systems and to help the individual responsible for the act of violation.

The majority of participants stated that there are input control problems that are mostly related to humans or staff. Entering incomplete data when recording transactions, at times entering invisible data that have no supporting documents, and not entering a transaction were the major issues raised. Getting complete and detailed information was said to be difficult either because of issues on input control or process control. All in all, challenges regarding errors control at the initial input stage were identified.

Developing and setting the policies and procedures for the information systems was mentioned as a challenge. This relates to access, authorization, and authentication issues. The nature of the data required extra security to avoid unauthorized access. Storage control included that updating the backup files to the current operating system being used for data integration purposes. This also involves keeping the backup files in a usable format and making sure that they can be restored later. The risk that the backup files may fail is also high and it requires regular data storage maintenance and update. There is a human factor to it that requires the experts to know what backup set is appropriate for the specific environment so as to include all the important data in the backup.

Respondents said that professional accountants must have the skill to use computer systems as the accounting systems are now computerized. The study by Ghasemi et al, (2011) supports this view. Management’s knowledge of information security, information system design, and awareness of the level of risk that is present in their organization is considered to take a

significant role in the prevention and detection of data breaches within the organization. The study by Ayereby (2018) indicated the same result.

IT governance is stated as a means of implementing internal control which will oversight the information system security and thereby reduce computer frauds. Whereas, establishment and implementation of IT governance requires organizations a great deal of effort. IT knowledge is considered an important asset among professional accountants, auditors, and top management as it enables efficient and effective use of the system. Updating knowledge based on current issues surrounding the information technology sector is considered crucial for successfully achieving organizational objectives, improving performance, and thereby strengthening internal control.

IT governance together with IT knowledge of system users is indicated to improve computer fraud detection and minimization. With the oversight function of IT governance policies coupled with an awareness of computer fraud by users of the system, an organization can improve their internal control benefits of adopting accounting information systems.

CHAPTER FIVE
SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS

5.1 Introduction

This section of the study presents the summary of the findings discussed in the preceding chapter, the conclusions, and recommendations based on the findings of this study. This section, therefore, contains parts dedicated to a summary of findings followed by conclusion, recommendations, and further research recommendations respectively.

5.2 Summary of Major Findings

The summary of major findings is presented here which overviews the internal control benefits and challenges of adopting computer-based accounting information systems. The researcher, based on the stated objectives, assessed the internal control benefits and challenges of adopting accounting information systems. A separate analysis of the benefits and challenges was made using both qualitative and quantitative methods in the previous chapter. In this section, the summary of the findings is presented after a comparison of similar patterns is identified over the qualitative and quantitative analyses that are made.

5.2.1 Internal Control Benefits of using CAIS

The adoption of computerized accounting information systems has various internal control benefits to organizations. Data collected from informants of this study indicated that the use of a computer-based accounting system improves internal control through the provision of extra control activities that are part of the internal control of the information system. The improvements are in terms of the use of a password, input controls such as checking of data types, and running verification when inputting or recording transactions. The improvement includes access control, and output and storage control provided by the built-in control system in the computer-based accounting information systems.

Accountability is confirmed to have improved in the case of the adoption of computerized accounting information system in the sense that it gives additional accountability through an audit log which enables tracking activities relating to each workstation which adds an extra layer of information to hold individuals accountable and responsible for interaction with the system.

5.2.2 Internal Control Challenges of using CAIS

A computer-based accounting information system doesn't come without challenges. Some challenges are peculiar to the accounting system and also specific to the information system or the technology itself. This study aimed to point out the challenges that are present in the Ethiopian context. Identifying the challenges is halfway through the solution and the paper includes recommendations (in Section 5.4 down below) based on literature and considering experiences of other studies conducted in different countries.

Based on data collected from informants of this study through questionnaires, open-ended questions, and interviews, it is confirmed that major internal control challenges associated with the use of computer-based accounting information systems include input control challenges that are related to human factors in terms of incomplete data and invisible data that are lacking source document to support the transaction. Data storage control was also a challenging area as there were issues relating to access control, data integration, proper handling of backup data for future use, and risks of data loss as a result of factors such as human error, hard disk failure, system failure and corruption, and power outage and so on.

