# FACTORS INFLUENCING IMPLEMENTATION OF CENTRALIZED DATA HEALTH CARE MANAGEMENT WITHIN NANDI COUNTY IN KENYA

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## DECLARATION

This research project is my original work and has not been presented to any other institution or university.

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## DEDICATION

This research project is dedicated to my mother Mrs. Florence Langat, Siblings, Husband and beloved children, Roy and Tiffany. Your unwavering patience, understanding, and encouragement have been the cornerstone of my journey. Despite the time and energy this endeavor demanded, your steady source of inspiration and motivation is much appreciated. May this pursuit not only contribute to knowledge but also serve as a testament to the values of perseverance and determination that I hope to instill in you. Thank you for being my greatest supporters and for enriching my life in ways beyond measure

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## ABSTRACT

The centralization of health information systems aims at advancing a data-driven and responsive healthcare framework, enhancing healthcare delivery services and decision-making through transparency and accountability. This approach is particularly effective when complemented by the development of staff skills, which is essential in maintaining the efficiency of centralized data management. To achieve this, training programs must be designed to enhance the competencies of employees responsible for managing centralized healthcare data. In light of these considerations, this study aimed to determine the elements impacting execution of centralized data healthcare management within Nandi County, Kenya. The study focused on four specific objectives: to establish the influence of ICT attributes on the adoption of centralized data healthcare management, to establish the consequence of top management on the implementation process, to analyze the influence of staff skills on the implementation, and to analyze how operational costs affect the implementation of centralized data healthcare management. The study was anchored on two theories namely the Diffusion of Innovations Theory which elaborates how, why, and at what rate new ideas and technology spread through cultures; and the RBV Theory-which posits that an organization's competitive advantage lies in its unique resources and capabilities. With an 87.5% response rate, a descriptive survey design was employed targeting a population of 80 healthcare professionals within Nandi County. A simple random sampling was employed to determine the sample size, ensuring representation across different strata. Both primary and secondary data were gathered, with the primary data gathered through questionnaires. The reliability and validity of the instruments were tested using Cronbach's alpha and expert opinion. The data were analyzed optimizing descriptive analysis, correlation analysis (Pearson's Product Moment Correlation Coefficient) to determine the strength of relationships between the attributes, and regression analysis to identify significant predictors relationship. The assessment discoveries of the assessment unveiled that ICT factors had the most substantial influence on the implementation of centralized data healthcare management, with a high level of agreement among respondents on the vital role of technological infrastructure such as Enterprise Resource Planning, Electronic Document management and Geographic Information System. Top management support was also identified as a significant factor, with effective leadership being crucial to the success of the implementation process. Staff skills and operational costs were also found to be important, with the investigation highlighting the need for continuous training programs and efficient cost management to ensure sustainable adoption. The model employed in the evaluation explained 69.08% of the variance in adoption outcomes, signifying a strong connection amid the identified elements and successful implementation. However, the assessment concludes that, there is need for a holistic approach encompassing robust ICT, strong leadership, skilled personnel, and prudent cost management in the successful implementation of centralized data healthcare management within Nandi County. The assessment recommended that counties across Kenya should prioritize the development of their ICT systems and invest in continuous staff training. Additionally, top

management should remain actively involved in the implementation process, and operational costs should be carefully managed to sustain these initiatives. Also, it is recommended that policy makers should create frameworks that standardize and integrate ICT systems across healthcare institutions and to provide guidelines that support effective leadership involvement and resource allocation to enhance the effectiveness of a centralized data healthcare management systems.

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## DEFINITION OF TERMS

**Centralized data-** Health-related information that is collected, stored, and managed in a single, centralized repository to facilitate access and sharing among authorized health care providers and stakeholders

**Data healthcare management**-This involves using data to enhance healthcare delivery, efficiency, and patient results.

**Heath care -** A system of organized services and activities aimed at promoting, maintaining, and restoring individuals and communities health as provided by various health facilities and professionals

**Implementation of centralized data-**This refers to establishing a central system for storing and managing all data.

## LIST OF ABBREVIATIONS

| | |
|---|---|
| CDH - | Centralized Data Health Care Management |
| CHVs - | Community Health Volunteers |
| CoG - | County Government |
| DHIS - | District Health Information System (Though Kenya may use a different system, DHIS is a common one) |
| ICT - | Information and Communication Technology |
| M&E - | Monitoring and Evaluation |
| MoH - | Ministry of Health |

# CHAPTER ONE
# INTRODUCTION

## 1.1 Background of the Study

The Digital Health Bill 2023 in Kenya presents a comprehensive framework aimed at advancing and regulating digital health services in the country (Kenyan Digital Health Act, 2023). According to a study by Pedrotti (2023), centralized and digital healthcare systems aim at promoting, creating and maintaining a Comprehensive Integrated Health Information System. This system promises enhanced healthcare delivery through improved data management, portability and integration (WHO, 2019). Additionally, the bill emphasized financial transparency and effective governance structures to ascertain the efficient execution of digital health initiatives. It also addresses critical aspects such as health data governance, security and e-waste management, reflecting a commitment to privacy, sustainability and innovation in healthcare delivery (Otieno, Kaseje & Ndege, 2014).

The Digital Health Bill 2023 outlines the backbone for significant advancements in Kenya's healthcare system by establishing robust governance structures, promoting innovation in digital health technologies, and prioritizing data security and privacy (Ochieng, Rotich & Kipsang, 2019). By centralizing health information systems and promoting best practices, the bill aims to improve healthcare delivery and decision-making while ensuring transparency and accountability in financial management. Moreover, its focus on sustainability through e-waste management underscores Kenya's commitment to environmental responsibility in the digital health sector (WHO, 2019).

