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**EFFECT OF DATA QUALITY DIMENSIONS ON INTERNAL AUDIT
PERFORMANCE OF INSURANCE COMPANIES IN KENYA**



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ADM NO: 142296

**A THESIS SUBMITTED TO STRATHMORE BUSINESS SCHOOL IN THE PARTIAL
FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER IN
COMMERCE (FORENSIC ACCOUNTING & INVESTIGATION OPTION) OF
STRATHMORE UNIVERSITY**

JULY, 2023

DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

ESTHER MUTANU MBITHI



Approval

The Proposal of Esther Mutanu Mbithi was reviewed and approved by:

Dr. David Mathuva (Supervisor)



Strathmore Business School

18th 24 2023



DEDICATION

I dedicate this work to God almighty for His grace, mercy and blessings that have seen me through and to my family and friends for been my support system all through.



ACKNOWLEDGEMENT

This thesis would not have been possible without the support of the following people. First and foremost, I thank God for His guidance and mercies He has given me throughout the entire project. I would like to acknowledge my supervisor Dr. David Mathuva for his guidance, commitment, availability and expert advice. I extend my appreciation to all my lecturers who taught me in the Masters in Commerce course work at Strathmore University.



ABSTRACT

Data quality has emerged as a key factor in decision-making for firms across a range of industries in today's data-driven economy. The quality of the data obtained, stored, and used throughout business operations will have an impact on the level of success attained in conducting business both now and in the future as data becomes an increasingly significant component of every company activity. Additionally, poor data quality can result in poor business decisions, which can harm the organization's reputation and cause major financial losses as well as poor customer satisfaction and trust issues. Therefore, it becomes crucial to guarantee your organization's data quality. The primary goal of the study was to establish the effects of data quality dimensions on the performance of the internal audit amongst Insurance companies in Kenya. With regard to internal audit performance of Insurance sector in Kenya, the study primarily intended to focus on the following specific objectives: first to examine the effect of data security control on internal audit performance of insurance companies. Secondly, to examine the effect of data completeness on internal audit performance of insurance companies. Thirdly, to examine the effect of data reliability on audit internal audit performance of insurance companies in Nairobi Kenya. Fourth, to determine the effect of time-related dimensions on internal audit performance of insurance companies in Nairobi Kenya and to assess the moderating effect of audit professionalism on data quality and internal audit performance of insurance companies in Nairobi Kenya. The study objectives were anchored by two theories: Agency and Contingency theories. The study used explanatory research design with the target population being four hundred and twenty seven functional area heads from the insurance companies having their head offices in Nairobi County. A sample size of two hundred and six respondents were chosen using simple random sampling, and the sample size was determined using the stratified random sampling technique. Questionnaires were utilized as the research instrument to gather primary data. In order to evaluate the data, regression analysis was applicable with ordinal regression method employed to model the relationship between the ordinal outcome variable and the independent variables with results being presented in form tables, graphs and figures. The results revealed correlation (R) coefficient, R-square value, which shows a determination coefficient of eighteen percent. Then a significant statistical relationship between four variables and dependent variable and performance of insurance companies. The results analysis highlights the benefits of utilising data quality dimensions on insurance company internal audit performance, which was one of the study's primary contributions that was helpful to aspiring academics and researchers. More studies that quantitatively show the impact of the effective use of data quality aspects on internal audit performance, as ours does, are required. The primary objective of data quality dimension analysis in the field of data quality analytics is to enhance the internal audit performance of insurance firms, therefore this area of research was crucial. A fresh contribution to the field of study is the understanding of the elements affecting it. The study recommends that a risk-based approach on data quality analytics should be considered to enhance decision-making and trustworthy reporting.

Keywords: Data quality, internal audit, performance, Insurance

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ABBREVIATIONS AND ACRONYMS

AKI - Association of Kenyan Insurers

CFA – Confirmatory Factor Analysis

EFA - Exploratory factor analysis

IPPF - International Professional Practices Framework

IRA - Insurance Regulatory Authority



DEFINITION OF TERMS

Data Analytics Quality – Analyzing data sets to find patterns and drawing conclusions about the information they contain is the profession of data analytics. Data analytics quality refers to how well a piece of information suits the fulfillment of a certain goal. Data quality traits including correctness, completeness, consistency, validity, uniqueness, as well as timeliness, which forms the foundation for data quality measurements (Côte-Real et al., 2020).

Data Completeness - This is used in the study to denote an indicator of how well the data can supply all the accessible values that are needed (Günther et al., 2019).

Data Reliability - A vital concept for generating data confidence throughout the organization, the word refers to data that is accurate and comprehensive. Data reliability is one of the main objectives of data integrity programs, which are also used to protect data security, data quality, and regulatory compliance (Günther et al., 2019).

Data Security Control - The term refers to the creation and execution of procedures that apply quality management principles to data in order to guarantee that the data is suitable to meet the particular needs of an organization in a given situation. In this study, data will be assessed to be of high quality if it is deemed suitable for the intended use (Günther et al., 2019).

Internal Audit - refers to an objective assurance and consulting procedure that is neutral and designed to improve the operations of a company (Günther et al., 2019).

Time related dimensions – this refers to the timely availability of when it is required. For instance, in this study, financial information is required every quarter; then if the financial data is ready when it is supposed to be, it is timely (Günther et al., 2019).

Usefulness of internal audit performance – this refers to the internal audit's goal of gathering information and evaluating it impartially to ascertain the amount to which audit criteria are met (Günther et al., 2019).

CHAPTER ONE

INTRODUCTION

1.1 Overview

This chapter provides the study background on the concept and context from the global, regional and local perspective. The section also provides the statement of the problem, study objectives, research questions, and significance of the research and scope of the study.

1.2 Background of the Study

The importance of internal auditing has grown significantly for businesses and economic institutions for a variety of reasons, the most significant of which is to provide value adding recommendations to improve company's operations, ensure optimization of assets and prevent inconsistencies in procedures, policies and controls (Turetken et al., 2020). Internal auditors use data collected and stored by organizations for analysis to give assurance on company's performance, risk management and effectiveness of internal controls through an audit report. Nonetheless, when data available to internal auditors is not accurate, internal auditors lack a clear overview of actual processes thereby affecting their findings and recommendations. Data quality is critical to executives and senior management in making informed and strategic decisions (Ibrahim et al., 2021). High data quality results to better decision making within an organization as those tasked with the responsibility have confidence in their decisions. The quality of data is therefore paramount to internal auditors as they provide independent assurance to decision makers to take more risk in strategic decisions. Internal auditors are considered to be experts and professional consultants who give recommendations on the controls an organization should adopt (Betti & Sarens, 2021).

According to Ussahawanitchakit and Intakhan (2011), an audit must be a conscious and purposeful effort of the auditor's intention, roles and responsibilities, best practices, and a high level of dedication based on set standards and rules. Accounting scandals that took down global giants, according to Lenz and Sarens (2012), raised questions about the effectiveness of internal audit data in helping firms manage their resources. They claimed that such problems could have been uncovered and avoided if there had been adequate and quality internal auditing data.

Globally, the present shifts in the political and economic climate as well as the development of information technology have had a big impact on corporate governance. Businesses face numerous business risks, which has resulted in a wide variety of financial fraud in recent years. For boards of directors and senior management, internal audit activities present a number of problems, including the identification and prevention of business hazards and significant financial crimes. Data protection is one of the issues that enterprises must deal with (Pavelek & Zajcková, 2021). More specifically, after the recession brought on by deceptive accounting practices in the 20th century, government agencies and professional associations changed the legal system to enhance internal audit effectiveness in corporate governance, which includes risk management and control processes. The goal of internal auditing is to strengthen and improve an organization's operations. It is an impartial, impartial assurance and consulting activity (IPPF, 2017). It helps a company achieve its goals by using a systematic approach, and it adheres to the right implementation procedure in order to evaluate and improve the efficiency of internal control, risk management, and governance activities. However, conflicting data is also shown in the Ahmeti et al. (2022) study on the impact of internal audit quality on the financial performance of insurance companies. The study's findings demonstrate that professional competence significantly improves the financial outcome while internal audit effectiveness has a detrimental influence on insurance companies' financial performance. Because internal auditors can have a detrimental effect on financial performance, the report advises insurance firms to pay close attention to both their efficacy and independence.

The Institute of Internal Auditors (IIA) North American surveyed 500 people in 2016 and 47% of those who responded said internal audit played a minimal role in assessing the caliber of data used in their firm. A little over a quarter (23%) of the respondents said they had only a passing confidence in the data-driven strategic choices made by their firms (Basel Committee, 2017, as cited in Jordana, 2017). The three primary data quality aspects that will be examined in this study to determine their impact on internal audit performance for insurance businesses are accessibility, completeness, and relevance. The three factors listed above are the most important ones that affect the auditor's conclusions in terms of data quality.

The East African insurance sector is seeing significant changes in market patterns and law according to the journal Insurance Sector Outlook for East Africa 2015 by Deloitte (2016). Kampire (2012) asserts that the East African Community has facilitated seamless trade in a variety of industries, with insurance being one of them. The streamlining of trade tariffs, according to AKI (2016), has led to the establishment of branches and activities by several regional insurance companies in various regional markets. Tanzania, Burundi, and Uganda

now have branches of Kenyan-registered insurance companies Britam Holdings Limited and Jubilee Insurance. As a result, there is now competition, and for a business to be relevant in a market, it needs competitive strategies.

Locally, according to the Association of Kenyan Insurers (2016), insurance industry annual report, insurance companies are repositioning themselves to take advantage of the opportunity presented by globalization and the rise in international trade through mergers and competitive strategies, as well as to manage the risks associated with it. According to the report, technology has lowered the cost of doing business internationally, which has led international insurance companies to concentrate on creating new markets and products that would appeal to various global market groups. The rise of the Kenyan insurance market is accompanied by an increase in competitiveness brought on by the admission of foreign insurance firms like Sanlam and Old Mutual Group (AKI, 2016). Despite the expansion, the majority of insurance businesses have not yet seen sufficient growth in profits and market share because of fierce competition. Even though there were 55 registered insurance underwriters in Kenya as of 2017 (IRA), only ten (10) of them hold 60% of the market. Major underwriter rivalry has made it difficult for many insurance businesses to grow significantly or achieve break-even.

According to Masika, (2013), the quality of Internal audit data assists management in identifying internal control misalignments that expose an organization to risks of resource proliferation, corruption, and accounting errors. Kimanthi (2019) posits that the Auditor General questioned the fiscal responsibility of public institutions, claiming that this was delaying growth. Further, Odoyo, Omwono, and Okinyi (2014) asserts that the most recent scandals in Kenya have resulted in financial losses and subpar service delivery. For instance, the Office of Auditor General (OAG) reported in 2018 that revenue totaling 5.1 billion Kenyan shillings from the financial year 2016–17 was collected but never transferred to the Exchequer. On the financial statements of 129 National Government institutions, the OAG also expressed 64% qualified, unfavorable, and disclaimer opinions, which correspond to questionable expenditure totaling 1.5 trillion Kenyan Shillings.

The aforementioned data indicates that internal audit process is a part of ongoing monitoring and internal controls of insurance business operations and ensures an objective evaluation of compliance with the insurance company's established policies and procedures. As a result, the internal audit process helps executive management and the board of directors perform their tasks effectively and efficiently. To fulfill its

requirements, every insurer must have a system in place for internal audits. Additionally, the role of internal auditing must be distinct from the activities being audited and ongoing internal control procedures.

1.2.1 Data Analytics Quality Dimensions

Data is frequently seen as a very significant organizational asset. If the right business intelligence (BI) tools, increased data sources, and proper systems are in place, this value can be exploited as a competitive advantage for the firm (Appelbaum et al., 2017). Management accountants can only get data and use it to give management with analysis and projections if they can access it (Chugh & Grandhi, 2013). The foundation of big data analytics-based decision support is data quality, which is viewed as a multidimensional concept. The identified dimensions are as follows: accessibility, amount of data, believability, completeness, concise representation, consistent representation, and ease of manipulation, error-free, interpretability, objectivity, relevancy, reputation, security, timeliness, understandability, and value-added (Abdouli & Omri, 2021). Cho et al. (2021) further emphasised that data quality dimensions are constructs utilised when examining data and are criteria or elements of data quality that are regarded to be significant for a specific user's task. Given that data quality has many different dimensions, it is crucial to take into account the methods used in these research as well as the most widely used metrics. Three methods are frequently employed in the data quality literature to investigate the many characteristics of data quality (Cichy & Rass, 2019). The first approach is an intuitive strategy based on the researchers' prior knowledge or intuitive perception of the dimensions that are essential. Secondly, is a theoretical method for investigating data quality from the viewpoint of the data generation process. The last approach is empirical, which is concerned with examining data quality from the perspective of the user. The notion that the quality of the data output is determined by its users is a tenet of the empirical approach.

This study, like many others, employed an intuitive technique to identify data quality characteristics since it allows the study to select the dimensions pertinent to the study's particular objective. To put it another way, the intuitive approach made it possible for the researcher to choose the four specific dimensions (data security control, data completeness, data reliability, and time-related dimensions) based on the context of the purpose of the study.

Data available to internal auditors have significant impact on their performance. Poor data quality can lead to inaccurate forecasts and wrong findings, which in turn influences the conclusions and recommendations. According to Gathaiya (2017), having high-quality data is crucial for any business since it is used to plan,

make decisions, and allocate resources to ensure that operations operate smoothly. Incorrect recommendations undermine effectiveness of internal audit. Decision making is heavily reliant on the data quality used in analysis. In this case, high quality data ensures that the data used in making decisions is accurate, complete and consistent. High quality data promotes confidence in the decision-making process hence shareholders support the various decisions taken within an organization.

One of the data source for data analytics is Big data and consists of both internal and external data (Abbott et al., 2019). Data obtained internally to the entity (i.e., the company's database) is referred to as internal data. Management accountants are accustomed to and generally comfortable with this type of data. External data, on the other hand, refers to information gathered from resources outside the business, such as news, social media, or the Internet of Things (IoT). External data are typically unstructured data that analytics tools must process in order to offer information. Internal and external data types shown in the boxes are merely examples and do not include all possible internal and exterior data types.

Abbott et al. (2019) also identifies a set of data that cannot be acquired, expanded upon, or handled by conventional database programs. The volume of this data grows with time or due to technical advancements that stand out from others. Big data is a crucial stage in the development of information and communication systems because it allows for the easier expression of enormous amounts of data. In this situation, big data technologies can examine location data, sensor data, and social network data. Innovative alternative methods that enable control and monitoring of its flows have been developed as a result of complex data whose size exceeds the capacity of standard computer programs and its storage, processing, and distribution mechanisms (Izedonmi, 2021).