5.2.3 The use of CAIS and IT Governance, IT Knowledge, and Computer Fraud

The study confirmed that IT governance contributes towards the implementation of internal control when using computer-based accounting information systems and it is also indicated that IT governance provides oversight into matters of information system security issues. However, developing and setting policies that govern the use of the information system within the organization was a major challenge indicated by the finding of an analysis of both qualitative and quantitative data. Both IT governance and IT knowledge contribute towards computer fraud detection and strengthening of internal control of organizations.

5.3 Conclusion

The study was aimed to provide some understanding of the internal control benefits and challenges of using computer-based accounting information systems. This is shown in the benefits and challenges that are associated with the adoption of computer-based accounting information systems concerning internal control. As more and more organizations are becoming heavily computerized, the need to study the technological impact on different areas and aspects became inevitable. Computer-based information systems have huge importance to every organization and hence the internal control issue needs to be given attention in order to effectively and efficiently use the systems in achieving organizational goals.

Based on the collected data, the informants of this study who are users of computer-based accounting information system has shown appreciation of the system interns of its benefits in particular from the aspect of improving internal control and thereby minimizing fraud. However, there are challenges that come with the systems which are part of the bigger issues and challenges of the current information technology-dominated environment.

Important components that can assist the realization of an improved internal control environment where the fraud level is kept to the minimum, are pointed out to be having IT governance for the management of information systems within the organization and providing continuous training on a regular basis to employees who are interacting with the system so that they possess the current knowledge to address and react to current issues in the IT world.

5.4 Recommendations

The researcher made the recommendations for practice and further study from the overall analysis of the collected data and based on literature reviews and articles concerning the topic of interest. In addition to this, recommendations were made by a few participants in the open-ended questions in the questionnaire, and they are taken into consideration even though they were only dully answered. Recommendations to challenges observed in practice were also given as an answer to the last interview question by informants.

5.4.1 Recommendation for Practice

Based on the findings of the study, practical recommendations are forwarded concerning internal control challenges of using computer-based accounting information systems and IT Governance, IT knowledge, and computer fraud concerning CAIS.

- **Management has a major responsibility** in designing and implementing internal control. Management also has to set the tone for the internal control culture within the organization as the saying goes on "the tone at the top". The design of the internal control has to begin with the understanding of the information systems that are being used in the organization. This is because the internal control system has to proactively detect (preventive methods) and minimize internal control issues instead of solving the problems after the problems have occurred (detection and minimization of damage).

- **Organizations should develop ways to protect and secure their computer systems** so as to be able to rely on the information they get out of these systems. Usually, computer frauds that happen because of lack or weakness in the control environment are not detected easily. This is because of the nature of the frauds. Frauds that involve the use of computers go unnoticed because detection requires special knowledge. Even though the systems are tampered with; they still keep working without causing any problem that users can easily identify. Therefore organizations need to improve their detection capacity through checking the audit log regularly, planning and conducting a frequent audit, hiring IT specialists, testing or checking the system regularly to make sure it is working properly, and providing continuous training to employees working on the systems to update their knowledge to the current state of the art and to make sure that they know the security threats involving the technology they are using.

- **In today's world IT governance has become the major part of company governance** since the application of IT is a basic element in every company's strategy. In order to use information systems efficiently and effectively, organizations need to establish and follow IT governance and also develop a good control environment (ISACA, 2019).

- **Emphasis should be given to human resources** for the successful implementation of internal control and use of computer-based accounting information systems as evidenced by recent studies (luna-Arocas & Camps,2012, as cited in Hla & Teru, 2015)

5.4.2 Recommendations for Further Research

The aim of this study was to spotlight the internal control benefits and challenges of adopting computer-based accounting information systems among NGOs in Ethiopia. This study is limited to charity organizations only. Further study should be made on different sectors and industries. This helps to have comparable studies in the future for further study or investigation on the topic of computer-based accounting information systems and internal control. The sector and industry-wise comparisons help to investigate what is best for each of the various sectors. Comparison can be made against profit-making companies, banks, manufacturing firms, service sectors, and even can be from the context of developed and developing nations.

Secondly, further research should be done on areas of accounting information systems under the ERP environment and also on the integration of accounting information systems and management information systems.