In their 2019 study, Olu et al. insist the growing consequence of digital health technologies in achieving the SDGs and UHC in Africa. Significant capitalism in digital solutions are instrumental in transforming healthcare systems across the continent. These innovations are not only improving operational efficiency but are also expanding gain to healthcare services and enhancing the quality of

care. Ultimately, they act viral position in supporting the attainment of UHC, contributing to more effective and equitable healthcare delivery across African nations. The implementation of centralized data healthcare management systems, which are a key component of digital health, acts a pivotal duty in addressing several health system challenges in Africa.

A study by Ndemo and Mkalama (2023) noted that ICT systems are important. Utilizing a comprehensive literature review and policy analysis, the authors examined case studies and existing data governance frameworks in various African countries, with a specific focus on Malabo. The findings revealed significant gaps in data protection and cyber-security measures, highlighting the need for robust regulatory frameworks and enhanced cooperation among African nations to leverage data for sustainable development. The study concluded by recommending strategic policy interventions and capacity-building initiatives to strengthen data governance and ensure the protection of personal and non-personal data across Africa.

Staff skills play an essential role in the execution phases. Training programs must be built to advance the competency of employees tasked with managing and utilizing centralized health care data (WHO, 2019). This includes training in data analysis, data security protocols, and understanding the nuances of healthcare systems. Without adequately skilled staff, the effectiveness of centralized data management can be compromised, leading to inefficiencies and potential data breaches (Ministry of Health, Kenya, 2019).

A study by Ochieng et al. (2019) confirmed that the infrastructure is a fundamental component that significantly influences the implementation of centralized data health care management. Governments must invest in robust IT infrastructure capable of securely storing, processing, and transmitting large volumes of sensitive healthcare data. This infrastructure should incorporate advanced security means to guard patient confidentiality and follow applicable information safeguarding policies. Furthermore, scalable and adaptable

infrastructure is essential to accommodate the evolving needs of healthcare systems and ensure seamless integration with existing technologies (WHO, 2019).

On the operational front, the costs associated with implementing and maintaining centralized data health care management can be substantial (Njoroge et al., 2014). Governments must carefully evaluate and allocate resources to cover expenses such as software development, hardware procurement, staff training and ongoing maintenance. Effective cost management strategies, including budget allocation and resource optimization, are necessary to prevent budget overruns and ascertain long-term sustainability (Ministry of Health, Kenya, 2019). The top leadership commitment is crucial for the successful execution of centralized data health care management (Ochieng et al., 2019). Strong leadership support is essential to drive organizational change, secure funding and overcome potential resistance from stakeholders. Leaders must champion the initiative, communicate its benefits effectively, and actively engage with stakeholders to address concerns and foster collaboration. Without leadership commitment, efforts to implement centralized data management may lack direction and fail to gain the necessary traction within the organization.

Staff skills are fundamental to the success of centralized data healthcare management. Skilled personnel are required to manage, analyze, and utilize health data efficiently. Training programs and consistent professional development are necessary to equip staff with the key technical and analytical skills (Chuma et al., 2015). Additionally, fostering a mentality of data-driven verdict-creation within the healthcare workforce is critical. This not only enhances the capability of the staff but also ensures that the data collected is used optimally for improving patient care and public health strategies. The emphasis on developing staff competencies aligns with the broader goal of enhancing human resource capacity within the healthcare sector (Kenya Ministry of Health, 2019).

Infrastructure and operational costs are also pivotal in the execution of a centralized data health care management system. Robust technological infrastructure, including reliable internet connectivity, secure data storage means, and efficient health information systems, is necessary for the smooth operation of centralized data management (Moon, 2002). The financial aspect, encompassing both initial setup costs and ongoing operational expenses, must be carefully planned and managed. Effective budgeting and resource allocation are required to ensure sustainability and scalability of the system (Gitahi & Otieno, 2016). Leadership commitment is equally crucial, as top leaders play a key role in driving the strategic vision, securing necessary resources, and fostering an environment that supports innovation and continuous improvement in healthcare delivery (May, 2018).

### 1.1.1 Implementation of Centralized Data Healthcare Management

The implementation of centralized data healthcare management refers to the systematic process of consolidating health information from various sources into a unified, digital platform that enables comprehensive data storage, retrieval, analysis, and sharing across healthcare institutions (Ministry of Health, Kenya, 2019). This mechanism majored to shape healthcare operations, improve the accuracy and accessibility of patient records, enhance decision-making processes, and facilitate better coordination among healthcare providers.

In the context of healthcare management, implementation of Centralized Data Health Care Management involves the establishment of a unified system for collecting, storing, analyzing, and utilizing healthcare data across various facilities and departments within a healthcare system (Ochieng et al., 2019). This centralized approach aims to enhance efficiency, accuracy and accessibility of health information, leading to improved patient care, resource allocation, and decision-making at both operational and policy levels (Ministry of Health, Kenya, 2019). Implementation of centralized data health care management requires strategic planning, coordination, and investment in

technological infrastructure, human resources, and organizational processes to ensure successful adoption and interconnecting into present healthcare systems (Otieno et al., 2014). This will be evaluated through the number of data health care management services fully implemented.

### 1.2 Statement of the Problem

Poor health data governance within county administration can lead to significant inefficiencies, compromised patient care, and missed opportunities for public health improvement. Without a centralized health care data management system, healthcare providers struggle to access comprehensive patient records, leading to duplication of tests, incomplete medical histories and delayed diagnoses. This fragmentation not only undermines the quality of care but also increases healthcare costs and administrative burdens for both providers and patients (Ministry of Health, Kenya, 2019). The lack of proper data protection mechanisms not only erodes public trust in the healthcare system but also exposes individuals to identity theft, fraud and other security threats.

Notably, centralized healthcare data management systems act crucial duty in modernizing healthcare services, improving efficiency, and enhancing the care quality with the efforts to digitize health records and create centralized data management repository being vital step towards addressing persistent challenges in healthcare delivery (Ministry of ICT, Kenya, (2021).