For the organization's performance and decision-making to improve, proper handling of organizational data and sustaining data reliability levels are crucial (Sigh et al., 2019). A strong foundation of trustworthy data that is thorough and accurate is necessary to establish data confidence throughout the organization. Data reliability is one of the main objectives of data integrity programs, which are also used to maintain data security, data quality, and regulatory compliance. Data quality dimensions can be categorized and measured in a number of different ways. There are no theoretical foundations for the origination, definition, and categorization of specific data quality qualities. In this case data quality is broken down into four categories by Ballou and Pazer (1985): accuracy, timeliness, completeness, and consistency. Redman (2016) has grouped the six main dimensions into completeness, timeliness, consistency, validity, integrity, conformity, and

accuracy. The six categories used to classify data quality dimensions are completeness, relevance, timeliness, validity, and accuracy.

In the modern world, where the majority of sensitive information is stored electronically, data security control is a crucial component (Chen et al., 2012). Data leak prevention is applied, and both data at rest and in transit are implied to be protected by the core feature of data security. It also includes additional architectural, administrative, and operational controls. This study considers data security controls as measures used to protect sensitive and essential information or to create a defense against its unlawful usage. These security measures support reducing, spotting, and avoiding security risks to data, computer systems, or other sets of information. By preventing, delaying, or limiting the speed of any potential hostile attack on data assets, this helps to further lower the risk of data loss or damage.

Data completeness in this study refers to the extent to which data are of sufficient breadth, depth, and scope for the task at hand (Cai & Zhu, 2016). A crucial point regarding null values and completeness needs to be made. It is crucial to understand the reason a value is missing when assessing how complete data or information is. A value can be null for one of three reasons, according to Redman (2016): either it doesn't exist (which doesn't contribute to incompleteness), it exists but is unknown (which contributes to incompleteness), or it's unknown whether it exists (which may or may not contribute to completeness).

Further, time-related dimensions also present one of the key dimensions of data quality (Ballou et al., 1998 as cited in van Wierst, 2019). The way that data changes over time and how much they are current is a key factor in defining data quality. The majority of studies identifies three temporal dimensions: currency, volatility, and timeliness. There are three dimensions of time and their relationships: currency, volatility and timeliness. Data's currency refers to how frequently it is updated. It can be described in terms of the most recent database update or the interval between receiving a data unit and delivering it to a consumer. The amount of time that data remains accurate is referred to as volatility. High volatility data are provided by rapidly changing real-world phenomena. Data should not only be current but also accurate before being used, according to the definition of timeliness.

Quality of data is affected by various factors including; data entry errors, data validation, data integration, data completeness, data accuracy, data consistency, data relevance and data security. These factors are to be emphasized so as to ensure data used is up to standards. However, data security control, time-related dimensions, completeness, and reliability are the main data quality dimensions that will be used in this study

to evaluate their impact on internal audit performance of insurance companies (Basel Committee, 2013). These three dimensions are the key components of data quality that have a significant impact on auditor findings.

1.2.2 Internal Audit Performance

The purpose of the internal audit report is to act as a conduit for communication between internal audit and the management of the company. It is also established as a crucial guideline to enhance corporate management and guarantee its success (Katana, 2014). Nevertheless, a lot of research has been done on the audit committee's makeup, the management of internal audit quality, and the factors influencing internal auditors' assessments and choices. Hutchinson and Zain (2009) made a start in this direction by looking at the effect of internal audit staff members' accounting backgrounds and auditing experience on internal audit performance.

According to Pickett (2011), the purpose of an internal auditor report is to offer management with opportunities to pay attention. The following are presented in an internal audit report: difficulties, their root causes, effects, management's response, and recommendations. These reports help management make the necessary decisions and take the necessary steps in order to comply with regulations, manage risks, implement internal control procedures, and utilize resources profitably and effectively.

Internal audit findings and recommendations are considered to be value adding if they are accurate and relevant and can be used by senior managers to improve effectiveness of organization's operations, compliance to policies and regulations as well as guiding in making timely strategic decisions. According to Drogalas et al. (2015), the quality of internal audit findings and recommendations are affected by various factors such as: quality of the internal audit process, competence of the auditors, independence of internal audit and management support. A value adding internal audit report is clear, concise with actionable recommendations for implementation.

1.2.3 Internal Audit Professionalism

The internal auditor needs to prepare and carry out their task in a professional manner. It takes a lot of work to guarantee that this fundamental condition is met, but there are numerous informational resources we may consult for advice in this regard (Tackie, 2016). The ACCA contends that the term "profession" denotes a group of individuals who have studied a certain subject of knowledge or expertise and have attained a certain level of proficiency in it. In this study, professionalism was used to denote the practice of having the knowledge and skill required to efficiently audit information or data from the insurance companies. This

encompasses personality trait of the officers who successfully do their jobs and achieve organizational goals. The concept of Internal audit professionalism in this study focused on a confluence of abilities, characteristics, and knowledge that show through observable, quantifiable, and evaluable performance behaviors of both auditors and the company staff (Tackie, 2016).

The academic components from Nugroho (2022) were employed to describe professional elements as applied in this study. These components include: the assurance that the work was extremely important, the importance of having faith in one's ability to serve the public, the significance of having autonomy in carrying out the work, the encouragement of having one's own rules in the work, and the significance of affiliation with similar job types in other organizations. The elements are key in moderating the effect of data analytics dimensions on internal audit performance as used in this study.

1.2.4 Insurance Industry in Kenya

Kenya has 58 insurers and reinsurers, however CIC, Jubilee, Britam, ICEA, Lion General, and APA Insurance dominate the industry (IRA, 2022). Kenya's industry regulatory authority, the Insurance Regulatory Authority (IRA), is charged with policing and supervising the participants in the insurance market. A board of directors oversees activities on behalf of the regulatory authority as part of their fiduciary duty. It is also accountable for formulating policies and procedures that guarantee insurance companies are acting in accordance with the Insurance Act's requirements.

The Insurance Regulatory Authority (IRA), which was established by the Insurance (Amendment) Act Chapter 487, oversees the Kenyan insurance sector (National Council for Law Reporting & Attorney-General, 2019). The Authority's mandate includes regulating, overseeing, and fostering the growth of Kenya's insurance sector. There are 5 and 56 licensed insurance and reinsurance businesses in the nation as of January 2020, respectively (IRA, 2020). The Association of Kenya Insurers (AKI), which represents the participants in the insurance market, has as its objective "To support an enabling environment for their members, and promote growth and quality in the insurance industry."

AKI (2016) estimates a 3.4% insurance penetration rate, with life insurance making up at least 1.2% of that total. Kenya is ranked number 31 globally in the global competitive index, with South Africa leading Africa with a penetration rate of 16% of the GDP. According to the IRA (2020), revenue in the long-term insurance segment in Kenya increased by 12.6% in 2017 compared to 2016, while the general segment increased by

2.5%. During 2017, the industry's insurance premiums totaled Shs. 299 billion, an increase of 6.3%. In contrast, the insurance penetration decreased from 2.71% in 2016 to 2.68% in 2017. This shows how different insurance coverage parameters perform.

1.3 Statement of the Problem

For insurance enterprises, data is a crucial business and control asset, especially to support wise decisions during trying circumstances. Recently, inflation and exchange rates have been on the rise. In this situation, management efforts are required to deal with balance sheet volatility, improve exposure awareness, expand online channels, and optimize the product mix in the face of such escalating issues. Similar to what the business saw throughout previous recessionary cycles, price schedules for insurance can be disappointing, and more insurance fraud is likely. Good-quality information is more crucial than ever for marketing, pricing, underwriting, reserving, management control, claims management, and risk management as the digital revolution accelerates. Although the adoption of digital transformation by the insurance sub-sector has been credited with generating significant opportunities and improving operational efficiency, there has been a significant increase in the risks related to digital data relevance, confidentiality, accuracy, and security as private information exchanged on digital platforms has grown more vulnerable to hacking and cyber-attacks. (AKI, 2016).

Further, the implementation of IFRS 17–Insurance Contracts in 2021 brought significant challenges, which requires Insurance Companies to have more quality data at a granular level to meet the new reporting requirements. IRA (2020) reports that the insurance sector saw a 5 percent increase in the number of client complaints from 2,126 in 2017 to 2,233 in 2018 and 2019. Data related issues such as erroneous deductions, delayed settlement, and poor offers were the main complaints. Notably, over the time period under examination, only 63% of all complaints were handled (IRA, 2020).

There are various gaps from previous studies which the current research intends to fill. For instance, research by Alrashidi et al. (2022) on the impact of big data analytics quality on audit procedures provides no clear indication on how big data quality directly impacted on the performance of internal auditors. Further, research by (Allegrini et al., 2015 and Schneider, 2013) reveals that despite, the internal auditors playing a crucial role in any firm by adding value and making better attempts to accomplish goals, there still exists scandals in corporate governance and accounting. In this case, the gap on the reliability of data used for audit duties requires further analysis. In such cases, the aspect on technology advances and lax internal controls are blamed

for the rise in fraud instances seen in the Insurance sector (Wanyama & Olweny, 2013). In this case, the internal auditors are increasingly having to deal with issues from the past data, which demands quality for higher performance outcome. Therefore, the majority of internal audit findings are seen as routine operating problems. In light of this, the study set out to determine the effect of data quality dimensions on internal audit performance of insurance companies in Kenya.

1.4 Research Objectives

1.4.1 General Objective

The general objective of the study was to establish the effect of data analytics quality dimensions on internal audit performance of Insurance Companies in Kenya.

1.4.2 Specific Objectives

- i. To examine the effect of data security control on internal audit performance of insurance companies in Nairobi Kenya.
- ii. To examine the effect of data completeness on internal audit performance of insurance companies in Nairobi Kenya.
- iii. To examine the effect of data reliability on internal audit performance of insurance companies in Nairobi Kenya.
- iv. To determine the effect of time-related dimensions on internal audit performance of insurance companies in Nairobi Kenya.
- v. To assess the moderating effect of audit professionalism on data quality and internal audit performance of insurance companies in Nairobi Kenya.

1.5 Research Questions

- i. How does data security affect the internal audit performance of insurance companies in Kenya?
- ii. To what extent do data completeness affect internal audit performance of insurance companies in Kenya?
- iii. To what extent does data reliability affect internal audit performance of insurance companies in Kenya?
- iv. What is the effect of time-related dimensions on internal audit performance of insurance companies in Kenya?

- v. To what extent does audit professionalism affect the relations between data analytics quality dimensions and internal audit performance?

1.6 Scope of the Study

The study focused on the effects of data quality on internal audit performance in Insurance companies. The study was conducted in 2023 across Insurance companies in Kenya. The data covered information directed at the Insurance companies in Kenya that have their head offices in Nairobi, specifically the Chief Internal Auditors were the target respondents alongside their direct reports.

1.7 Significance of the Study

Theoretical contributions of the study

The study information will be valuable to academics and scholars in the future. It shall help improve knowledge of the impact of data quality dimensions on internal audit findings. Additionally, it could serve as a springboard for further research and contribute to the body of knowledge on data quality and internal audit findings in respect to the agency theory.

Practical contributions of the study

As a result of learning how data quality affects internal audit performance, the study's findings will be of tremendous importance to the management of insurance companies in Kenya. They may use this information to put plans in place to improve data quality, which helps in creating internal audits performance that are valuable. This may help the insurance companies' decision-making as well.

Policy contributions of the study

Policy makers will find the study's findings extremely valuable since they will be able to better understand how data quality influences internal audit performance in the insurance sector, which could aid in the development of policies aimed at improving data quality. Additionally, it can guarantee the caliber of audit performance within firms.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter describes the research's theoretical foundations and provides an overview of the pertinent empirical literature from earlier studies. The conceptual framework, critique of existing literature and chapter summary is described in this chapter.

2.2 Theoretical Review

2.1.1 Agency Theory

Meckling and Jensen are credited as the proponents of this model in 1976 (Jensen & Smith, 2000). An agency association, in accordance with the theory, is a sort of contract in which one or more parties (the principal(s)) appoint another party (the agent) to carry out particular activities on their behalf. This includes giving agents the power to make choices. According to Jensen & Smith (2000) explanation, agents' decisions and those that would maximize general welfare often vary. Owners' interests in this connection with principal agents are to maximize share value, but managers' interests are to expand the business and use company resources for their personal benefit.

The agency theory is criticized because it makes the unrealistic assumption that behavior and its results are largely uniform and simple to manage (Davis et al., 1997). For example, in a complicated network of dyadic relations, the simplicity of the binary choice between monitoring and the recommendation of incentives to manage the action or consequence is useless. The cost of avoiding opportunistic conduct is also usually overlooked by agency theorists, which is that it can stifle initiatives, creativity, entrepreneurship, and innovation in firms (Davis et al, 1997).

In the current study, it is the duty of an auditor to determine if financial statements prepared by agents are accurate and true and whether they were prepared in accordance with general accounting standards, this fits the agency theory explanations. The organization's management is held accountable to shareholders for its management through these audited financial statements. Auditor engagement is done on a contractual basis, as an agent, and is separate from agent management of business activities. In this context, the main function of audited accounting is to ensure accountability. Audit also aids in fostering stability and building confidence. The variables data completeness, accuracy as well as audit professionalism as represented by the auditors (agents) are supported by this theory.

2.1.2 Contingency Theory

In 1964, Austrian psychologist Fred Edward Fiedler proposed the idea of contingent leadership (Fiedler, 2015). The theory establishes a restrictive relationship between at least two free components and a necessary parameter, which is dependent on observational approval. This survey suggests that a company's performance affects how effective an internal audit is. The relationships between the special circumstance or variables such as timeliness, data security control, internal control, hierarchical performance systems, and in particular unshakeable financial revelation value are anchored by contingency theory (Fiedler, 2015).

However, using the contingency theory, a researcher might methodically add variables to explain or foresee expected phenomena. A conditional link between two or more independent variables and a dependent variable can be hypothesized using this theory, and its validity can be tested empirically. This provides one of the strengths of contingency theory (Fiedler, 2015).

According to the experimental investigation, internal auditors with broad and higher internal potential should assess the viability of internal controls, and the company will gain from organizational suitability through the internal control function skills. To get results, the audit team may use structure and contingency (Fiedler, 2015). It is a matter of inspecting the company finances and determining whether they comply with regulations in order to assess and establish company standards and production procedures. By ensuring that resources are employed wisely in line with knowledge and experience, their work's quality ensures an organization's confidence.

2.3 Empirical Review

2.3.1 Data Security Control and Internal Audit Performance

Gahi et al., (2016) conducted a study on the security and privacy problems of big data analytics. The purpose of the study was to weigh the advantages of using data analytics quality dimensions against the drawbacks of maintaining data security and privacy. The study contends that many considerations were necessary when creating a big data environment, including data privacy, useful computation of this data, quality of the type of data extracted, access controls to the data storages, and communication lines across the transfer of this data, among others. The article also discusses some controls that may be used to occasionally restrict access to this data. These controls included, among other things, the use of encryption, application of authentication, activity audits, and enforcement of legal requirements. The study explains the impact on how the business can advance its digital transformation strategy, however, it lacks clarification on what it takes to comprehend the technology that can unlock the value of big data.