Lastly, Accounting Information system audit in Ethiopia, in relation to forensic accounting and computer fraud and theft should be studied for purpose of developing a curriculum that can address the current issues in the information technology world. This can go further deep into the study of big data analytics from the accounting information systems, including data science for audit investigation of patterns on data sets, data warehousing and how to handle data properly, compliance with privacy policies, security issues, and readjusting the curriculum to this level.

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ANNEXES

ANNEX I: INFORMATION SHEET

Name of the investigator: Yodit Belayneh (MSc candidate)
Research title: Internal control Benefits and Challenges of Adopting Computerized Accounting Information Systems (CAIS): In selected NGOs in Ethiopia

Research objective: The general and primary objective of this thesis is to study the benefits and challenges of adopting a Computerized Accounting Information System (CAIS) to enhance internal control in the context of NGOs that are currently working in Ethiopia.

Study procedure: Purposive sampling method is used to select NGOs that are using computerized AIS to take out the designed objective of the study. The study follows a convergent mixed-method approach. The analysis of the study will make use of a mixed type of analysis on data coming from both qualitative and quantitative databases. A comparison of results coming from the two databases will be made to reach a detailed and in-depth discussion.

Confidentiality: the collected information will be kept confidential and used only for research purposes. No one except the researcher will have access to the information collected. The personal information of the respondents will not be notified; also your name will not be mentioned or be attached to anything that you say.

Do you want to continue yes _____ No _____

Thank you in advance for your help!

Person to contact: if the data collectors or other NGO administrative staffs have any questions regarding the study, they are free to contact me in person or by the following addresses:

YODIT BELAYNEH
Tel. 0913098193
Email b.yodit@gmail.com

ANNEX II: NGO CONSENT FORM

This study will be conducted in NGOs that are engaged in providing various charity works across Ethiopia. The main objective of this study is to assess the internal control benefits and challenges that are related to the adoption and use of a Computerized Accounting Information System in the context of NGOs that are currently working in Ethiopia.

In this study, data will be collected from accountants, auditors, top management, and IT personnel directly working and involved in CAIS. Any personal information will be maintained throughout the study process and no unauthorized access to the information is allowed.

Finally, the NGOs have all the right to refuse to participate in this study at any time. If you have any questions or need further information regarding the planned study, you are free to get clarification from the investigator through the following address: Yodit Belayneh, Tel. 0913098193. Therefore, if you would like to participate in this study, would you please confirm it by signing here?

Thank you very much!

Participant (NGO) _____

Investigator _____

ANNEX III: QUESTIONNAIRE

Addis Ababa University

College of Business and Economics

MSc in Accounting and Finance

Dear Respondents,

The main theme of this study is to explore the internal control benefits and challenges that are associated with the adoption of computerized accounting information systems (CAISs) in selected NGOs in Ethiopia.

The research aspires to obtain an overview of the benefits and challenges of adopting computerized AIS in Ethiopia and believed it will be a valuable contribution to the available literature in the area of computerized accounting information systems and their adoption with regard to internal control issues. Hereby, I am kindly asking for your assistance in completing this research by answering the attached questionnaire objectively, since your contribution is so vital for the successful accomplishment of this research project.

Kindly note that the questionnaire will not take more than 15 minutes to complete, and all collected information will be confidential and used solely for the research objectives only. It is not compulsory to participate in this study and you may choose to withdraw at any time even if prior consent has been given. Also, you do not have to give reasons for withdrawal and there are no consequences attached to your decision if you wish to withdraw.

If you have any concerns regarding the ethical elements of this research project, you can talk with me directly through telephone: 0913098193. I highly appreciate your precious cooperation in advance.

Respectfully yours,
Yodit Belayneh

INTRODUCTION

This questionnaire has **4** sections.

Section 1 is related to your personal data

Section 2 is about the internal control benefits of adopting CAIS

Section 3 is about internal control challenges of adopting CAIS

Section 4 is about the use of CAIS and IT knowledge, IT Governance and Fraud

SECTION-1: Demographic Data

Instruction: please fill in the blank space or tick mark (√) on your answer in the box as indicated

A1. Age: 18-2☐ 26-35☐ 36-45☐ 46-55☐ above 55☐

A2. Gender:

Male ☐ Female ☐

A3. Marital status:

Single ☐ Married ☐

Divorced ☐ Widowed ☐

A4. What is your field of study?

Accounting ☐ IT ☐

A5. What is your level of education?