Furthermore, without a coordinated approach to health data management, counties risk missing critical opportunities for early intervention and prevention, putting the health and well-being of its residents at risk (Ministry of Health, Kenya, 2019). Without access to reliable and comprehensive healthcare data, policymakers struggle to assess the effectiveness of existing programs, allocate resources efficiently and prioritize areas for intervention. This lack of data-driven decision-making has led to suboptimal health outcomes, wasted resources and missed opportunities for advancing the health and welfare of the county's population. This means that the case for poor healthcare data

management in counties in Kenya is clear, highlighting the urgent need for the implementation of centralized data healthcare management (Ochieng et al., 2019).

Addressing this issue through comprehensive research and strategic interventions can enhance the efficiency, effectiveness, and security of healthcare data management within the county, ultimately yielding to enhance health discoveries and better healthcare delivery for its residents (WHO, 2019). Moreover, studies on this topic reveals a multifaceted landscape characterized by efforts to enhance insight-driven verdict-creation, advance healthcare service offering, and promote good governance practices. Margetts and Dorobantu (2019) emphasized the role of data science in public policy, highlighting the potential of machine learning models to provide actionable insights for policymakers. This aligns with the objectives of the Kenyan Digital Health Act 2023, which strive to establish a CIHIS to facilitate insight sourcing and examination for in-depth verdict-making in healthcare. Insights from the KHSSP, Ministry of Health, 2018) provides a policy framework for integrating digital health solutions into broader healthcare strategies, emphasizing the importance of policy coherence and implementation for sustainable development.

Typically, Nandi County, according to the Digital Health Strategy for Kenya 2020–2024, on the implementation of centralized healthcare data management systems is framed to address the unique challenges that includes insufficient resources, limited ICT infrastructure, lack of training for healthcare personnel, and challenges in system integration. Such barriers hinder the progress toward fully digital and centralized health systems, which are vital for advancing efficiency and healthcare delivery quality (Ministry of ICT, Kenya, 2021; Ministry of Health, Kenya, 2016). With few studies done under this topic, this assessment majored to determine the various attributes impacting the execution of Centralized Data healthcare management in Nandi County, Kenya. It aims to provide replies to the research question. What are the various Factors

influencing the implementation of Centralized Data healthcare management in Nandi County, Kenya?

### 1.3 Research Objectives

The study was guided by broad and specific objectives.

#### 1.3.1 Broad Objective

This study sought to determine the factors influencing the implementation of Centralized Data health care management in the Nandi County, Kenya

#### 1.3.2 Specific Objectives

i. To uncover the influence of ICT factors in the implementation of Centralized Data health care management in Nandi County, Kenya.
ii. To uncover the influence of top management in the implementation of Centralized Data health care management in Nandi County, Kenya.
iii. To analyze the influence of staff skills in the implementation of Centralized Data health care management in Nandi County, Kenya.
iv. To analyze the influence of operational costs in the implementation of Centralized Data health care management in Nandi County, Kenya

### 1.4 Research Hypotheses

**$H_{01}$.** There is no consequential influence of ICT factors in the execution of Centralized Data Health care management in the Nandi County, Kenya.

**$H_{02}$.** There is no consequential influence of Top management in the execution of Centralized Data Health care management activities in Nandi County, Kenya.

**$H_{03}$.** There is no consequential influence of staff skills in the execution of Centralized Data health care management in Nandi County, Kenya.

**$H_{04}$.** There is no consequential influence of Operational costs in the execution of Centralized Data health care management in Nandi County, Kenya.

### 1.5 Scope of the Study

The assessment majored on Nandi County, located in Kenya's Rift Valley region, which plays a pivotal role in local governance, service delivery, and

development initiatives within its jurisdiction. Established under Kenya's devolved system of government, the county is responsible for a range of services including healthcare, education, infrastructure development, and agricultural support. Led by elected officials, the government's policies and initiatives are aimed at improving the socio-economic welfare of its residents, promoting sustainable development, and enhancing local governance through participatory processes. Nandi County's administration works closely with national government bodies and local stakeholders to address challenges and harness opportunities for growth, reflecting its commitment to advancing community welfare and economic prosperity.

### 1.6 Limitations of the Study

The evaluation encountered various setbacks that may have affected the breadth and depth of the discoveries. First, the assessment was confined to Nandi County, restricting the generalizability of the outcomes to various regions in Kenya. The specific socio-economic and technological context of Nandi County may differ from that of other counties, which could influence the implementation of centralized data healthcare management in different ways.

Its' dependency on self-reported insights collected through questionnaires, which may be yield to bias response. Participants might have provided socially desirable answers or misrepresented their actual experiences and opinions.

Additionally, the subjective nature of stakeholder perspectives posed a challenge in capturing consistent views. These constraints highlight the need for more robust data collection and objective analysis in future studies

Furthermore, the study focused only on four key factors namely ICT factors, top management, staff skills, and operational cost without considering other potentially influential variables such as organizational culture, stakeholder engagement, or external environmental factors.

### 1.7 Delimitations of the Study

This investigation focal point specifically on the elements affecting CDH implementation and available data related to current health care practices and

data infrastructure within the Nandi County, Kenya. It did not explore the technical aspects of CDH system design or compare different data management technologies. The research was limited to stakeholder perspectives accessible within the study's scope, recognizing that capturing these subjective viewpoints may involve inherent challenges.

### 1.8 Significance of the Study

The study on attributes affecting the execution of centralized data health care management in Nandi County, Kenya, holds significant value for the county's management. For Nandi County management, the findings offer insights into the critical elements necessary for the successful adoption and operation of a centralized data system. By understanding the enablers and barriers specific to their context, management can tailor strategies to enhance data accuracy, accessibility, and security, ultimately leading to improved health care delivery. This localized understanding can facilitate better resource allocation, staff training, and infrastructure development, ensuring that the centralized system meets the unique needs of Nandi County.