Kavonga, (2017) in her research on the effect of a business continuity plan on the service delivery of insurance firms in Kenya, the author discovered that the majority of these companies used ICT systems to carry out their daily, crucial tasks. But there was a lot of laxity when it came to putting in place a continuity strategy for data protection or a backup to guarantee that system failures were kept to a minimum and that recovery times would be sped up in the event of a threat to their systems. The relation between the variables in this study reveals the influence that ICT system has on company's daily crucial tasks. The Technology acceptance theory anchors the findings of the study. The current study will fill the gap by determining the importance of data security on authenticity of audit information used.

Wahhab et al, (2022) studied the part internal audit plays in big data analysis and auditing, as well as how it affects the quality of financial reports. The study examined the most recent methodological advancements in auditing, including big data analysis and technological modifications, and discovered how big auditing data affected the nature of the relationship between the auditor and the client as well as how big auditing data affected the audit process. In the study by Alrashidi et al. (2022), evidence from the Middle East and the investigation were assessed using PLS-SEM to determine the effect of big data analytics on audit procedures. The investigation concluded that Middle Eastern auditors moderately rely on big data based on the evidence. According to the survey results, BDA has an impact on the auditing procedure. BDA facilitates the audit process for auditors to perform analytical procedures, analyze client risks, and comprehend and evaluate the internal control system. Where BDA contributes to auditors' understanding of the internal audit client and the external environment, which aids them in deciding whether to accept, not accept, or follow through on the audit engagement to provide relevant information. In-depth justification of the significance of data completeness on the outcome of the audit report will be provided by the current study.

Barzan (2018) looked into the elements that influence internal audits and their connection to organizational effectiveness. The degree to which the independent variables specified in the conceptual framework had an impact on organizational performance was evaluated using multiple regression. Ahmad (2018) looked at how internal audits affected the organizational performance of the top Jordanian banks using a sample of 364 employees. Notably, the effect of internal audit quality on the monetary performance of commercial banks in various nations has been studied by a number of scholars. However, the current study will delve not only on monetary issues but also importance of the authenticity of general information data necessary for internal auditing.

2.3.2 Data Completeness and Internal Audit Performance

Ebrahim & Rangan (2014) conducted a study on the effect of Internal Audit and organization performance. The purpose of this study was to propose a framework for the links between internal audit characteristics (IAC), such as professional credentials, the size, scope, and competency of the Chief Audit Executive (IA), and business performance. According to the study, internal audit is a crucial part of the organizational and corporate governance (CG) structure, which includes the actions of the board of directors and audit committees to guarantee the accuracy of the financial reporting processes. Reports of conceptual findings were made. If primary and secondary data had been used in equal measure, the research's findings might have been more thorough. By doing this, the investigation would have obtained responses that the secondary data would have omitted.

Mungal and Slippers (2015) assessed the caliber of internal auditors' reports. The quality and completeness of audit reports from the standpoint of auditors were the main research interests. The South African Reserve Bank's committee chairs participated in the study, which used structured questionnaires to collect data. The purpose of the study was to determine how respondents felt about the regular delivery of internal audit reports. It was discovered that not all internal audit functions produced reports with the proper clarity and concentration. Internal audit reports are valuable, according to the audit committee, but there is no opportunity for improvement. Comparatively speaking, relevant data produces more accurate audit results than irrelevant data. The auditing process takes longer because irrelevant data forces the auditors to consult with additional people. The current study looks into how relevance and accuracy of information will encourage more accurate internal audit performance.

Schroeder (2016) examined how audit completeness and quality affected the GAAP disclosures in earnings announcements. This study looked at how the external audit affected management's choice of how much GAAP financial information to reveal in the earnings report each year. A crucial piece of information that public firms disclose is the earnings release. Earnings announcements do not necessarily have to include audited GAAP statistics; in fact, recent trends indicate that most companies report their earnings before the end-of-year audit fieldwork is complete. In line with the study, companies that wait until the audit is complete at the time of the earnings announcement and who receive better audits provide balance sheet, cash flow statement, and total GAAP disclosures that are more extensive.

A study conducted by El-Gharboui and Chraibi (2021) measured how quality of information provided by the companies influenced their financial performance in Nigeria and used the independence of the internal auditor

and the internal audit committee as independent variables. They concluded that the audit's quality had a favorable and significant effect on financial performance. Additionally, Hazaea et al., (2020), performed research on the effect of internal audit quality on Yemeni commercial banks' financial performance. The independent variables that the authors used were the degree of internal auditor independence, adherence to internal audit standards, application of governance principles, scope of departmental internal audit, and frequency of audit committee meetings. The finding was that internal audit quality has a positive and significant impact on auditor performance (ElGharboui & Chraibi, 2021).

2.3.3 Data Reliability and Internal Audit Performance

According to The Courier (2020), the insurance industry's market dynamics had altered the environment inside the insurance sector with the introduction of the Internet of Things (IoT). According to the surveys, market segmentation, value-added services, aggressive competition, and product development provide reliable information for business growth in the insurance sector. In their analysis of non-life insurance price dynamics in China, Tian et al. (2018) pointed out that institutional and economic factors play a crucial role in determining price changes. The study found that non-life insurance prices were influenced by the gross domestic product, interest rates, stock market returns, and the costs of substitute products.

The foundation of any database, according to Overman et al. (2019), is reliable and comprehensive information. A company should carry out a rigorous, open, and objective verification process to ensure that the information it has is of the highest caliber. If they don't have these procedures in place, the information they do have cannot be trusted to appropriately inform participants and users of the information. In the process of making decisions, information about results is crucial. Therefore, has an impact on the reputation, policies surrounding health care, payment, etc.

These developments highlight the value of having a strong data verification process. Information can be confirmed in a variety of ways, including through on-site visits and document verification from a distant source. The advent of the central statistical verification approach, which offers real-time monitoring, is one significant development. The method of information verification can greatly increase the amount and quality of information while also reducing the impact of resource usage on users and the database (Overman et al., 2019). According to this study, the quality of data that may be used for auditing is improved by data completeness.

Tackie et al. (2016) studied the components that affect the efficiency of internal audits in Ghana's decentralized local government systems. The Metropolitan, Municipal, and District Assemblies (MMDAs) make up Ghana's local government. The Ashanti region of Ghana, which has the greatest number of MMDAs, was the study's primary area of interest. The rising interest in local government internal audits served as the study's driving force. The results of a descriptive survey that used questionnaire data showed that the majority of the internal audit employees of MMDAs in Ghana's Ashanti Region possess the necessary professional expertise. The link to the current study is on the idea that the current study extends the research to cover Insurance institution and data analytics quality dimensions as one of the factors influencing the performance of internal audits.

Saleh (2010) conducted research on internal audit, crucial success criteria, and data quality in cooperative firms in Indonesia. Researchers wanted to know what factors helped the selected corporate firms in Indonesia have better data quality in their accounting information systems (AIS). These organizations are the main economic players in Indonesia. According to recommendations made by directors in charge of the internal audit committees based on data analysis from these organizations, there may be a connection between the quality of AIS information and the role of internal auditors in implementing success criteria. There was a greater chance that the standard of the company would rise by concentrating on system engagement, the function of management reporting from internal auditors, increased commitment from middle management, and stability of AIS. The current study will provide further information on how data analytics quality dimensions influences the audit performance of other institutions for generalization purposes.

2.3.4 Time-related dimensions

The study by Woodall et al. (2013) can help businesses tailor the data quality evaluation procedure to their specific requirements for timeliness and organizational demands. The study doesn't offer detailed instructions on how to carry out any of the exercises. Combining a configuration guide with a practical understanding of the actions outlined in the work of Woodall and his colleagues would be beneficial. The current study employs a similar strategy to evaluate the correlations between variables as described in order to identify the crucial activities of data quality assessment based on timeliness.

van Wierst (2019) conducted a study on a process model for organizational data quality assessment. The study reveals the way data changes over time and how much their currency provides a key factor in defining data analytics quality. The study identifies three temporal dimensions of time-relatedness, which includes currency, volatility, and timeliness. This will be key in providing the aspect on how timeliness as an independent variable affects audit performance within various companies.

2.3.5 Audit Professionalism Moderating effect on Performance

A study by Ussahawanitchakit and Intakhan, (2011), focused on Audit professionalism, audit independence and audit effectiveness. This study set out to discover the effects of audit autonomy and professionalism on the efficiency of CPA audits in Thailand. The study's findings showed that an audit requires a deliberate and intentional effort on the part of the auditor, as well as awareness of their roles and responsibilities, best practices, and a high level of commitment based on predetermined norms and guidelines. The findings demonstrate that audit independence is significantly enhanced by audit professionalism. Additionally, audit effectiveness is significantly enhanced by both audit independence and audit professionalism. This study revealed a conceptual gap that requires an explicit theoretical and professional contributions, which the present study covered through the theoretical framework.

2.4 Summary of the Literature and Research Gap(s)

According to previous researchers (Schroeder, 2016; Overman and Clarke, 2014; El-Gharboui and Chraibi, 2021), the quality of integrated data aims to enhance the notification process, particularly with regard to administrative issues like analyses, management, and guidance throughout the short, medium, and long terms. The authors provide information that gives businesses the capacity to offer a complete picture of their performance confidently and succinctly in a connected, comparable manner. However, the various literature reviewed provides no clear indication on how data quality directly impact on the performance of internal auditors. Further, there is no clear indication revealing that the nature of performance of a project depends on the data all the way from initial stages which is a significant factor. Some of the studies only used the independence of the internal auditor and the internal audit committee as independent variables to determine the general performance neglecting the issue on quality of the data that they present. However, the current study will include use of relevant and quality data as a way of promoting more accurate internal audit findings. The data is accurate and free from falsification, distortion, and inaccuracy. Quality in this context refers to the accuracy of the accounting data in the financial reports. Reports must be written in accordance with a set of legal, regulatory, professional, and technical requirements in order to fulfill the purpose for which they are used.

Table 2.1: Summary of gaps in literature

Author (year)	Topic	Methodology	Results	Research gap	Contribution of the current study
Alrashidi et al. (2022)	Big data analytics' effects on auditing procedures	Descriptive research design	The findings indicate a moderate level of reliance on big data by Middle Eastern auditors. The survey results also show that Big Data Analytics has an impact on the auditing process.	There was no clear indication that BDA directly impacted on the performance of internal auditors. This showed a contextual gap	The current study shows how BDA directly facilitates the audit process for analytical procedures.
Ahmad (2018)	How internal audits impacted the efficiency of the leading Jordanian banks' organizations	Cross-sectional survey was the main method	The result reveals that the initial stage that concerns principles of success provides a significant factor concerning project performance. In	There was no clear indication revealing that the nature of performance of a project depends on the initial stage principles' applicable for project success, which is a significant	The various activities undertaken at the initial stages of the project provide key factors that ensures the project success.

			<p>this case, such principles should be considered for efficient delivery to clients.</p>	<p>factor. The study revealed a the methodological gap.</p>	
<p>Fatah et al., (2021).</p>	<p>A survey study of a few Iraqi banks examines the impact of internal audit on financial performance under IIA standards.</p>	<p>Descriptive research survey design was used.</p>	<p>The financial success of commercial banks is highly correlated with internal auditing standards.</p>	<p>There was no clear indication that the application of internal auditing standards influence banking activities in Iraq. There was a contextual gap in the study.</p>	<p>The current study reveals how improving data quality influence internal auditing and ultimately the financial performance of insurance companies.</p>
<p>El-Gharboui & Chraibi (2021)</p>	<p>How quality of information provided by the companies influenced their financial performance in Nigeria.</p>	<p>Exploratory research design was used.</p>	<p>The audit's caliber significantly and favorably impacted financial performance.</p>	<p>Only the internal auditor's independence and the internal audit committee were employed in the study as independent variables. The study revealed a</p>	<p>There was inclusion of other variables surrounding data quality.</p>

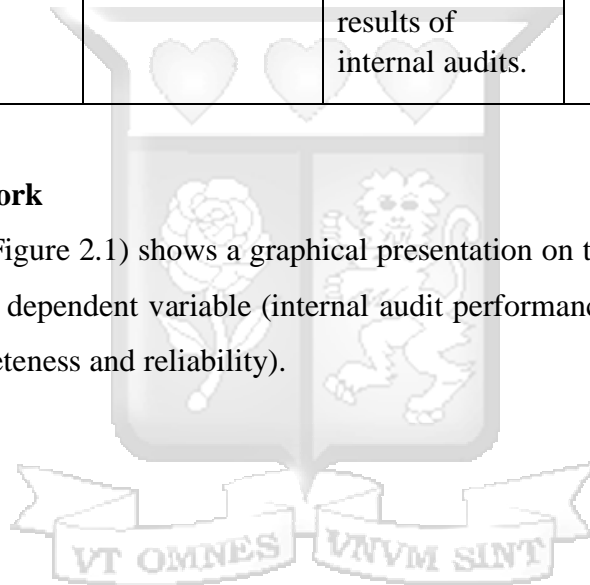
				methodological gap.	
Hazaea et al., (2020)	The effect of internal audit quality on Yemeni commercial banks' financial performance	Descriptive research design was used.	Financial performance is positively and significantly impacted by the quality of internal audits.	The study did not demonstrate how the frequency of audit committee meetings affected the effectiveness of the internal audit process. There was a conceptual gap in the study.	It is key that internal auditing considers all stages to ensure proper allocation of resources.
Schroeder (2016)	How the GAAP disclosures in earnings announcements were impacted by the completeness and quality of the audit.	Cross-sectional survey was used	The results shows that businesses those who postpone their earnings announcement until after a more thorough audit has been completed and those who	There was no clear guidance on the means of measuring the results from the GAAP disclosures. Methodological gap was revealed.	Quality reports comprise all data that articulates the outcomes of the company's operations.

			receive superior audits provide more thorough financial report disclosures.		
Tackie et al. (2016)	How Ghana's decentralized local government administrative systems affect internal audit effectiveness.	Descriptive research design was used.	The findings revealed that the majority of MMDA internal audit staff members in Ghana's Ashanti Region have the required level of professional experience.	The study only considered the rising interest in local government internal audits serving as the study's driving force but not data quality. There was the contextual gap in the study.	The current study considered all aspects of data quality as the driving force for internal auditing.
Mungal & Slippers (2015)	Evaluation of the quality of reports and effects on internal auditing.	Descriptive research design was used.	It was discovered that not all internal audit functions produced reports with the proper clarity and concentration.	The quality and completeness of audit reports from the standpoint of auditors were the exclusive subject of the research. Methodological gap was identified.	The use of relevant data will promote more accurate internal audit findings.

Saleh (2010)	Data quality, internal audit, and important success elements in Indonesian cooperative firms.	Exploratory research design was used.	Internal auditors' responsibilities and the application of success factors are somehow related to the accuracy of AIS data. Thus, firms' provision of high-quality data would enhance the results of internal audits.	The study focused only on selected corporate enterprises in Indonesia. The study revealed a contextual gap.	The current study provides information on the relationship existing between internal auditor's role and nature of data used.
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2.5 Conceptual Framework

The conceptual framework (Figure 2.1) shows a graphical presentation on the relationship between variables of the study. In this case, the dependent variable (internal audit performance) and the independent variables (data security control, completeness and reliability).