Diploma ☐ PhD ☐

Masters ☐ Other ☐

Degree ☐

A6. Which of the following professional accounting qualification do you have?

ACCA	☐	Other	☐
CPA	☐		
CMA	☐	None	☐

A7. Where is your area of practice (Work Group)?

☐ Auditing

☐ Accounting and Finance

☐ IT

☐ CAIS

A8. How long have you been working on CAIS?

_____ Years

A9. Have you received any formal training on computerized accounting information systems or AIS?

Yes ☐ No ☐

A10. If your answer to question No. 9 above is “yes”, what level of training did you get?

Not adequate ☐ Neutral ☐ Adequate ☐ None ☐

SECTION-2: Internal Control Benefits of Adopting CAIS

How much do you agree or disagree with the following statements about the realization of internal control benefits of adopting CAIS by your organization? Please read each statement carefully and show the extent of your agreement on the statements by **circling** the numbers in the column using the following rating scale (Likert Scale).

Where: 1 = Strongly Disagree **2** = Disagree **3** = Neither Agree nor Disagree **4** = Agree

5 = Strongly Agree

No	Statement	Scale				
B1	CAIS is less prone to input error	**5**	**4**	**3**	**2**	**1**
B2	CAIS enables to process of data with great accuracy	**5**	**4**	**3**	**2**	**1**
B3	CAIS improved the reliability of financial data through strengthening the internal control	**5**	**4**	**3**	**2**	**1**
B4	CAIS improved compliance to company policy	**5**	**4**	**3**	**2**	**1**
B5	CAIS improved compliance to government laws and regulation s	**5**	**4**	**3**	**2**	**1**
B6	CAIS strengthened control over accounting data and information in terms of unauthorized access	**5**	**4**	**3**	**2**	**1**

B7	CAIS improved segregation of duty as a means of internal control	**5**	**4**	**3**	**2**	**1**
B8	CAIS improved accountability and internal control	**5**	**4**	**3**	**2**	**1**
B9	CAIS prevented unauthorized modification of accounting data	**5**	**4**	**3**	**2**	**1**
B10	CAIS strengthened data security controls through audit log	**5**	**4**	**3**	**2**	**1**
B11	CAIS provided necessary information to support internal control and its evaluation	**5**	**4**	**3**	**2**	**1**

What benefits did your organization realize through the adoption of CAIS in order to enhance internal control?

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SECTION-3: Internal Control Challenges of Adopting

How much do you agree or disagree with the following statements about the internal control challenges of adopting CAIS? Please read each statement carefully and show the extent of your agreement on the statements by **circling** the numbers in the column using the following rating scale (Likert Scale).

Where: **1** = Strongly Disagree **2** = Disagree **3** = Neither Agree nor Disagree **4** = Agree

5 = Strongly Agree

No	Statement	Scale				
Input Control Challenges						
CA1	Problems of initiating unauthorized transaction	**5**	**4**	**3**	**2**	**1**
CA2	There is problem of accidental entry of bad data	**5**	**4**	**3**	**2**	**1**
CA3	Entering incomplete data to the CAIS	**5**	**4**	**3**	**2**	**1**
CA4	Entry of invisible data that lacks source document	**5**	**4**	**3**	**2**	**1**
Process Control Challenges		Scale				
CB1	Lack of clear audit trail or activity log in CAIS	**5**	**4**	**3**	**2**	**1**
CB2	Computers lack judgment when things go wrong	**5**	**4**	**3**	**2**	**1**
CB3	Potential errors in the application program	**5**	**4**	**3**	**2**	**1**
CB4	There is no effective adequate separation of duty in CAIS (because of centralization of data)	**5**	**4**	**3**	**2**	**1**
CB5	Effect of error spread rapidly through files because of CAIS fast processing	**5**	**4**	**3**	**2**	**1**