For policymakers, the study provides a robust framework to formulate and refine policies that support the centralization of health care data management. It highlights the importance of policy directives that address technical, administrative, and regulatory challenges. By using evidence-based insights from Nandi County, policymakers can develop comprehensive guidelines that promote standardization, interoperability, and data privacy. This can lead to more coherent and cohesive national health care data policies, enhancing overall system efficiency and patient care outcomes across different regions.

Future scholars will also gain from this study as it tops up the existing knowledge on health care data administration, particularly in the context of developing countries. It opens avenues for further research on the interplay between technological adoption and health care service delivery. Scholars can build on this work to explore comparative studies in other counties or regions,

investigate long-term impacts, and assess the scalability of successful strategies. Additionally, the study's methodological approaches and findings can be a reference point for subsequent research, fostering academic discourse and contributing to the continuous improvement of health care management practices globally.

# CHAPTER TWO
# LITERATURE REVIEW

## 2.1 Introduction

This part explores on the literature review based on previous studies done on the topic of the assessment. A discussion of both the theoretical and empirical review on Factors influencing implementation of Centralized Data health care management will be as well reviewed. A conceptual framework linking the construct variables will also be presented.

## 2.2 Theoretical Framework

The assessment was established by the Diffusion of Innovation theory and RBV Theory.

### 2.2.1 Diffusion of Innovations Theory

It was proposed by Everett M. Rogers in 1962 and show how ideas diffuse in a firm (Rogers, 1962). It assumes that the spread of new ideas follows a predictable pattern and that the social system, communication channels, time, and the innovation itself are crucial determinants of adoption. The theory posits that innovation adoption is influenced by elements like perceived benefits, alignment with current systems, difficulty, testability, and visibility. These factors help explain why some healthcare counties Nandi faces challenges when implementing centralized healthcare data systems.

In another study, Somani et al., (2023) explores how factors like task complexity, technology characteristics, and personal innovativeness affect the adoption of AI in healthcare, which can be applied to understanding similar barriers in healthcare data management systems. They argue that personal innovativeness and willingness to experiment with new technologies also plays a role in whether healthcare professionals adopt new systems, but factors like limited ICT infrastructure and training deficiencies pose significant hurdles in less-developed regions

The theory also emphasizes the significance of an innovation's compatibility with pre-existing systems, infrastructure, and organizational practices. In healthcare, the adoption of systems like electronic health records (EHR) and centralized data management hinges on their ability to integrate seamlessly into existing workflows and organizational structures. Research indicates that challenges such as outdated infrastructure and insufficient ICT resources often obstruct the successful execution of ICT solutions in healthcare (Moqaddasi et al., 2020). For counties with limited ICT capabilities, such as Nandi County, the adoption of centralized healthcare data systems is particularly challenging, as these systems frequently face compatibility issues with the current healthcare infrastructure (Ministry of ICT, Kenya, 2021).

Notably, the theory argues that the ability to try out an innovation on a small scale before full implementation can accelerate adoption. In healthcare, pilot projects or small-scale trials can provide tangible evidence of the benefits of centralized data systems (Rogers, 2003). However, in many rural or underserved areas like Nandi, the lack of sufficient pilot projects or success stories from other regions makes it harder for stakeholders to see the practical benefits of ICT adoption. Studies suggest that visibility and positive demonstrations of ICT in action are critical to increasing adoption rates (Al-Qudah, Al-Shboul & Al-Sahab, 2021).

The theory highlights that the opportunity to pilot an innovation on a smaller scale before full-scale implementation can expedite its adoption. Nyakwende and Mavhunga (2022), while investigating the barriers to ICT adoption in rural healthcare settings in Kenya, highlighted how the absence of successful demonstrations or pilot programs in such regions affects adoption rates. In the context of Nandi county, pilot projects offer concrete evidence of the benefits of centralized data systems, making it easier to gain stakeholder buy-in (Rogers, 2003). Al-Qudah et al., (2021) agrees that that the visibility of successful ICT implementations and positive demonstrations are essential in increasing adoption rates.

Rogers (2003) posits that the complexity of an innovation can significantly impede its adoption. In the healthcare context, the implementation of centralized data management systems often involves overcoming substantial challenges such as staff training, adaptation to new workflows, and resistance to change. In counties with limited ICT infrastructure, like Nandi, the complexity of learning to operate new systems can be a formidable barrier. Insufficient training for healthcare personnel and unfamiliarity with digital tools can lead to slow adoption rates and inefficient use of these systems, ultimately affecting their effectiveness (Ministry of ICT, Kenya, 2021; Al-Qudah et al., 2021).

In the context of implementation of centralized data healthcare management in Nandi County, the Diffusion of Innovations Theory helps analyse how health care providers adopt and implement the new system. By examining factors such as the perceived benefits (relative advantage), alignment with existing workflows (compatibility), and ease of use (complexity), stakeholders can better understand the challenges and facilitators of adopting centralized data systems. This understanding is crucial for developing strategies to encourage acceptance and integration of the new technology among health care workers in Nandi County.

A critique of this theory is that it often overlooks the socio-economic and cultural contexts that can significantly affect the diffusion process. It tends to assume a linear progression and may not fully account for the resistance and adaptation by different groups within a society (Chadwick, 2009). Caplehorn (2013) critically examined the adoption of Rogers' Diffusion of Innovations principle in healthcare settings and argues that the theory falls short in addressing the broader organizational dynamics and external elements that impacts technology execution in healthcare systems. In the context of Nandi County, challenges like limited infrastructure, restricted training opportunities, and inadequate human resources could significantly hinder the adoption of new technologies, despite their potential benefits (Ministry of ICT, Kenya, 2021). These organizational and environmental barriers must be considered alongside

individual adoption factors to fully understand the challenges faced in implementing centralized healthcare data management systems.

### 2.2.2 Resource-Based View (RBV) Theory

The RBV Theory was popularized by scholars like Edith Penrose (1959). The RBV assumes that organizations can be viewed as bundles of assets and capacities, and the heterogeneity of these resources leads to differences in performance among firms. It was further developed by Barney (1991), who argued that resources and capabilities that the VRIN criteria can provide viable advantages.