Independent Variables

Dependent Variable

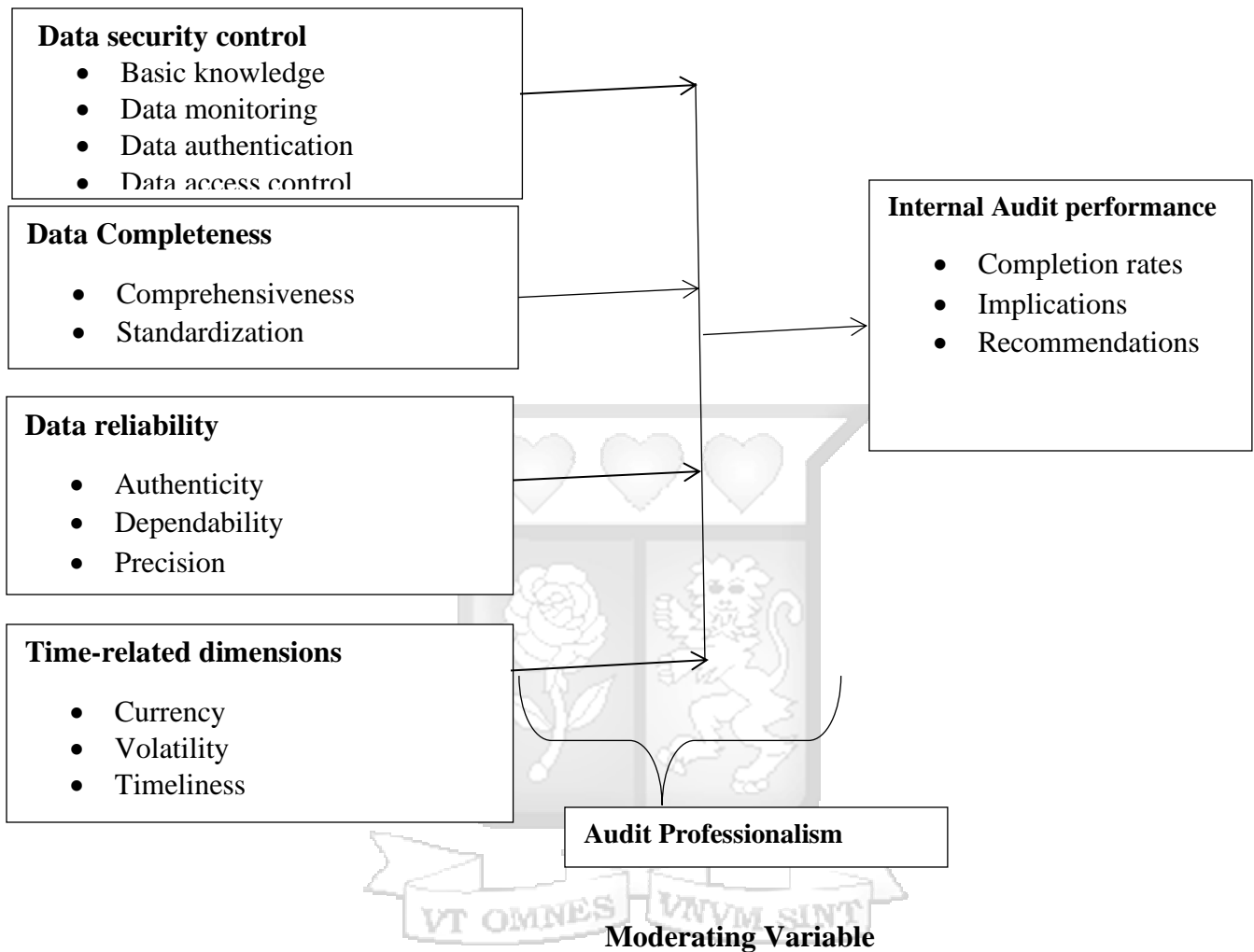


Figure 2.1: Conceptual framework (Source: Researcher, 2023)

2.5.1 Operationalization of the Variables

Data Reliability

The degree to which the data's content is consistent with the user's area of interest is known as data dependability. Corrected pertinent data enhances the reliability of internal audits. Internal audit competency and dependability is one of the four components of the internal audit code of ethics in this study. This code required internal audit to have the necessary skill, experience, and knowledge to perform the services (Onay & Erdoan, 2019). For the internal audit role to be reliable, technical proficiency is crucial. Internal auditors

must possess competence, according to IIA requirements. ISPPIA 1210 stipulates that internal auditors must have the knowledge, abilities, and other competencies required to perform each of their unique duties. Furthermore, one of the main responsibilities of top managers is to guarantee that internal audit departments have the abilities to do their obligations collaboratively or to acquire such abilities.

Internal auditors should think about continuous professional development if they want to maintain their operations in a changing company environment. If the internal audit profession is to take on new roles in risk management and corporate governance, internal auditors must acquire a new set of skills. Furthermore, according to Onay and Erdoan (2019), internal auditors need to have the skills and knowledge to take on projects that do not conflict with the characteristics of their line of work in industries like corporate risk management, governance, compliance, and information technologies.

Data Security Control

The foundation of sound business decisions is high-quality data. Data security regulations are put into place to safeguard sensitive and priceless information or to offer a defense against its unauthorized use. These security measures help to reduce, identify, and prevent security risks to computer systems, data, or other collections of information. It is necessary to measure your data in order to guarantee its security and authenticity. Software and actions involved with storing, retrieving, or acting on data kept in a database are referred to as data accessibility. The measures for data security will be basic knowledge, authenticity and validity.

The definition emphasizes the independent and unbiased nature of internal audit and calls for the use of secure data in internal auditing. In this instance, independence and the concept of authenticity are closely associated (Stewart & Subramaniam, 2010). International Standards for the Professional Practice of Internal Auditing (ISPPIA) defines secure data as the absence of elements that could compromise objectivity and the appearance of objectivity. Such a threat needs to be managed both at the level of the individual internal auditor and at the level of the internal audit department in the functional context. For the profession of internal audit, independence is a need (Fatah et al., 2021).

Data Completeness

Complete data is precise and reliable. An indication of whether or not data are complete is referred to as completeness. The data resource has all the information required to satisfy both the present and future audit demands. The aforementioned elements in data improve internal audit performance.

In addition to making sure that transactions are initiated, recorded, processed, and reported in line with the claims made by management and shown in the financial statements, management support is in charge of producing and maintaining a complete data for internal control (Fatah et al., 2021). In order to sustain completeness of data with the best performance possible, management must assist internal audit, which, according to the firm's organizational structure, is positioned as the senior management team's strategic thought partner. Senior management is in charge of creating the conditions that allow the internal audit function to perform its duties within the organization. For internal audit to preserve its independence, it must adhere to data completeness criteria or have management's support. Internal audit managers and auditors should have the support of top management to improve audit effectiveness (Fatah et al., 2021).

Time-related dimensions

This will serve as one of the independent variables. In this case, the time-related dimensions comprise of data's currency, which reveals the frequency of data update (Ballou et al., 1998). It can be explained in terms of the time between getting a data unit and giving it to a customer or the most recent database update. Volatility is the period of time during which data is accurate. Currency, volatility, and timeliness will be used as indicators for this variable.

Internal Audit Performance

Internal audit activity (IAE) has been linked to the effectiveness of internal audit methods, internal audit features, and internal audit activity outcomes. The features of the audit team, the audit process, and organizational relationships have an impact on IAE (Fatah et al., 2021). Additionally, the criterion for IAE is the extent to which managers adopt the recommendations of the internal audit. How successfully an organization's internal audit department operates has a big impact on its success. In order to determine the factors that affect IAE, extensive research has been done on samples made up of participants from both sides who requested and provided internal audit services. The International Standards for the Professional Practice of Internal Auditing (ISPPPIA) served as the primary framework for the identification of the aspects that needed

to be looked at in order to define IAE. Additionally, factors like national economic situations, regulatory public institution guidelines, and the industry in which the academic models were developed were influenced by environment.

Moderating effect of Audit Professionalism

The auditor must be qualified to perform a professional audit of the financial statements. Professional internal audits' capacity to not only spot internal control weaknesses but also to report audit results, foresee them in the future, and recommend modifications guarantees that the services provided are of the highest standard and are accountable for (Tackie, 2016). With appropriate conditions and the auditor's influence, contingency theory-based audit professionalism can be achieved. The internal auditor's influence, in the form of the auditor losing his independence, will have an impact on his professional capacity to conduct audit operations and deliver high-quality information. The auditor's use of his professional abilities in audit activities can also be increased by variables outside of the auditor, such as organizational commitment to improving the audit of professional abilities through education and training. Internal audit performance is impacted by audit professionalism (Tackie, 2016).

Table 2.1: Operationalization of variables

Variable	Category	Indicators	Metrics
Internal Audit Performance	Dependent variable	<ul style="list-style-type: none"> Improvements due to implemented recommendations Ability to plug data on income leakages, wastage and financial improprieties 	<ul style="list-style-type: none"> Percent of the planned audit engagements finalized. Number of problems identified and recommendations made. The proportion of timely implemented recommendations
Data Security Control	Independent variable	<ul style="list-style-type: none"> Authentication process Nature of available data 	<ul style="list-style-type: none"> Comparing logically linked characteristics of an activity's conduct. Execute or manage in a predetermined amount of time
Data Reliability	Independent variable	<ul style="list-style-type: none"> Timeliness Consistency Uniqueness 	<ul style="list-style-type: none"> Test-retest Interrater

Data Completeness	Independent variable	<ul style="list-style-type: none"> • The percentage of expected reports actually submitted. • Missing data 	<ul style="list-style-type: none"> • Completeness Ratio (the proportion of values in a dataset that are not missing). • Outlier analysis
Time-related dimensions	Independent variable	<ul style="list-style-type: none"> • Currency • Volatility 	<ul style="list-style-type: none"> • Quantity of up-to-date data/information
Audit professionalism	Moderating variable	<ul style="list-style-type: none"> • Staff internal audit skills 	<ul style="list-style-type: none"> • Staff competence



CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The research techniques used for the study's data collecting and analysis are described in this chapter. The research design, target demographic, sample design, data collecting, and data collection instruments, as well as data analysis and ethical considerations, are all specifically covered.

3.2 Research Philosophy

This study adopted an epistemological research philosophy guided by the positivist paradigm (Tamminen & Poucher, 2020). According to Saunders et al. (2009), epistemology is the study of what knowledge is deemed appropriate in a certain field of study. It takes into account opinions of the best approaches to understanding the nature of the universe, what knowledge is, and what defines the sources and boundaries of knowledge. According to Saunders et al. (2009), epistemology is the theory of the process of knowing existing to expand this into a set of reality, how what exists may be known, and what requirements must be met for anything to be referred to as knowledge.

The positivist paradigm served as the foundation for this study's research methodology (Saunders et al., 2009). The positivist research paradigm is based on the notion that theory should come before data and that statistical evidence from testable hypotheses should support conclusions. Working with observable social reality is required in positivism, and the results may resemble generalizations of laws found in the physical and scientific sciences. This paradigm places a strong focus on an unbiased view of science and is frequently linked to quantitative approaches that rely on the researcher's capacity to compile numerical evidence of the phenomenon under study and analyze it to provide an answer to the research question (Saunders et al., 2009). The positivist paradigm with an element of epistemology will be used in this study because it allows for the reporting of findings as they are observed and the explanation of the new knowledge that is learned from the investigation. In this study, the goal of this research philosophy is to discover the truth concerning the internal audit performance through fact observation and measurement of the data quality from the Insurance companies where the generalization about their performance is derived (Cohen et al., 2011).

3.3 Research Design

The research design provides an outline for answering the research questions, this study utilized an explanatory research design. Venkatesh et al. (2013) refers to research design as the method applicable in acquiring data

by the researcher and which enables the researcher to be able to answers questions efficiently. The research design applicable in this study helped to improve the ability of the research in conceptualizing the operational plan and variables. The study employed an explanatory research methodology, which involves obtaining data that answers the research questions. When there is little information available, explanatory design investigates the causes of events (Pandey & Pandey, 2021). The design was used in this study because it helped in understanding the study's topic, how or why the process occurs, and coming up with future forecasts.

3.4 Population and Sampling

The study focused on licensed insurance and reinsurance firms with headquarters in Nairobi City County. In 2021, the number of licensed insurance companies remained at 56 (Appendix I) with 5 reinsurance firms providing a total of 61, which was the target population (Insurance Industry report as cited in IRA, 2020). These businesses, which make up the study's target population, were further divided into non-life, life, reinsurance, and composite insurance.

The officers of the insurance companies served as the unit of analysis. On the other hand, the unit of observation comprised of the various insurance companies. Generally speaking, **finance, underwriting, claims, operations, technology, human resource and business development** made up the seven functional areas of business management in such companies. The senior managers who work in the corporate headquarters and are directly in charge of these functional areas were the respondents. In this instance, the population size was made up of 427 functional area heads from the 61 insurance companies (7 functional areas × 61 firms = 427).

3.5 Sampling Procedure

The process of choosing a representative sample from the target population is called sampling (Saunders et al., 2009). The study used stratified random sampling techniques to select the sample size. To create an acceptable sample for the aim of gathering empirical data, proportionate stratified random sampling and basic random sampling was sequentially carried out.

3.5.1 Sample size determination

Using the Yamane formula, which presumes a normal distribution, a 95% level of confidence, and a precision level of 0.05, the suitable sample size was determined (Yamane, 1967 as cited in Adam, 2021).

$$n = N/1+N*e^2$$

$$n = 427/1+ 427(0.05)^2 = 427/2.0675 = 206.5 = \underline{207}$$

Based on the categories specified by the Insurance Regulatory Authority, the stratified random sampling formulae was applicable to determine the population size from each category that was included in this study.

Table 3.1: Sample size

Category	Total population	Sample size calculation	Sample size
Life	174	$(207/427) * 174$	84
Non-life	108	$(207/427) * 108$	52
Reinsurance	60	$(207/427) * 60$	29
Composite	85	$(207/427) * 85$	41
Total	427		206

(Author, 2020)

3.6 Data Collection Methods

The study used questionnaire as data collection instrument. The instrument included questions that are based on the study's goals, research questions, and hypotheses (Saunders et al., 2009). The respondents were asked to rate each statement on a 5-point Likert scale. To answer the questions concerning the effectiveness of data quality and the effect on internal audits of insurance companies in Nairobi County.

3.6.1 Developing Data Collection Instrument

The development of the equipment needed for the measurement of variables during the data gathering process is a crucial stage. This is since the procedure makes the required adjustments to fit the study and prevent biased outcomes. In the development of the questionnaire as a quantitative instrument, a number of steps were followed. First, the conceptualization of the objectives of the study was done to capture the key components of the study. Then a clear definition of the variables as well as the constructs measured in this study. Afterwards, a multi-item questionnaire containing a five-point item scales was developed. This would allow for the collection of a complete and accurate data in a logical manner. The procedure of using both open-ended and closed ended questions enables the researcher to obtain reliable conclusions from the various observations in the field. Secondly, there was a clear definition of the target population from where the data was to be collected and the channels applicable in reaching the respondents. In this case, personal contact was preferred. Thirdly, the researcher settled on the content of the questionnaire whereby we used open-ended and closed-ended questions taking the form of a Likert scale. In this case, each question focuses on answering the research questions as established in the research design.