Storage Control Challenges		Scale				
CC1	Invisibility of audit trail (activity log)	**5**	**4**	**3**	**2**	**1**
CC2	Information can be altered without physical trace	**5**	**4**	**3**	**2**	**1**
CC3	Accidental destruction of data by CAIS users	**5**	**4**	**3**	**2**	**1**
CC4	Intentional destruction of data by employee	**5**	**4**	**3**	**2**	**1**
CC5	Data is easy to steal in CAIS	**5**	**4**	**3**	**2**	**1**
CC6	Loss of data or information	**5**	**4**	**3**	**2**	**1**
Output Control Challenges		Scale				
CD1	Reports get distributed to unauthenticated users in CAIS	**5**	**4**	**3**	**2**	**1**
CD2	Unauthorized access to information through sharing of password	**5**	**4**	**3**	**2**	**1**
CD3	Fictitious or incorrect output (intentional)	**5**	**4**	**3**	**2**	**1**
CD4	Output may fail to reflect the real-world situation because of sophisticated processing of CAIS	**5**	**4**	**3**	**2**	**1**
CD5	Output from CAIS is assumed to be accurate and usually not checked	**5**	**4**	**3**	**2**	**1**

Personnel Control Challenges		Scale				
CE1	Not running a background check while hiring causes computer fraud	**5**	**4**	**3**	**2**	**1**
CE2	Inadequate training and lack of monitoring of staff working on CAIS can be a reason for accidental breach of control	**5**	**4**	**3**	**2**	**1**
CE3	Unauthorized access to data is possible under CAIS because if centralization of data	**5**	**4**	**3**	**2**	**1**
Other Control Challenges in CAIS		Scale				
CF1	Unauthorized access to CAIS by hackers	**5**	**4**	**3**	**2**	**1**
CF2	Natural disasters (fire, loss of power, etc.)	**5**	**4**	**3**	**2**	**1**
CF3	Introduction (entry) of computer virus to the CAIS	**5**	**4**	**3**	**2**	**1**
CF4	Risk of loss of data during system failure under CAIS	**5**	**4**	**3**	**2**	**1**

If there is any other problem or challenge that you observed in relation to the use of computerized CAIS in your organization concerning internal control, please write it down below.

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What solutions do you recommend to address the challenges you listed above?

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SECTION-4: The use of CAIS and IT Knowledge, IT Governance and Fraud

How much do you agree or disagree with the following statements about the use of CAIS and IT knowledge, IT Governance, and Fraud? Please read each statement carefully and show the extent of your agreement on the statements by **circling** the numbers in the column using the following rating scale (Likert Scale).

Where: **1** = Strongly Disagree **2** = Disagree **3** = Neither Agree nor Disagree **4** = Agree **5** = Strongly Agree

No	Statement	Scale				
D1	IT knowledge of human staff plays an important role in achieving the benefits of adopting CAIS	**5**	**4**	**3**	**2**	**1**
D2	The existence of IT governance is important in achieving internal control goals through the use of CAIS	**5**	**4**	**3**	**2**	**1**
D3	CAIS provides protection against fraud and internal control breaches	**5**	**4**	**3**	**2**	**1**
		5	**4**	**3**	**2**	**1**

D4	CAIS contributes towards detection of frauds					
D5	Staff working on CAIS have a full picture of security threats that comes with the computer-based system	**5**	**4**	**3**	**2**	**1**
D6	Accounting staffs need to have adequate IT knowledge to minimize accidental entry of bad data	**5**	**4**	**3**	**2**	**1**
D7	Management's IT knowledge have a role in identifying risks to internal control under CAIS	**5**	**4**	**3**	**2**	**1**
D8	Accountants need to have adequate IT knowledge so as to protect digital information as an asset	**5**	**4**	**3**	**2**	**1**

ANNEXES IV: INTERVIEW [OPEN ENDED QUESTIONS]

Q1	What were the major internal control benefits that your organization acquire by adopting computerized AIS?
Q2	What were the major internal control challenges your organization faced when adopting and applying computerized AIS?
Q3	What were the major input control challenges your organization faced when adopting and applying computerized AIS?
Q4	What were the major process control challenges your organization faced when adopting and applying computerized AIS?
Q5	What were the major storage control challenges your organization faced when adopting and applying computerized AIS?
Q6	What were the major output control challenges your organization faced when adopting and applying computerized AIS?
Q7	What were the major personnel control challenges your organization faced when adopting and applying computerized AIS?
Q8	Any ideas or comments on the adoption of computerized AIS and the relevance of IT Knowledge of accountants, the governance of IT in organizations, and frauds that involve the use of a computer or IT?

Thank you very much for your participation in this study.

Please return the questionnaire to:

Yodit Belayneh

Contact address: 0913098193