In the context of centralized healthcare data management, RBV suggests that healthcare organization's resources such as staff skills, ICT infrastructure, resources and top management support influence the adoption and effectiveness of new technologies (Barney, 1991; Wernerfelt, 1984). Studies indicate that counties with limited resources, such as Nandi County, often face significant challenges in adopting these systems due to insufficient infrastructure, lack of skilled personnel, and inadequate financial support (Ministry of ICT, Kenya, 2021).

Moreover, trained healthcare staff are essential for the successful implementation and operation of centralized data systems. However, the adoption process can be hindered by limited training opportunities and a shortage of skilled professionals. This shortage can lead to delays and reduced system effectiveness (Moqaddasi et al., 2020).

The theory also emphasizes the importance of organizational capabilities, particularly leadership support and effective change management practices, in addressing resistance and fostering an innovation-friendly culture. These factors are essential for ensuring successful execution and adoption of new technologies, like centralized data systems. Leadership that actively supports technological initiatives and promotes a culture of innovation can mitigate

challenges, while effective change management ensures smoother transitions in the face of resistance (Al-Qudah et al., 2021; Cunningham et al., 2016). Moreover, a commitment to continuous training and the alignment of organizational strategies with technological advancements can further enhance the likelihood of successful implementation (Nyakwende et al., 2022).

For the implementation of centralized data health care management in Nandi County, the RBV theory highlights the importance of leveraging key resources including skilled personnel, technological infrastructure, and financial assets. By assessing the county's internal resources, stakeholders can identify strengths and gaps that must be tackled to facilitate the successful execution and sustainability of the centralized data system. This theory provides a framework for evaluating how effectively these resources are utilized to achieve a competitive advantage in healthcare delivery (Gitahi & Otieno, 2016).

A critique of the RBV is that mismatch between the training needs of healthcare staff and the available technological solutions can lead to inefficiencies in technology use. Additionally, aligning organizational strategies with new technologies requires a major redesign of existing systems, workflows, and how resources are distributed. This can be time-consuming and difficult, as it involves changing the way things have been done for a long time. Without a clear, coherent strategy, healthcare systems may face challenges in ensuring that the adoption of new technologies contributes to long-term improvements in care delivery (Nyakwende et al., 2022). Also, while leadership is universally recognized as essential for innovation adoption (Al-Qudah et al., 2021), the type and depth of leadership support required can vary greatly therefore there is need foster collaborative engagement across different departments and teams.

### 2.3 Empirical Review

The empirical review provides analysis of previous assessments related to implementation of centralized data healthcare management, ICT factors, top management, staff skills and operational cost.

### 2.3.1 Implementation of Centralized Data Health Care Management

There are different factors influencing implementation of data systems in healthcare settings. The successful implementation of centralized data healthcare management systems hinges on a variety of factors that can significantly influence outcomes in healthcare settings. These factors encompass ICT infrastructure, top management, staff skills, and operational costs, each playing a vital place in directing the effectiveness and sustainability of data systems in healthcare. The healthcare sector in Kenya faces challenges in data fragmentation, hindering informed decision-making and resource allocation (Gachie & Iravo, 2016). Centralized data healthcare management (CDH) systems offer a potential solution, but successful implementation hinges on various Factors (Langpinakis, 2015).

A reliable hardware, software, and network connectivity is required to ensure seamless data collection, storage, and accessibility across healthcare facilities. Studies emphasize investment in secure data centers, user-friendly interfaces, and proper data backup procedures (Chikumba et al.,2020). Top management support is equally crucial. Strong leadership and governance are fundamental for the successful execution of centralized health data systems. In many African countries, leaders playing a key position in securing the core resources, creating a supportive environment, and ensuring staff receive proper training. Without the commitment of top management, challenges like resistance to change, lack of resources, and poor planning can hinder the adoption process (Gilson et al., 2018). This fosters a culture of evidence-based verdict-making within the healthcare system.

A survey conducted by Al-Qudah et al. (2021) examined the attributes impacting execution of centralized data systems in hospitals in Jordan. The investigation optimized a mixed-methods model, combining a quantitative survey to gather data from healthcare workers and a qualitative analysis of interviews with hospital administrators. The survey majored on the perceived gains, setbacks, and readiness of staff to adopt new technologies. The study

highlighted leadership support, infrastructure readiness, and training as crucial factors for successful CDH implementation.

Panda and Thakur (2016) conducted their study in India, focusing on the decentralization of the health system and its impact on performance. The objective was to review the dimensions, difficulties, and derivatives associated with health system decentralization. The study found that decentralization could potentially improve health system performance by enhancing local decision-making and accountability. However, significant gaps were identified, including the lack of capacity at local levels, uneven resource distribution, and challenges in maintaining quality and consistency across decentralized units.

In their 2021 study, Akinyi and Ndungu looked at how investments in data centers can enhance healthcare services in East Africa. It identified key challenges such as unreliable data storage systems, frequent power outages, and poor internet connectivity, which hindered the effective management of healthcare records. To address these issues, they proposed solutions including the development of modern data centers, the adoption of inexhaustible energy sources like solar power, and training programs to equip healthcare workers with the primary skills to use advanced systems. Additionally, they recommend for regional collaboration to improve data sharing, ultimately making healthcare delivery more efficient, secure, and reliable across the region.

A skilled workforce is vital for CDH success (Kubai, 2015). Healthcare professionals will require training on data entry, analysis, and utilizing data for improved patient care and resource allocation. Investing in training programs equips staff to leverage the full potential of CDH. Notably, implementing and maintaining a CDH system requires ongoing financial resources (KIPPRA, 2018). The County Government needs to develop a sustainable funding plan that considers hardware, software licenses, system maintenance, and staff training. Analyzing the cost-benefits of CDH, such as improved efficiency and reduced waste, can help justify the investment.