3.6.2 Data Collection procedure

The quantitative data was obtained through self-administered questionnaires (Blumberg, Cooper & Schindler, 2013). Participants were given the questionnaires at their individual offices, where they filled them out and then leave them for the researcher to collect later. Before completing the questions, the participants must sign consent forms provided by the researcher.

3.7 Data Analysis

The quantitative data was examined using regression analysis. In this situation, values were given as the unit of measurement for the data via descriptive statistics. The data was presented using tables and charts. The data was also examined using inferential statistics (Blumberg et al., 2014), which included a Pearson correlation analysis of the study's variables.

The ordinal regression method was employed in this work to model the relationship between the ordinal outcome variable and the independent variables. The outcome variable was evaluated using a five-point, ordered categorical Likert scale. It is unreasonable to assume normality and homogeneity of variance for an ordered categorical result. Because it draws parallel lines across all levels of the categorical outcome as opposed to assuming normality and constant variance, the ordinal regression model proves to be a more useful modeling tool as a result. Researchers can estimate the impact of independent and explanatory variables on the outcome/dependent variable using the ordinal regression method.

Multiple regression analysis was used to examine the independent variables' capacity to predict performance. Gaining a deeper understanding of the relationship between a number of independent factors and a dependent variable is the main goal of multiple linear regression. It is preferable to first present simple linear regression, the most basic type of linear regression, in order to fully comprehend the notion of multiple linear regression. Only one independent variable, X, can be handled by simple linear regression and one dependent variable, Y, which is a linear function of X. For any value x_i of variable X, the following equation gives the value y_i of variable Y:

$$Y_i = \alpha + \beta x_i + e_i \dots \dots \dots (i)$$

When more than one independent variable ($X(X_1, X_2, X_3, \dots, X_n)$) is linearly dependent on the dependent variable (Y), multiple linear regression, which is effectively a collection of many basic linear regressions, is utilized. Multiple regression analysis was used in this study to ascertain the association between data quality and internal audit performance of Kenyan insurance companies. The study obtained linear regression results for each variable. The overall regression model was as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \dots\dots\dots(ii)$$

Whereby:

X_1 = Data Accessibility X_2 = Data Completeness X_3 = Data Relevance Further,

β_1, β_2 and β_3 = Regression Coefficients,

β_0 = Constant and ε = Error term

3.7.1 Moderation Regression model Analysis

By identifying the moderating impact of audit professionals on the relationship between data quality characteristics and internal audit performance, moderated regression analysis was employed to answer specific objectives (i)-(iv). The straightforward guideline is that whenever investigating the moderator effect, the individual elements of any goods must always be taken into account (Troy et al., 2008). Troy et al. (2008) asserts that unlike other regression models, the model for moderator analysis is not additive. Because of this, un-standardized coefficients rather than standardised coefficients are used to interpret the model's coefficients (Whisman and Mc Clelland, 2005). In order to ascertain the association between the explanatory variables; data quality dimensions, audit professionalism, and the dependent variable, internal audit performance, moderator analysis was used.

Multicollinearity issues in the estimation of regression coefficients might arise because moderated regression analyses (MRA) involve multiplicative components that may be highly correlated with their constituents (Cohen & Cohen, 1983). This issue was solved by mean centering, a technique that has been shown to reduce multicollinearity in multiplicative regression models (Howell, 2007). This involved computing interaction terms before mean centering all the variables.

In order to evaluate the moderating effects of audit professionalism on the link between data analytics quality factors and internal audit performance, a moderated regression analysis was carried out in this respect. In this process, the independent variable, the possible moderating variable, and the cross-product interaction term between the independent variable and the potential moderating variable are all regressed against each other. The moderating variable is recognised to have a significant impact on the construction of the relationship between internal audit performance and the criterion variable if the cross-product interaction term results in a significant change in the R-square value (significantly increases the measure of variance factored in the criterion variable). However, a method known as mean centering was used to make sure that all construct measures were mean centred prior to computing interaction terms so as to prevent multicollinearity in a multiplicative regression model.

3.8 Research Quality

3.8.1 Reliability

How consistently a procedure analyzes something is referred to as its reliability. The measurement is said to be reliable if the same outcome can be consistently obtained using the same procedures under the same conditions. The internal reliability test of the questions in the questionnaire was tested by use of Cronbach Alpha's reliability coefficient, α . In this case, a greater internal consistency is revealed when α moves closer to 1.0 of the items in the scale (Venkatesh et al, 2013). Cronbach proves the level of variable reliability as well as consistency. In testing for the reliability, when the alpha value is at 0.7 or greater, then the instrument is acceptable and considered reliable.

3.8.2 Validity

The degree to which a measure's results accurately represent the variable for which they were created is referred to as validity. Both construct and content validities were applicable in the study. Construct validity is the ability to deduce test results from the concept that is being researched, while content validity is the instrument's ability to effectively cover all the material that it should with regard to the variable. In this study, content validity was ensured with the assistance of the supervisor (Blumberg et al., 2014).

3.9 Ethical Issues in Research

Data was coded to ensure protection of the respondents' identities, guaranteeing their confidentiality and right to anonymity. The researcher provided respondents with sufficient and accurate information about the study so that they may decide whether or not to participate in it. When managing, the information provided by the

respondents, the researcher maintained a strict level of secrecy. The researcher obtained permission from relevant authorities and institutions.



CHAPTER FOUR

RESULTS

4.1 Introduction

The various statistical techniques used to examine the impact of data analytics quality dimensions on internal audit performance of Insurance companies are discussed in this chapter. Descriptive and inferential statistics are used to display and analyze field data.

4.2 Response Rate

In the field data collection 203 of the 206 expected respondents were able to complete and return the questionnaires, yielding a 98% response rate. Since Sekaran (2016) claims that any response rate above 75% is considered to be optimum, the response rate was thought to be satisfactory. This indicates that the response rate was quite good.

4.3 Profile of the Respondents

The study sought to determine the various profile of the respondents such as gender, education level and service period within the current company. The table 4.1 displays the results on respondent demographics.

Table 4.1: Demographics of Respondents

Gender			
		Frequency	Percent
Female		95	48.5
Male		101	51.5
Total		203	100.0
Education Level			
		Frequency	Percent
Degree		117	59.7
Masters		45	23.0
PhD		34	17.3
Total		203	100.0
Service period			
		Frequency	Percent
1-5 years		74	37.8
6-10 years		87	44.4
Above 11 years		35	17.9
Total		203	100.0

(Author, 2023)

The work history as indicated in table 4.1 revealed that 37.8% of the respondents have between one to five years of employment duration. Then 44.4% of the respondents had worked in the respective companies between six and ten years, and 17.9% for more than eleven years. The results indicate that majority have been employed for over five years within respective organizations. This is a clear indicating that they had a higher to average degree of experience. When asked what level of education they had attained, the respondents revealed that 59.7% of them had a bachelor's degree, 23% had a master's degree, 10% and the least number of respondents 17.3% had a Ph.D. As a result, they had the information necessary to thoroughly analyze the study objectives, which demonstrates that the majority of respondents in this study had a university degree as their highest level of education.

4.4 Exploratory Factor Analysis

Exploratory factor analysis (EFA) approach was used to represent covariance or relationships among scale variables that are normally distributed in a simple way. EFA was used to test the validity, reliability and suitability of observed variable on the four constructs. In this case, the levels of construct or factor validity (suitability) in the given dataset regarding the relationships among themselves was assessed (Lowry & Gaskin, 2014). A sample of 203 observations was used in the analysis thus satisfying the minimum sample size of 200. Moreover, other underlying assumptions for including normality, reliable correlations and multi collinearity were met.

The Maximum Likelihood (ML) extraction method was desired in this analysis due to its statistical proficiencies. ML was a preferred extraction to other extraction methods like Principle Component Extraction, provided in SPSS, because it was the most comparable to CFA. In the conceptual Model, six factors were specified, and these factors were also justified by Eigen values greater than 1. The factor loadings were ordered by size and a constraint of 0.3 was used to omit values lower than it.

In this dataset, as indicated in the table 4.2 below, we had 2 factor matrices exceeding the threshold of 0.3 and thus correlation was assumed. As the data had variables that were more correlated to each other, it was noted that the constructs were not orthogonal (or rather were correlated) and thus the promax rotation method was adopted. As exhibited in past studies, if no factors had any of their variances exceeding 0.32 threshold, then verimax, equamax or orthomax methods of rotation could have been used as the orthogonal rotation alternatives.

Table 4.2: Factor Correlation Matrix

		Correlation Matrix^a					
Factor		PFM3	DA3	DC3	DR3	TRD3	ADTPrf3
Correlation	PFM3	1.000	.086	.112	.132	.399	.348
	DA3	.086	1.000	.610	.053	.024	.003
	DC3	.112	.610	1.000	.305	.244	.032
	DR3	.132	.053	.305	1.000	.563	-.086
	TRD3	.399	.024	.244	.563	1.000	.029
	ADTPrf3	.348	.003	.032	-.086	.029	1.000

a. Determinant = .260 (

b. DS – Data Security Control, DC – Data Completeness, DR – Data Reliability, TRD – Time-relatedness Dimension, ADTPrf – Audit Professionalism

(Author, 2023)

Further, Kaiser Meyer Olkin (KMO), which determines whether or not variables can be grouped into a smaller set of the major constructs, was used in this study to further examine the suitability of how the constructs suited the data.

KMO evaluated how well each model variable was sampled and how much variance there is between different variables. A KMO score greater than 0.8 typically denotes adequate sampling. Bartlett's test of sphericity was found to be significant at 45 degrees of freedom, $p < 0.0001$, while the KMO value was satisfactory at 0.825. Table 4.3 displays Kaiser-Meyer-Olkin (KMO) result statistics that are higher than the conventional probability value of 0.5 and over 0.60 for an adequate sample. This suggests that the sample size was suitable for factor analysis.

Table 4.3: Kaiser-Meyer-Olkin and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.825
Bartlett's Test of Sphericity	Approx. Chi-Square	1862.234
	df	45
	Sig.	.000

(Author, 2023)

Thus since the Bartlett's test of Sphericity was significant, it implies that the construct variables had relationships among themselves. Using the method of latent root, scree test (Appendix I) and percentage of covariance explained that all constructs were retained which depicted 78.24% of the total variance explained.

All the factor loadings were greater than 0.57, which is in line with the general rule of thumb that sets a minimum of 0.55 factor loading (Table 4.4).

Table 4.4: Factor Loading

	Communalities	
	Initial	Extraction
PFM3	1.000	.715
DA3	1.000	.845
DC3	1.000	.817
DR3	1.000	.767
TRD3	1.000	.804
ADTPrf3	1.000	.746

Extraction Method: Principal Component Analysis.

(Author, 2023)

4.5 Descriptive Statistics

This section presents the descriptive study findings based on the mean and standard deviation of the variables. Data security, data completeness, data reliability and time-relatedness dimension were the components employed as the study's independent variables. In this instance, the outcome variable internal audit performance of Insurance Companies. The primary goal of the study was to determine how data quality analytics factors affected the internal audit performance of the Insurance companies in Nairobi County. Table 4.5 lists the findings based on means and standard deviations computed from responses given on a 5-point Likert scale. The responses' degrees of agreement on the measures used were reflected by the data collected on this scale. The standard deviation, in particular, gauges how much the responses deviate from the true mean. In this instance, an SD of roughly 1 indicates that the respondents' answers to the questionnaire's study questions varied.

Table 4.5: Descriptive Statistics

	DS	DC	DR	TRD	PfM
Mean	2.689	2.323	1.612	1.950	2.319
Std. Deviation	1.165	.871	.728	.988	.441

(Author, 2023)

4.6 Inferential Statistics

The goal of the study was to determine the effect of data analytics quality dimensions on internal audit performance of Insurance Companies in Kenya. The following variables were looked into: Data security

control (DS), Data Completeness (DC), Data Reliability (DR), Time-relatedness dimension (TRD) and organization performance (PFM). This also included the moderating effect of audit professionalism.

4.6.1 Correlation Analysis

The relationship between the independent and dependent variables was examined and verified using the Spearman correlation analysis. The symbol ‘ ρ ’ stands for an evaluation of the strength of a linear relationship between two items. By identifying the variable that best reflected how data analytics quality affected the internal audit performance of Insurance Companies in Kenya, it thus assisted in determining the strengths of the connection in the model.

The non-parametrical correlation test shows that there is statistical significant correlation between data security control and internal audit performance of insurance companies ($N = 203, \rho = .114; p < .05$). Additionally, the correlation coefficient is statistical significant $p < .05$. However, there is a statistical significant positive correlation between data security control and data completeness ($\rho = 0.603$).

The non-parametrical correlation test shows that there is a statistical significant correlation between data completeness and internal audit performance of insurance companies ($N = 203, \rho = .108; p < .05$).

The non-parametrical correlation test shows that there is also a statistical significant correlation between data reliability and internal audit performance of insurance companies ($N = 203, \rho = .083; p < .05$).

The non-parametrical correlation test shows that there is a statistical significant positive correlation between time-relatedness dimension and internal audit performance of insurance companies ($N = 203, \rho = .400; p < .05$). Although the correlation is statistical significant, the effect is moderate. In other words this effect shows that there is positive, if moderate, association between time-relatedness dimension and internal audit performance. There is also a statistical significant positive correlation between data completeness and data reliability ($N = 203; \rho = .344$), time-relatedness dimension and data completeness ($N = 203; \rho = .232$) and time-relatedness dimension and data reliability ($N = 203; \rho = 0.610$).

Further, the moderation variable audit professionalism was significant at $p=0.0001$ and the non-parametrical correlation test shows presence of a statistical significant positive correlation between audit professionalism and internal audit performance of insurance companies ($N= 203; \rho = 0.250; p < .05$). This shows that audit

professionalism affected positively and significantly the relationship between the independent and dependent variables. As a result, it was generally agreed in the research that there was a true, substantial correlation between the dependent and independent variables.

Table 4.6: Bivariate Spearman’s Correlation

			PFM2	DA2	DC2	DR2	TRD2	ADTPrf
Spearman's rho	PFM2	Correlation	1.000					
		Coefficient						
		Sig. (2-tailed)	.					
		N	203					
	DA2	Correlation	.114	1.000				
		Coefficient						
		Sig. (2-tailed)	.006	.				
		N	203	203				
	DC2	Correlation	.108	.603**	1.000			
		Coefficient						
		Sig. (2-tailed)	.027	.000	.			
		N	203	203	203			
	DR2	Correlation	.083	.093	.344**	1.000		
		Coefficient						
		Sig. (2-tailed)	.023	.189	.000	.		
		N	203	203	203	203		
	TRD2	Correlation	.400**	.042	.232**	.610**	1.000	
		Coefficient						
		Sig. (2-tailed)	.000	.550	.001	.000	.	
		N	203	203	203	203	203	
ADTPrf	Correlation	.250**	-.029	-.027	-.137	-.012	1.000	
	Coefficient							
	Sig. (2-tailed)	.000	.684	.706	.051	.863	.	
	N	203	203	203	203	203	203	

** . Correlation is significant at the 0.01 level (2-tailed).

(Author, 2023)

4.7 Ordinal Logistic Regression Analysis

In this study, ordinal logistic regression is chosen to analyze the data using explanatory variables linked to the dependent variable. There are various choices to be made when building an ordinal regression model. In this case, the aspect of identifying the ordinal outcome variable comes first, then making choice on which

predictors to include in the model's location component follows. Finally, the choice of the connection function that best suits the study data is made at the end.