### 2.3.2 ICT Factors and the Implementation of Centralized Data Health Care Management

The foundational position of ICT in implementing centralized data systems cannot be overstated. ICT infrastructure for instance, hardware, software, network resources, and services are required for the sourcing, storage, management, and dissemination of insights. Robust ICT infrastructure ensures that healthcare providers have reliable access to data, which is crucial for timely decision-making and effective patient care.

Maqbool, Khan, and Zubair (2020) executed assessment in Pakistan to examine the elements impacting the adoption of centralized health data systems. The research found that inadequate ICT training among healthcare workers and insufficient infrastructure were significant defenders to successful execution. The assessment highlighted the must focused capacity-building initiatives for staff and improvements in ICT infrastructure to advance the effectiveness and integration of health data systems in Pakistan. This research emphasizes the importance of addressing these challenges to ensure smoother adoption and more efficient optimization of health data systems (Maqbool et al., 2020).

Wanyonyi et al. (2020) explored the ICT-related challenges faced by Kenyan healthcare facilities in implementing Health Information Systems (HIS). The assessment employed a mixed-methods model, utilizing surveys and interviews with healthcare professionals to evaluate the state of ICT. They found out that inadequate internet connectivity, limited access to necessary hardware, and insufficiently trained staff were significant defenders to the successful execution of HIS. The investigation insists the necessity for increased investment in ICT infrastructure and staff capacity-building programs to improve the effectiveness of healthcare data systems in Kenya.

In their study, Munyao et al. (2021) conducted a survey to assess the state of ICT infrastructure in Kenyan hospitals, specifically focusing on the implementation of EHR. The study uncovers that although some hospitals had

made progress in implementing EHR, challenges such as outdated hardware, poor internet connectivity, and lack of staff skills were persistent barriers to successful integration. The researchers recommended that continued investments be made in ICT infrastructure and that healthcare workers undergo professional development to address these issues and improve the effectiveness of health data management systems.

Otieno et al. (2018) conducted a qualitative study using focus group discussions and interviews with health facility administrators and ICT officers to evaluate the challenges of implementing centralized health data systems in Kenya. The study identified inadequate ICT infrastructure and insufficient staff training as major barriers to the successful execution of health data systems. They emphasized the importance of providing ongoing training and investing in better infrastructure to support the effective integration of these systems. According to Wainaina, Ole Sopia, and Cherono (2016), insufficient ICT infrastructure can severely deter the usage of new technologies in healthcare settings. Absence of proper systems, outdated technology, and inadequate network capabilities are common barriers that need to be addressed.

### 2.3.3 Top Management and the Implementation of Centralized Data Health Care Management

Top management are instrumental in the strategic implementation of centralized data healthcare management systems. Effective leadership is essential for setting a clear vision, securing necessary resources, and promoting a culture of creativity and ongoing enhancement. Leadership commitment involves not only the financial resource allocation but also provides strategic direction to support the staff during the transition to new systems. Kamau (2015) emphasizes that leadership engagement is crucial for overcoming resistance to change and ensuring alignment with organizational goals.

Churruca et al. (2023) noted that successful organizational change initiatives, including the implementation of new data systems, largely depends on the active

involvement and support of top management. Leaders who prioritize the adoption of centralized data systems can motivate staff, facilitate training, and avail the necessary infrastructure thereby enhancing the likelihood of successful implementation.

Witter et al. (2019) carried out their research in American Hospitals with the objective of findings progress made in health system strengthening. This reflective analysis granted treasurable information into the concept and assessment of health system strengthening, highlighting the significance of a holistic and context-specific model. The factors identified included issues such as leadership, service systems and good access to work systems. Others covered access to essential medicines and technologies as critical for the successful implementation of health system reforms, including centralized data management systems.

The study conducted in China examined the execution of a centralized healthcare data management system and highlighted the importance of top management involvement for successful adoption. The research found that active participation by top leaders in setting clear goals, aligning resources, and overseeing the change management process was essential for overcoming challenges related to system integration and staff adaptation (Zhang, Liu, Wang, & Li, 2019).

Similarly, a study was conducted in South Africa to outline the vital position of hospital leadership in the successful execution of centralized healthcare data management systems. The study found that hospital leaders played a key role in making sure the right resources were available, creating a supportive environment, and ensuring that staff received the necessary training to use the new systems effectively. They noted that leadership is crucial in overcoming challenges like resistance to change and technical issues. The research showed that without strong leadership, adopting electronic systems could face major setbacks, like resistance to dynamic and poor technological infrastructure.

Strong leadership is needed to overrun these setbacks and ensure the successful implementation of new systems (Gilson & Agyepong, 2018).

Uzochukwu et al. (2018) executed investigation in Nigeria and they explore the accountability mechanisms for implementing care. The objective was to analyze how accountability practices impacted the implementation of this health financing option. The findings showed that effective accountability mechanisms, including transparent reporting and community involvement, were essential for the successful deployment of the BHCPF. Nonetheless, the study highlighted gaps such as limited stakeholder engagement, inadequate monitoring systems, and the necessity for more robust institutional frameworks to boost accountability.

Kamau (2015) findings suggested that organizational structure, leadership, and resource availability were significant determinants of successful strategic plan implementation. However, the study identified gaps in organizational culture, inadequate staff training, and limited financial resources as major obstacles that needed to be inscribed to improve the effectiveness of strategic plans in these hospitals. A study by Wainaina et al (2016) was conducted at the Nakuru Provincial General Hospital in Kenya. The study found that leadership commitment, staff involvement, and adequate resources were critical for successful change management. However, gaps were noted in resistance to change among staff, inconsistent policy implementation, and the need for constant training and advancement programs to support the transition.

### 2.3.4 Staff Skills and the Implementation of Centralized Data Health Care Management

The skills and competencies of healthcare staff are vital determinants of the successful implementation of centralized data healthcare management systems. Skilled personnel are essential for operating new technologies, managing data, and leveraging information for improved patient outcomes. Training and

continuous professional development are necessary to equip staff with the required technical and analytical skills.

Al-Qudah, M. A., et al. (2021) agrees through a survey study on the adoption of centralized EHR systems in Jordan that training and user attitudes helps to enable the successful execution of new health information systems. The study found out that healthcare workers lacked adequate training in using new technologies, which delayed the usage of the EHR systems. Additionally, the study found that the attitudes of healthcare workers, along with their perceptions of the technology's ease of use, significantly influenced the adoption process.
In their 2020 qualitative study, Maqbool, Khan, and Zubair investigated staff skills as a critical factor impacting the maximization of centralized health data systems in Pakistan. The findings highlighted the need for targeted capacity-building programs to enabled the execution of HIS in Pakistan.

Pandya, Slemming, and Saloojee (2018) carried out a study in a South African province. Their qualitative perspectives revealed that factors such as staff training, resource availability, and support from management were crucial for successful implementation. The study identified gaps in resource allocation, inconsistent training programs, and the need for stronger managerial support to ensure effective implementation of IMCI guidelines.

In Ghana, Kweku, Osei, Anwar, and Agyemang (2020) conducted a participatory study to assess the challenges faced by health workers in the Volta Region regarding the use of electronic data systems in the ranging-up of the CHPS program. The study involved engaging stakeholders and performing needs assessments. It revealed that inadequate training and insufficient capacity were major barriers affecting the effective use of electronic data systems for decision-making in healthcare.

Beyene, Assefa, Abebaw, and Fekadu (2021) conducted a study in Ethiopia that examined the implementation of Health Management Information Systems

(HMIS). The study emphasized that insufficient training of staff led to errors in data entry and inefficient use of the centralized system. It highlighted that training was essential for the successful adoption and operation of HMIS.

According to Wainaina, Ole Sopia, and Cherono (2016) is heavily reliant on the capacity and readiness of the staff to adapt to new systems. Therefore, investing in comprehensive training initiatives that emphasize both technical abilities and change management is crucial. This ensures that healthcare providers are well-prepared to utilize centralized data systems effectively, ultimately leading to enhanced service delivery and patient care.

Wanyonyi, Otieno and Ombuki (2020) examined the challenges faced in implementing Health Information Systems (HIS) in Kenya, specifically focusing on the issues of staff training and ICT infrastructure. The study found that while healthcare workers expressed willingness to adopt new technologies, the lack of structured ICT training programs left them struggling to effectively incorporate these systems into their daily routines. These skills gap pointedly deferred the full implementation of centralized data systems in healthcare facilities across Kenya.

Rugged, Mutua and Odhiambo (2021) explored consequence of ICT capacity and staff training in the adoption of centralized health data management systems in rural Kenya, particularly in resource-limited areas. The study found that healthcare workers in these regions lacked the required skills to effectively optimize the systems, and the training provided was often deficient. As a result, the adoption process was slow, and data errors became common. The study recommended that more targeted training programs and infrastructure investments be made to facilitate successful implementation.

### 2.3.5 Operational Costs and the Implementation of Centralized Data Health Care Management

Operational costs are a significant factor influencing the implementation of centralized data healthcare management systems. These costs include the initial investment in ICT infrastructure, ongoing maintenance, staff training, and other associated expenses. Effective cost management is essential to guaranteeing the system's sustainability.

Adler-Milstein and Huckman (2018) while doing a case assessment to assess the financial impacts of implementing centralized electronic health records (EHRs) across a network of U.S. hospitals found out that initial costs were significant, including software procurement, infrastructure upgrades, and staff training, but long-term benefits included reduced administrative costs and improved patient care outcomes. Quantitative data collection through surveys and financial records and compared pre- and post-implementation operational costs. Bainbridge, M., et al. (2019) carried out a study in Australia to evaluate the cost-effectiveness of My health record. This study used a mixed-methods approach to evaluate centralized data systems under the My Health Record initiative. Quantitative data on implementation costs and qualitative insights on operational challenges were collected. The study found out that while initial costs were high, including IT infrastructure and data integration, operational costs declined due to streamlined data access, leading to improved efficiency and decision-making.

Reddy and Gupta (2020) carried out an economic evaluation model in India to analyze the cost structure of India's Health Management Information System (HMIS). Data from government reports and healthcare facility records were utilized to quantify expenses and cost savings. The study found out that high initial investments in hardware, software, and training are barriers to widespread adoption. A descriptive cross-sectional evaluation by (Awad, A. I., et al. 2021) across hospitals in sub-Saharan Africa to examine the costs and barriers to adopting centralized healthcare data management systems was carried out.

Financial data, surveys of healthcare staff, and qualitative focus groups were used. The study found out that though the systems improved data accuracy and resource allocation, limited funding, high maintenance costs, and the need for donor support was a challenge.

Ibeneme, Okeibunor and Muneene (2021) while carrying out a review on the roll-out of EHR systems in Ghana Health Service (GHS), a combination of policy analysis, infrastructure assessments, and interviews of healthcare workers showed that despite initial success in linking patient records across facilities, poor network infrastructure, lack of comprehensive end-user training, and inadequate stakeholder involvement limited the system's effectiveness.

Nyangena, Rajgopal and Ombech (2021) executed a detailed investigation on the execution of centralized healthcare data management systems in Kenya. The methodology involved assessing leadership, governance, human resources, and technology domains through workshops and consensus discussions with representatives from Kenya's Ministry of Health, academia, NGOs, and private sectors. The assessment unveiled that most domains of Kenya's health information systems were in the nascent or emerging maturity stages. Key challenges identified included fragmented governance, inadequate financial management, and underdeveloped ICT infrastructure, which significantly limited operational efficiency and data system integration. To address these gaps, the study recommended strengthening governance, increasing investments in ICT infrastructure, and promoting systematic monitoring mechanisms.