Goodness-of-fit statistics assist in determining whether the model adequately describes the data. Deviance is a useful metric for assessing goodness of fit. The model provides a considerable improvement over the baseline intercept-only model, according to the significant chi-square statistic. In this case, the difference between Intercept Only Model and Final Model was significant $p = 0.0001$, hence the model adequately fitted the data. In essence, this means that the model provides more accurate predictions than would be possible if we simply made educated guesses based on the outcome categories' marginal probabilities.

Table 4.7: Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	1071.591			
Final	956.240	115.350	60	.000

Link function: Negative Log-log.

The Goodness of Fit statistic indicates a poor fit if the significance value is less than 0.05. In this case, the model adequately fitted the data ($P > 0.05$) (Table 4.8). For the model to adequately fit the data the model fitting information should be significant (< 0.05) while the goodness-of-fit insignificant (> 0.05) (Table 4.8). Generally, the goodness-of-fit test refers to measuring how well the observed data correspond to the fitted (assumed) model.

Table 4.8: Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	3229.890	3580	1.000
Deviance	933.103	3580	1.000

Link function: Negative Log-log.

(Author, 2023)

The model summary reveals the Pseudo R-Square (Table 4.9), which means that it is not technically explaining the variation. But they can be applicable as approximate variation in the criterion variable. These approximations are produced because it is not possible to compute a single statistic that embodies all the features of the linear regression model for regression models with a categorical dependent variable. The

coefficient of determination is calculated using the subsequent techniques. The R-square formula developed by Cox and Snell (1989) is based on the comparison of the model's log likelihood to that of a baseline model. Even with a "perfect" model, it has a theoretical maximum value of less than 1 for categorical outcomes. An altered version of the Cox & Snell (R-square) was developed by Nagelkerke (1991), who changed the scale of the statistic to include the entire range from 0 to 1. Another variation is McFadden (1974), which is based on the log-likelihood kernels for the intercept-only model and the entire estimated model. By this metric, the model with the highest statistic is considered to be the "best". The numbers in Table 4.9 show that, by these standards, the fitting model is satisfactory. In the case of Ordinal Regression, McFadden value of R-Square is applicable, whereby, the R-Square value was (1.0). R-Square is a measurement of the proportion of total variance in the dependent variable that the independent variable can account for. The data had a perfect fit to the linear model, as shown by an R-square of 1.0 in table 4.9.

Table 4.9: Pseudo R-Square

Cox and Snell	.996
Nagelkerke	1.000
McFadden	1.000
Link function: Negative log-log	

(Author, 2023)

The assumption of Ordinal Logistic Regression (OLR) was that the various Odds falling into the higher (vs. Lower) category on the dependent variable were the same across categories. In other words, the effects of the predictors were the same across the levels of the dependent variable. In this case, the Odds of the predictor falling into the categories on the dependent variable were the same across the response categories.

The test of parallel lines for the models in this study aids in determining whether the presumption that the parameters are the same for all categories is reasonable. In this test, a model with a single set of coefficients for all categories is put up against a model with a different set of coefficients for every category. Table 4.10 demonstrates that, in this case, when the measured significant level is high, the assumption is reasonable. The p-value is expected to be insignificant ($p=1 > 0.05$). The significant Test of Parallel lines would mean that probability of falling to a higher category does not vary across categories on the dependent variable for the predictors.

Table 4.10: Test of Parallel Lines

Test of Parallel Lines ^a				
Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	956.240			
General	.000 ^b	956.240	1140	1.000

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.

a. Link function: Negative Log-log.

b. The log-likelihood value is practically zero. There may be a complete separation in the data. The maximum likelihood estimates do not exist.

(Author, 2023)

Parameter estimates and an overview of each predictor's impact are provided in Table 4.11. The relative values of the coefficients for component levels and the sign of the covariate coefficients provided crucial information about the effects of the model's predictors. Positive (negative) coefficients for variables denoted favourable (inverse) correlations between predictors and result. An increasing value of a covariate with a positive coefficient indicated a larger likelihood of falling into one of the categories with "higher" cumulative outcomes. When it comes to factors, a factor level with a higher coefficient indicated a higher likelihood of falling into one of the groups with "higher" cumulative outcomes. The influence of a factor level in relation to the reference categories affected how a coefficient for that factor level was spelt out.

Table 4.11: Parameter Estimates

Parameter Estimates								
		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[PFM3 = 1.00]	.590	.356	2.740	1	.098	-.108	1.288
	[PFM3 = 1.14]	.679	.355	3.666	1	.056	-.016	1.374
	[PFM3 = 1.29]	.944	.355	7.066	1	.008	.248	1.640
	[PFM3 = 1.43]	1.174	.359	10.709	1	.001	.471	1.877
	[PFM3 = 1.57]	1.530	.367	17.369	1	.000	.810	2.249

	[PFM3 = 1.71]	1.827	.375	23.776	1	.000	1.093	2.562
	[PFM3 = 1.86]	2.075	.381	29.664	1	.000	1.329	2.822
	[PFM3 = 2.00]	2.279	.386	34.822	1	.000	1.522	3.035
	[PFM3 = 2.14]	2.774	.398	48.510	1	.000	1.994	3.555
	[PFM3 = 2.29]	3.166	.408	60.357	1	.000	2.367	3.965
	[PFM3 = 2.43]	3.500	.416	70.942	1	.000	2.685	4.314
	[PFM3 = 2.57]	3.794	.423	80.444	1	.000	2.965	4.623
	[PFM3 = 2.71]	4.240	.436	94.399	1	.000	3.385	5.096
	[PFM3 = 2.86]	4.615	.451	104.792	1	.000	3.732	5.499
	[PFM3 = 3.00]	4.968	.468	112.428	1	.000	4.049	5.886
	[PFM3 = 3.14]	5.396	.498	117.540	1	.000	4.421	6.372
	[PFM3 = 3.29]	6.114	.575	112.946	1	.000	4.986	7.241
	[PFM3 = 3.43]	6.528	.643	102.997	1	.000	5.267	7.789
	[PFM3 = 3.71]	6.822	.705	93.637	1	.000	5.440	8.204
	[PFM3 = 3.86]	7.234	.815	78.847	1	.000	5.637	8.831
Location	DS3	0.082	.080	2.747	1	.006	.025	.298
	DC3	0.061	.109	.649	1	.027	.325	.136
	DR3	0.116	.125	.852	1	.035	.362	.130
	TRD3	0.673	.126	28.525	1	.000	.426	.920
	ADTPrf3	0.402	.071	30.745	1	.000	.260	.545

Link function: Negative Log-log.

(Author, 2023)

Data security control (DS) was a significant positive predictor of internal audit performance of the insurance companies in Nairobi. For every one unit increase on data security control, there is a predicted increase of 0.082 in the log-odds of higher internal audit performance of insurance companies. This is an indication that the insurance company with high level of data security control was more likely to experience high performance on internal audit.

Data completeness revealed a significant positive predictor in the model. In this case, for every one unit increase on data completeness, there is a predicted increase of 0.061 on the internal audit performance of the insurance companies.

Data reliability (DR) and Time-relatedness dimension (TRD) also revealed significant positive predictors of internal audit performance of the insurance companies in Nairobi. For every one unit increase on data reliability and time-relatedness dimension, there is a predicted increase of 0.116 and 0.673 respectively in the log-odds of higher internal audit performance of insurance companies. This suggests that an insurance business was more likely to perform well on internal audit if it had a high level of trustworthy and timely data. Importantly, audit professionalism was a significant moderator on the relationship between the independent (DS and DC) and the dependent variable (PFM) with $p=0.0001$.

4.8 Establishing the Moderating Effect of Audit professionalism on the Relationship between data analytics quality dimensions and internal audit professionalism

The fifth objective of the study sought to establish whether the relationship between data quality dimensions and internal audit performance was moderated by audit professionalism. Using moderated regression analysis (MRA), the research question for this target was actually realised. This was motivated by the realisation that a suitable moderating variable could improve a weak link between variables (Judd et al., 2014). Furthermore, by including the contextual aspects in the form moderator variables, conflicting study findings, particularly with regard to internal audit performance, can be eliminated. The study investigated the relationship between internal audit performance and the characteristics of data analytics quality. This approach used hierarchical regression, which requires inputting internal audit performance and data quality dimensions variables in step 1, and then entering the interaction variable (which is audit professionalism) in step 2. Standardised values were utilised for the interaction variable to lessen concerns of multi-collinearity by lowering the extent of any

high correlation of independent and dependent variables with the new interaction (Ondoro, 2014). The summary regression coefficients are shown in Table 4.12.

Table 4.12: Estimated Regression Coefficients for Variables in the Effect of Audit professionalism on the Relationship between Data analytics quality dimensions and internal audit performance Model

		Coefficients ^a					Collinearity Statistics	
Model		Unstandardized Coefficients		Standardized Coefficients		Sig.	Tolerance	VIF
		B	Std. Error	Beta	t			
1	(Constant)	1.680	.136		12.376	.000		
	DS3	.049	.042	.095	1.147	.000	.605	1.654
	DC3	.015	.061	.022	.248	.000	.545	1.834
	DR3	.109	.065	.135	1.689	.000	.645	1.550
	TRD3	.379	.062	.478	6.084	.000	.672	1.488
2	(Constant)	1.123	.164		6.866	.000		
	DS3	.056	.040	.109	1.401	.000	.604	1.656
	DC3	.034	.057	.049	.601	.001	.543	1.841
	DR3	.065	.061	.080	1.058	.000	.633	1.579
	TRD3	.352	.059	.444	6.011	.000	.667	1.499
	ADTPrf3	.178	.033	.329	5.403	.000	.980	1.021

a. Dependent Variable: PFM3

(Author, 2023)

Table 4.12 displays the standardised (β) and unstandardized (B) coefficients for internal audit performance and data quality dimensions with and without the interaction term. When presenting the moderation coefficient, the un-standardized coefficient should be utilised because it depicts simple effects rather than the main effects that are revealed in the additive regression model (Whisman and McClelland, 2005). Without the interaction factor, B for the data quality dimensions are DS = .056, DC= .034, DR= .065 and TRD = .352, which are all significant at (p=0.000). The B coefficients after the inclusion of the interaction term for data quality dimensions and interaction term were (DS = .049, DC= .015, DR= .109 and TRD = .379) and Audit professionalism ADTprf =.178 respectively. As a result, the moderation model was confirmed to be;

$$Y = 1.123 + .049X_1 + .015X_2 + .109X_3 + .379X_4 + .178Z + \varepsilon \dots\dots\dots(iii)$$

In the model, the intercept and the XY slope is under influence by the Z (moderating variable) intercepts as well as the slopes of line YX. The unstandardized co-efficient of the moderator model is = .178. This denotes that for each unit increase in Z, the slope relating X to Y increases by .178. Further implication is that as data

quality dimensions increases by one unit, the audit performance of insurance companies improves by (.178). Notably, the summary statistics for the moderator regression model is shown in table

Table 4.13: Model Summary of Effect of Audit professionalism on the relationship between data analytics quality dimensions and internal audit performance

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics			Sig. F Change
						F Change	df1	df2	
1	.254 ^a	.065	.060	.56084	.065	13.865	1	201	.000
2	.428 ^b	.183	.175	.52536	.119	29.066	1	200	.000

a. Predictors: (Constant), Data analytics quality dimensions (DS, DC, DR, TRD)

b. Predictors: (Constant), Data analytics quality dimensions (DS, DC, DR, TRD), ADTPrf3

(Author, 2023)

The table 4.13 revealed the full model 2 where data quality dimensions was the independent variable and audit professionalism as the moderator. The model is significant at ($R^2 = .183$, Adjusted $R^2 = .175$, $F(1,200) = 29.066$, $p = 0.000$). This shows that the relationship between data analytics quality and internal audit performance of insurance companies is moderated by audit professionalism. In comparison to the reduced model 1, which only include predictor variables, the addition of the moderator variable in the full model significantly increases the R^2 by $= .118$; $p = 0.000$ or 11.8%. Even though the change was small, it was statistically significant. The differences in the two cases of R^2 for each of the model are less than a ceiling of 0.5 (Field, 2005). The noted low shrinkage between R^2 and adjusted R^2 in each of the models depict both models as valid and stable for the prediction of the dependent variable, internal audit performance, at 7% and 18.3% variance respectively. The influence to detect moderation effects is often low because of the small effect sizes as observed in social science (Judd et al., 2014). The findings concur with the study by Ussahawanitchakit and Intakhan, (2011), who observed that internal audit performance is significantly enhanced by audit professionalism

4.9 Discussion of Findings

The results of the Ordinal regression analysis show that the data quality analytics dimension variables (Data security control and data completeness) had a positive impact on the performance of the internal audit of insurance companies, which is consistent with the results of Fatah et al., (2021), Gharboui & Chraibi (2021), Hazaea et al., (2020) and Saleh (2010). While formal data quality frameworks are still largely focused on

customized methods for commercial applications, they are primarily deployed to comply with requirements. However, acquiring clients' trust, maintaining efficient operations on data security and completeness as well as high performance all depend on having high-quality information. Further, the aspect on inclusion of the moderating variable audit professionalism provides evidence that the level of professionalism of an auditor enables them to determine if financial statements prepared by agents (agency theory) are accurate and true and whether they were prepared in accordance with general accounting standards, this fits the agency theory aspect that anchored the study variables.

The ordinal regression coefficients revealed that when data completeness, data reliability and time-relatedness dimension of data analytics quality are held constant, a unit increase in data security control will lead to a .082 increase in the internal audit performance of the insurance companies. The results correlates with the findings of Gahi et al., (2016) who conducted a study on the security and privacy problems of big data analytics. Further, when data security control and time relatedness dimension of data analytics quality are held constant, a unit increase in data completeness will lead to a 0.061 increase in the internal audit performance of the Insurance firms. The findings reflect the sentiments of van Wierst (2019) who conducted a study on a process model for organizational data quality assessment. The positive correlations between the variables of this study timeliness, data security control, data reliability and performance systems all reflected the appropriate application of the contingency theory. This is since the theory provided the much needed conditional link between the various independent variables.

Data assets rarely receive the same level of attention as other organizational assets, despite the fact that data's relevance is rising due to the digital revolution. Although recent studies have proven that the value of data can be quantified using methods for the evaluation of intangible assets, one reason for this is the lack of widely accepted methodology for the valuation of data assets. Depending on the specified level of data quality, these methodologies estimate opportunities and hazards resulting from the use of data in a particular context. Therefore, the first stage in any project's journey towards data management should be to formulate a data strategy and tie data activities to value-based business goals.



CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This section provides the summary, conclusion, recommendations and suggestions for further studies subsections for this study.

5.2 Summary

The main objective of the study was to establish the effects of data analytics quality dimensions on the performance of the internal audit amongst Insurance companies in Kenya. With regard to internal audit performance of Insurance sector in Kenya, the study primarily intended to focus on the following specific objectives: first to examine the effect of data security control on internal audit performance of insurance companies. Secondly, to examine the effect of data completeness on internal audit performance of insurance companies. Thirdly, to examine the effect of data reliability on audit internal audit performance of insurance companies in Nairobi Kenya. Fourth, to determine the effect of time-related dimensions on internal audit performance of insurance companies in Nairobi Kenya and to assess the moderating effect of audit professionalism on data quality and internal audit performance of insurance companies in Nairobi Kenya. A small-scale survey involving 206 respondents was used to collect quantitative data.

The first objective examined the effect of data security control on internal audit performance of insurance companies. The results indicated that data security control as an aspect of data quality analytics plays a key role when it comes to internal audit performance. The results show thus (N = 203, Mean = 2.689, SD = 1.165, $\rho = .114$; $p < .05$ and B = 0.082).

The second specific objective was to examine the effect of data completeness on internal audit performance of insurance companies. The results showed thus, (N = 203, Mean = 2.323, SD = .871, $p < .05$, B=0.061) study revealed that data completeness had a statistically significant relationship with internal audit performance since p-value was less than 0.05 significant value.

Third objective was to examine the effect of data reliability on audit internal audit performance of insurance companies in Nairobi Kenya. The results were as follows; (Mean = 1.612, SD = .728). This reveals that data

reliability ($p > 0.05$) had no statistically significant relationship with internal audit performance of insurance companies in Nairobi.

The fourth objective was to determine the effect of time-related dimensions on internal audit performance of insurance companies in Nairobi Kenya. The results were as follows; (Mean = 1.950, SD = 0.988), from the factor analysis time-related dimensions was found to have no influence to internal audit performance.

5.3 Conclusion

The main objective of the study was to establish the effects of data analytics quality dimensions on the performance of the internal audit amongst Insurance companies in Kenya. The findings indicated the importance of data quality analytics and its effect on the internal audit performance. The study concluded that insurance companies' internal audit performance in Nairobi has been significantly and favorably impacted by two characteristics of their data quality analytics (data security control and data completeness). Data security control and data completeness were found to have a significant favorable impact on internal audit performance, while data reliability and time-relatedness dimension had no major impact on performance. The mean of between 2 and 3 from the study results and a SD value of either 1 or close to one was a strong indication that the information provided by the respondents were varied and did not deviate far away from the expected outcome responses.

The management and governance requirements should serve as the foundation for data quality management, and these vary as the scope shifts. The overarching enterprise data governance program should be adhered to and followed by all stated processes, policies, and procedures. Therefore, the management should assist in prioritizing areas for implementing data quality by identifying important procedures that contain crucial data.

5.4 Recommendations

The knowledge base has benefited significantly from this research. New information and understanding have been produced that directly contribute to the extent data analytics quality dimensions impacts the outcome of internal audits in companies. These fresh perspectives should significantly advance the role of the data quality and the comprehension of analytical approach for assessing overall performance on internal audits.

Although some costs, such as those associated with making poor decisions as a result of inadequate data, are difficult to assess, a risk-based approach to data management offers the executive suite a number of glaring and compelling advantages. A risk-based approach should be considered to enhance decision-making and

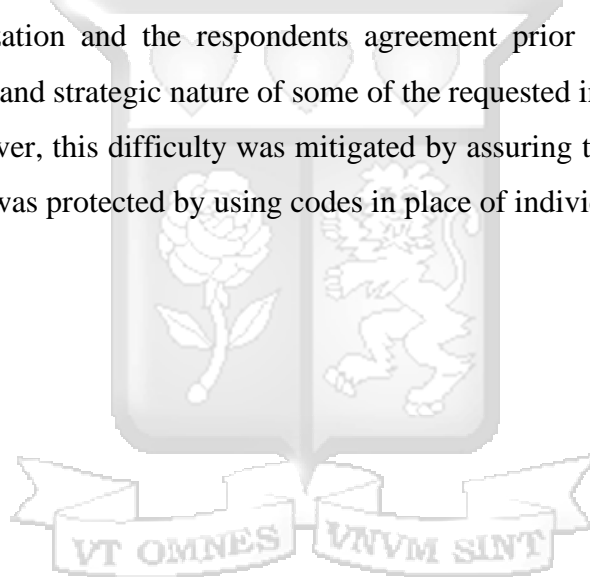
trustworthy reporting for Chief Executive Officers who are focused on increasing revenues, cutting operational costs, adhering to regulations, and developing confidence with stakeholders and consumers.

5.5 Suggestion for Further Research

It is advised that further research be conducted on how laws and policies governing other data analytics quality dimensions not included in this research affect internal audit performance in other companies besides insurance companies.

5.6 Study Limitations

This study aimed to establish the effect of data analytics quality dimensions on internal audit performance of Insurance Companies in Kenya. Because of policy requirements and the nature of the target respondents; the researcher had trouble reaching them while conducting this study. This constrain was reduced by use of the NACOSTI research authorization and the respondents agreement prior to asking them to complete the questionnaires. The sensitive and strategic nature of some of the requested information presented a barrier for the researcher as well. However, this difficulty was mitigated by assuring the respondents that anonymity in processing the research data was protected by using codes in place of individual respondent's identities.



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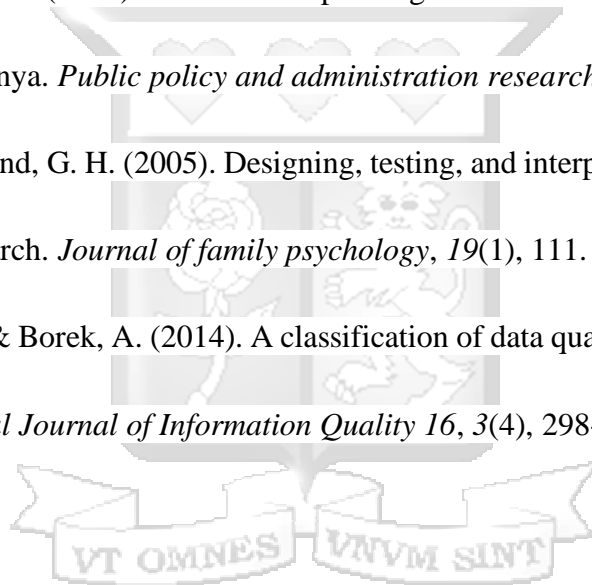
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APPENDICES

APPENDIX I: LETTER OF INTRODUCTION



12th May 2023

Ms Mbithi Esther,
esther.mbithi@strathmore.edu

Dear Ms Mbithi,

RE: Effect of Data Quality on Internal Audit Performance of Insurance Companies in Kenya

This is to inform you that SU-ISERC has reviewed and **approved** your above **SU-masters** research proposal. Your application reference number is **SU-ISERC1734/23**. The approval period is from **12th May 2023 to 11th May 2024**. This approval is subject to compliance with the following requirements:

- i. Only approved documents including (informed consents, study instruments, MTA) will be used.
- ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by SU-ISERC.
- iii. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to SU-ISERC within 72 hours of notification.
- iv. Any changes anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to SU- ISERC within 72 hours.
- v. Clearance for the export of biological specimens must be obtained from relevant institutions.
- vi. Submission of a request for renewal of approval at least 60 days prior to the expiry of the approval period. Attach a comprehensive progress report to support the renewal.
- vii. Submission of an executive summary report within 90 days of completion of the study to SU-ISERC.

Before commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology, and Innovation (NACOSTI) [https://research- portal.nacosti.go.ke/](https://research-portal.nacosti.go.ke/) and obtain other clearances needed.

Yours sincerely,

A handwritten signature in blue ink, appearing to read "Ambrose Rachier".

for:



Mr Ambrose Rachier,
Chairperson; SU-ISERC

Ole Sangale Rd, Madaraka Estate. PO Box 59857-00200, Nairobi, Kenya. Tel +254 (0)703 034000 Email admissions@strathmore.edu www.strathmore.edu

APPENDIX II: RESEARCH QUESTIONNAIRE/INTERVIEW GUIDE

Part A: Demography of Respondents

1. Gender: Male Female

2. Period of Service in the Organization
 - 1-5 years
 - 6-10 years
 - Above 11 years

3. Highest Level of Education
 - Degree
 - Master's
 - PhD

Part B: Data Security Control

4. Indicate your level of agreement on the following statements on the relationship between data security control and internal audit performance of insurance companies in Kenya. 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5 =Strongly Agree.

Measures	1	2	3	4	5
There is some level of objectivity and professional judgement amongst the internal auditors					
The data used has minimal invalid entries					
There are control access to data					
The system and data are regularly updated as part of the organization's culture					
The organization uses data from multiple sources					
The data is always monitored for intrusion					

5. Indicate other factors that impact the relationship between data accuracy and internal audit performance of insurance companies in Kenya?

.....

Part C: Data Completeness

6. Indicate your level of agreement on the following statements on the relationship between data completeness and internal audit performance of insurance companies in Kenya. 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5 = Strongly Agree.

Measures	1	2	3	4	5
I am able to check completeness of data using basic data analytical tools like excel					
There are no data duplicates reported					
Risk of accessing outdated information is minimized due to the availability of unique data					
Data retrieved contains adequate information needed for auditing					
Data conveys the correct message about the organization					
The Insurance's management provides a transparent verification process in establishing accuracy of audit data					
Internal Audit schedules audits to monitor the source data quality					
Our Insurance's input data controls are very effective					
Our Insurance's input data controls are very reliable					

7. Indicate other factors that impact the relationship between data completeness and internal audit performance of insurance companies in Kenya?

.....

Part D: Data Reliability

8. Indicate your level of agreement on the following statements on the relationship between data reliability and internal audit performance of insurance companies in Kenya. 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5 = Strongly Agree.

Measures	1	2	3	4	5
Data is free from error hence can be easily be analyzed by auditors					
Data is recorded exactly as intended					
Data is easily reproduced					
Data is aligned with the expected audit need/requirement					
Data conforms with the relevant regulatory standards					
Data provided is timely (up to date)					
Manual effort required for reconciliation and remediation of data-quality issues					
There is effective communication between Internal Audit and other department on the available audit data					
The auditors may consult on any inappropriate information					

9. Indicate other factors that impact the relationship between data relevance and internal audit performance of insurance companies?

.....

Part E: Time-related dimensions

10. Indicate your level of agreement on the following statements on the relationship between Time-related dimensions and internal audit performance of insurance companies in Kenya. 1= Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5 = Strongly Agree.

Measures	1	2	3	4	5
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The data is frequently updated and free from error					
The data remains accurate for fairly longer time					
High volatility data is present depending on the season					
The organization provides more current and accurate data for audit requirement					
Data provided is timely (up to date)					

Part F: Internal Audit performance of Insurance companies in Kenya

11. Indicate your level of agreement on the following statements about internal audit performance. 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5 = strongly agree.

Measures	1	2	3	4	5
Internal Audit carries out Data Quality/Data Driven audits					
The mistakes identified from audit data are analyzed in the internal audit performance					
Collection and analysis of data a crucial aspect of the Internal Audit strategy					
Internal Audit performance on data, is driven primarily by regulatory compliance needs; no focus on data quality					
Impact of data quality on audits is measured and communicated in the internal audit performance					
Suggestions on how to improve organization data is recorded in the internal audit performance					
Data doesn't get enough board and senior management attention (e.g., seen as an IT issue, not considered a business asset)					
Audit professionalism moderates the effect of data analytics quality and internal audit performance					

APPENDIX III: LIST OF ALL LICENSED INSURANCE COMPANIES IN KENYA (IRA, 2022)

1. AAR Insurance Company Limited
2. Africa Merchant Assurance Company Limited
3. AIG Kenya Insurance Company Limited
4. Allianz Insurance Company of Kenya Limited
5. APA Insurance Limited
6. APA Life Assurance Company Limited
7. Absa Life Assurance Kenya Limited
8. Britam General Insurance Company (K) Limited
9. Britam Life Assurance Company (K) Limited
10. Metropolitan Cannon General Insurance Company Limited
11. Metropolitan Cannon Life Assurance Limited
12. Capex Life Assurance Company Limited
13. CIC General Insurance Company Limited
14. CIC Life Assurance Company Limited
15. Corporate Insurance Company Limited
16. Directline Assurance Company Limited
17. Fidelity Shield Insurance Company Limited
18. First Assurance Company Limited
19. GA Insurance Limited
20. GA Life Assurance Limited
21. Geminia Insurance Company Limited
22. Geminia Life Insurance Company Limited
23. ICEA LION General Insurance Company Limited
24. ICEA LION Life Assurance Company Limited
25. Intra Africa Assurance Company Limited
26. Invesco Assurance Company Limited
27. Kenindia Assurance Company Limited
28. Kenya Orient Insurance Limited
29. Kenya Orient Life Assurance Limited
30. KUSCCO Mutual Assurance Limited
31. Liberty Life Assurance Kenya Limited
32. Madison Insurance Company Kenya Limited
33. Madison General Insurance Kenya Limited
34. Mayfair Insurance Company Limited
35. Occidental Insurance Company Limited
36. Pacis Insurance Company Limited
37. MUA Insurance (Kenya) Limited
38. Pioneer General Insurance Company Limited
39. Pioneer Assurance Company Limited
40. Prudential Life Assurance Company Limited
41. Saham Assurance Company Kenya Limited
42. Sanlam General Insurance Company Limited



43. Sanlam Life Insurance Company Limited
44. Takaful Insurance of Africa Limited
45. Tausi Assurance Company Limited
46. The Heritage Insurance Company Limited
47. Jubilee Life Insurance Limited
48. Jubilee Allianz General Insurance (K) Limited
49. Jubilee Health Insurance Limited
50. The Kenyan Alliance Insurance Company Limited
51. The Monarch Insurance Company Limited
52. Trident Insurance Company Limited
53. UAP Insurance Company Limited
54. UAP Life Assurance Limited
55. Xplico Insurance Company Limited
56. Equity Life Assurance (Kenya) Limited



APPENDIX IV: ANALYSIS RESULTS OUTPUT

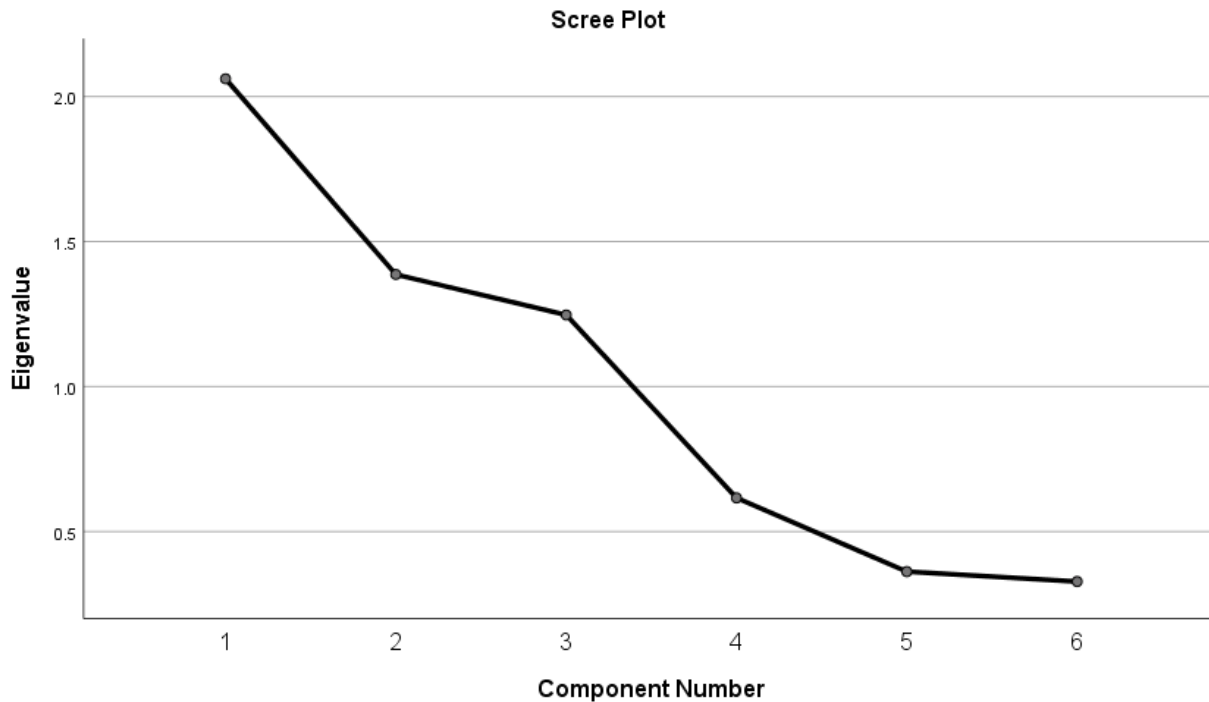
Total Variance Explained							
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings ^a
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	2.061	34.351	34.351	2.061	34.351	34.351	1.803
2	1.386	23.107	57.458	1.386	23.107	57.458	1.673
3	1.247	20.783	78.241	1.247	20.783	78.241	1.419
4	.616	10.268	88.509				
5	.362	6.030	94.539				
6	.328	5.461	100.000				

Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.



Appendix IV b: Scree Plot



Appendix IV c: Case Processing Summary

Case Processing Summary			
		N	Marginal Percentage
PFM3	1.00	6	3.0%
	1.14	1	0.5%
	1.29	4	2.0%
	1.43	5	2.5%
	1.57	11	5.4%
	1.71	13	6.4%
	1.86	14	6.9%
	2.00	13	6.4%
	2.14	32	15.8%
	2.29	23	11.3%
	2.43	17	8.4%
	2.57	13	6.4%
	2.71	16	7.9%
	2.86	10	4.9%
	3.00	7	3.4%
	3.14	6	3.0%
	3.29	6	3.0%
	3.43	2	1.0%
	3.71	1	0.5%
	3.86	1	0.5%
4.00	2	1.0%	
There is some level of objectivity and professional judgement amongst the internal auditors	Strongly Disagree	48	23.6%
	Disagree	89	43.8%
	Neutral	28	13.8%
	Agree	11	5.4%
	Strongly Agree	26	12.8%
	6	1	0.5%
The data used has minimal invalid entries	Strongly Disagree	66	32.5%
	Disagree	52	25.6%
	Neutral	31	15.3%
	Agree	21	10.3%
	Strongly Agree	33	16.3%
Data is protected from using passwords	Strongly Disagree	72	35.5%
	Disagree	43	21.2%

	Neutral	28	13.8%
	Agree	23	11.3%
	Strongly Agree	37	18.2%
Data accuracy fosters is part of the organization's culture	Strongly Disagree	66	32.5%
	Disagree	47	23.2%
	Neutral	32	15.8%
	Agree	21	10.3%
	Strongly Agree	37	18.2%
The organization uses data from multiple sources	Strongly Disagree	74	36.5%
	Disagree	44	21.7%
	Neutral	27	13.3%
	Agree	22	10.8%
	Strongly Agree	36	17.7%
There are minimal procedures in accessing data	Strongly Disagree	68	33.5%
	Disagree	45	22.2%
	Neutral	30	14.8%
	Agree	16	7.9%
	Strongly Agree	44	21.7%
I am able to check completeness of data using basic data analytical tools like excel	Strongly Disagree	26	12.8%
	Disagree	47	23.2%
	Neutral	65	32.0%
	Agree	26	12.8%
	Strongly Agree	39	19.2%
There are no data duplicates reported	Strongly Disagree	53	26.1%
	Disagree	51	25.1%
	Neutral	30	14.8%
	Agree	24	11.8%
	Strongly Agree	45	22.2%
Risk of accessing outdated information is minimized due to the availabilityof unique data	Strongly Disagree	58	28.6%
	Disagree	52	25.6%
	Neutral	26	12.8%
	Agree	22	10.8%
	Strongly Agree	45	22.2%
Data retrieved contains adequate information needed for auditing	Strongly Disagree	90	44.3%
	Disagree	46	22.7%
	Neutral	10	4.9%
	Agree	15	7.4%
	Strongly Agree	42	20.7%
	Strongly Disagree	97	47.8%

Data conveys the correct message about the organization	Disagree	42	20.7%
	Neutral	10	4.9%
	Agree	15	7.4%
	Strongly Agree	39	19.2%
The Insurance's management provides a transparent verification process in establishing accuracy of audit data	Strongly Disagree	121	59.6%
	Disagree	40	19.7%
	Neutral	2	1.0%
	Agree	10	4.9%
Internal Audit schedules audits to monitor the source data quality	Strongly Agree	30	14.8%
	Strongly Disagree	135	66.5%
	Disagree	57	28.1%
	Neutral	5	2.5%
	Agree	2	1.0%
Our Insurance's input data controls are very effective	Strongly Agree	4	2.0%
	Strongly Disagree	113	55.7%
	Disagree	68	33.5%
	Neutral	16	7.9%
	Agree	5	2.5%
Our Insurance's input data controls are very reliable	Strongly Agree	1	0.5%
	Strongly Disagree	124	61.1%
	Disagree	62	30.5%
	Neutral	13	6.4%
Valid	Agree	4	2.0%
		203	100.0%
Missing		0	
Total		203	

Appendix IVd : Explanatory variables based on the ordinal regression model with negative log-log link

Parameter Estimates								
		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[PFM3 = 1.00]	-4.326	1.867	5.369	1	.021	-7.985	-.667
	[PFM3 = 1.14]	-4.267	1.866	5.230	1	.022	-7.924	-.610
	[PFM3 = 1.29]	-4.055	1.863	4.737	1	.030	-7.707	-.404
	[PFM3 = 1.43]	-3.832	1.861	4.240	1	.039	-7.479	-.184
	[PFM3 = 1.57]	-3.458	1.858	3.463	1	.063	-7.100	.184
	[PFM3 = 1.71]	-3.136	1.857	2.852	1	.091	-6.776	.503
	[PFM3 = 1.86]	-2.850	1.856	2.356	1	.125	-6.488	.789
	[PFM3 = 2.00]	-2.596	1.856	1.956	1	.162	-6.234	1.042
	[PFM3 = 2.14]	-1.996	1.855	1.157	1	.282	-5.632	1.640
	[PFM3 = 2.29]	-1.543	1.854	.692	1	.405	-5.177	2.092
	[PFM3 = 2.43]	-1.158	1.853	.390	1	.532	-4.790	2.475
	[PFM3 = 2.57]	-.805	1.853	.189	1	.664	-4.437	2.827
	[PFM3 = 2.71]	-.261	1.854	.020	1	.888	-3.894	3.372
	[PFM3 = 2.86]	.178	1.856	.009	1	.924	-3.460	3.815
	[PFM3 = 3.00]	.597	1.860	.103	1	.748	-3.048	4.243
	[PFM3 = 3.14]	1.126	1.869	.363	1	.547	-2.537	4.790
	[PFM3 = 3.29]	2.033	1.899	1.146	1	.284	-1.690	5.756
	[PFM3 = 3.43]	2.585	1.932	1.791	1	.181	-1.200	6.371
	[PFM3 = 3.71]	3.039	1.967	2.389	1	.122	-.815	6.894
	[PFM3 = 3.86]	3.889	2.041	3.630	1	.057	-.112	7.891
Location	[B1=1]	.133	1.079	.015	1	.902	-1.982	2.248
	[B1=2]	.568	1.068	.283	1	.595	-1.525	2.662
	[B1=3]	.490	1.072	.209	1	.648	-1.610	2.590
	[B1=4]	.715	1.166	.376	1	.540	-1.570	3.000
	[B1=5]	-.446	1.096	.166	1	.684	-2.594	1.701
	[B1=6]	0 ^a	.	.	0	.	.	.
	[B2=1]	-1.536	.990	2.404	1	.121	-3.477	.405
	[B2=2]	-1.909	.906	4.439	1	.035	-3.685	-.133
	[B2=3]	-2.073	.862	5.784	1	.016	-3.763	-.384
	[B2=4]	-1.576	.932	2.861	1	.091	-3.402	.250
	[B2=5]	0 ^a	.	.	0	.	.	.
	[B3=1]	.889	.809	1.209	1	.271	-.696	2.475

[B3=2]	1.751	.762	5.283	1	.022	.258	3.244
[B3=3]	.443	.641	.477	1	.490	-.814	1.699
[B3=4]	.877	.756	1.345	1	.246	-.605	2.360
[B3=5]	0 ^a	.	.	0	.	.	.
[B4=1]	.529	.608	.757	1	.384	-.662	1.720
[B4=2]	.469	.632	.551	1	.458	-.770	1.707
[B4=3]	1.769	.640	7.645	1	.006	.515	3.023
[B4=4]	.515	.704	.535	1	.465	-.865	1.894
[B4=5]	0 ^a	.	.	0	.	.	.
[B5=1]	-.189	.480	.155	1	.694	-1.129	.751
[B5=2]	-.344	.470	.536	1	.464	-1.264	.577
[B5=3]	-.285	.516	.306	1	.580	-1.295	.725
[B5=4]	-.238	.551	.187	1	.665	-1.317	.841
[B5=5]	0 ^a	.	.	0	.	.	.
[B6=1]	.307	.452	.461	1	.497	-.579	1.192
[B6=2]	-.066	.500	.018	1	.894	-1.046	.913
[B6=3]	-.083	.507	.027	1	.870	-1.076	.910
[B6=4]	-.378	.578	.426	1	.514	-1.511	.756
[B6=5]	0 ^a	.	.	0	.	.	.
[C1=1]	-1.153	.409	7.928	1	.005	-1.955	-.350
[C1=2]	-.706	.388	3.310	1	.069	-1.467	.055
[C1=3]	-.048	.321	.022	1	.881	-.677	.582
[C1=4]	.028	.355	.006	1	.937	-.669	.725
[C1=5]	0 ^a	.	.	0	.	.	.
[C2=1]	.541	.583	.863	1	.353	-.601	1.684
[C2=2]	.878	.555	2.504	1	.114	-.209	1.965
[C2=3]	1.098	.628	3.056	1	.080	-.133	2.329
[C2=4]	1.717	.539	10.138	1	.001	.660	2.775
[C2=5]	0 ^a	.	.	0	.	.	.
[C3=1]	-.810	.453	3.195	1	.074	-1.699	.078
[C3=2]	-.860	.512	2.821	1	.093	-1.863	.143
[C3=3]	-1.305	.533	5.998	1	.014	-2.348	-.261
[C3=4]	-2.103	.576	13.335	1	.000	-3.232	-.974
[C3=5]	0 ^a	.	.	0	.	.	.
[C4=1]	1.120	.443	6.380	1	.012	.251	1.989
[C4=2]	1.359	.500	7.383	1	.007	.379	2.339
[C4=3]	1.186	.585	4.109	1	.043	.039	2.333
[C4=4]	2.038	.667	9.324	1	.002	.730	3.345
[C4=5]	0 ^a	.	.	0	.	.	.

[C5=1]	-.200	.603	.110	1	.740	-1.383	.982
[C5=2]	-.024	.682	.001	1	.972	-1.362	1.313
[C5=3]	-1.166	.692	2.835	1	.092	-2.522	.191
[C5=4]	-1.032	.772	1.786	1	.181	-2.546	.482
[C5=5]	0 ^a	.	.	0	.	.	.
[C6=1]	-1.002	.559	3.213	1	.073	-2.098	.094
[C6=2]	-1.520	.634	5.743	1	.017	-2.764	-.277
[C6=3]	5.175	1.251	17.105	1	.000	2.722	7.627
[C6=4]	.654	.773	.715	1	.398	-.862	2.169
[C6=5]	0 ^a	.	.	0	.	.	.
[C7=1]	.106	.619	.029	1	.864	-1.107	1.319
[C7=2]	-.647	.626	1.065	1	.302	-1.874	.581
[C7=3]	-1.211	.781	2.402	1	.121	-2.742	.320
[C7=4]	3.691	1.295	8.119	1	.004	1.152	6.229
[C7=5]	0 ^a	.	.	0	.	.	.
[C8=1]	-2.432	1.106	4.835	1	.028	-4.601	-.264
[C8=2]	-2.216	1.134	3.821	1	.051	-4.438	.006
[C8=3]	-2.493	1.173	4.514	1	.034	-4.792	-.193
[C8=4]	-.393	1.408	.078	1	.780	-3.153	2.367
[C8=5]	0 ^a	.	.	0	.	.	.
[C9=1]	.338	.882	.147	1	.701	-1.390	2.067
[C9=2]	.398	.872	.209	1	.648	-1.311	2.107
[C9=3]	1.190	.941	1.598	1	.206	-.655	3.035
[C9=4]	0 ^a	.	.	0	.	.	.

Link function: Negative Log-log.

a. This parameter is set to zero because it is redundant.

Coefficients ^a								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.165	.049		44.623	.000		
	INTR	.005	.001	.254	3.724	.000	1.000	1.000
2	(Constant)	1.583	.117		13.513	.000		
	INTR	.379	.001	.250	3.909	.000	1.000	1.000
	ADTPrf3	.186	.035	.345	5.391	.000	1.000	1.000

a. Dependent Variable: PFM3

APPENDIX V: NACOSTI LISENCE



REPUBLIC OF KENYA



NATIONAL COMMISSION FOR SCIENCE,
TECHNOLOGY & INNOVATION

Ref No: **996568**

Date of Issue: **18/May/2023**

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 - ii. Adversely affect the lives of Kenyans
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