Nyangena, Rajgopal, and Ombech (2021) conducted a study to examine the implementation of centralized healthcare data systems in Kenya. The research used workshops and discussions with participants from Kenya's Ministry of Health, universities, NGOs, and the private sector to assess leadership, governance, human resources, and technology. They found that most parts of Kenya's health information systems were still at early or developing stages of

maturity. Key problems included weak governance, poor financial management, and inadequate ICT infrastructure, all of which reduced efficiency and hindered system integration. The study recommended enhancing governance, increasing investment in ICT infrastructure, and implementing more effective monitoring systems to address these challenges and improve the overall implementation of centralized healthcare data systems in Kenya.In the context of centralized data systems, in order to make sure that the long-term advantages surpass the early costs, a comprehensive cost-benefit analysis is crucial. Moreover, securing sustainable funding sources and optimizing resource allocation can help mitigate financial challenges, ensuring that the system remains operational and effective over time.

### 2.4 Conceptual Framework

For this study, the predictor attributes operationalize the factors influencing the implementation of Centralized Data health care management which includes: ICT Factors, Top management, Staff skills and Operational Costs.

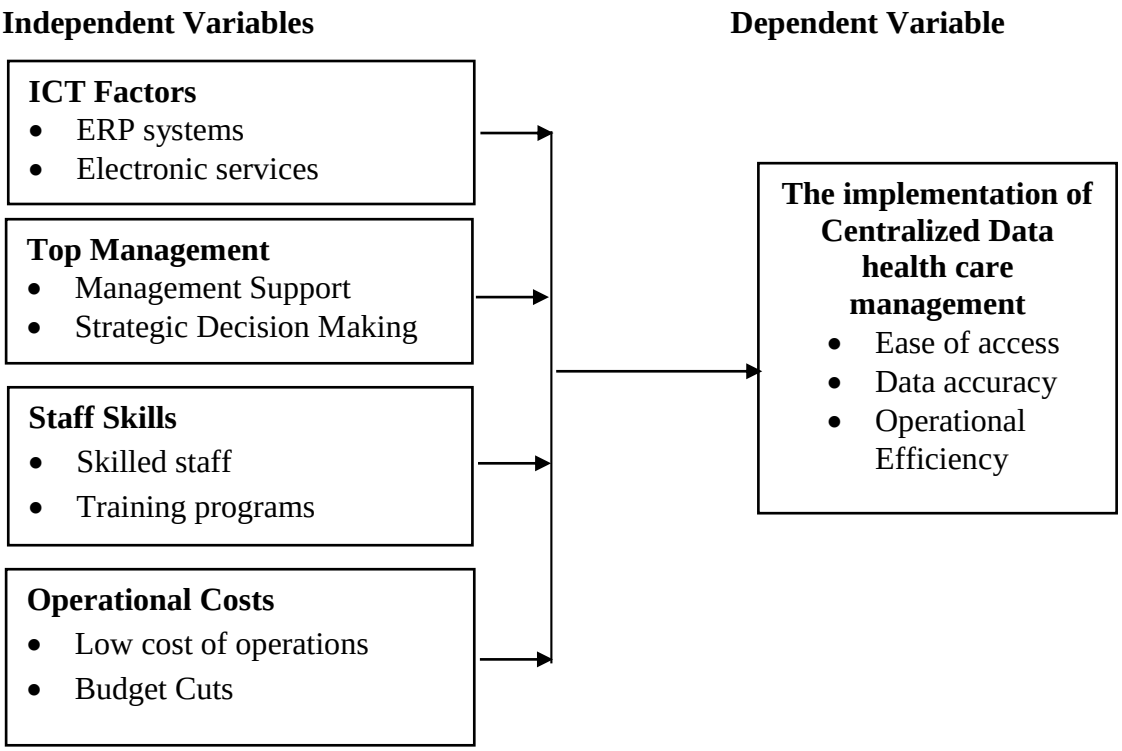



**Figure 2.1: Conceptual Framework**

In the conceptual framework depicted above, ICT factors, top management, staff skills and operational costs is hypothesized to influence the implementation of centralized data health care management. ICT factors is defined as ERP systems and Electronic services. Top management is defined as management support and strategic decision making. Staff skills is defined as skilled staff and training programs while Operational costs is defined as low cost of operations and budget cuts.

## 2.5 Research Gaps

Different evaluations have been executed on this topic. Nevertheless, gaps were noted in the consistency of program application across different departments and thus the need for ongoing training and resources to sustain the improvements. The study displays inadequate monitoring and evaluation strategies to dynamically track development and respond to implementation hindrances. Additionally, while other studies highlight hitches in integrating centralized data systems into current frameworks, it does not investigate the

need for a phased implementation. High initial and operational costs were identified, but there is no detailed exploration of long-term sustainability strategies for instance alternative funding sources or innovative cost-reduction measures. Limited stakeholder engagement is noted with resistance to change being ignored. Although leadership and staff engagement were emphasized as critical, there is a lack of consistent application of implementation practices across different departments which hinders the effectiveness of centralized system

**Table 2.1: Empirical Studies and Inherent Gaps in Knowledge**

| Author(s) and Year | Methodology | Findings | Research Gap | Type of Research Gap(s) | Focus of the Current Study |
|---|---|---|---|---|---|
| Churruca et al. (2023) | Cross sectional design | Leadership support, staff engagement, and clear communication are critical for program success | Inconsistency in program application across different departments | Implementation consistency | Sustaining improvements through consistent application across departments |
| Witter et al. (2019) | Cross-sectional | Holistic and context-specific approach crucial for health system strengthening | Uneven implementation of Factors across hospitals | Implementation variation | Comprehensive approach to centralized data management systems |
| Panda and Thakur (2016) | Survey | Decentralization improves decision-making and accountability | Lack of local capacity and uneven resource distribution | Capacity and resource distribution | Enhancing local capacity and equitable resource distribution |
| Pandya, Slemming, and Saloojee (2018) | Cross-sectional | Staff training, resource availability, and management support are crucial | Gaps in resource allocation and inconsistent training programs | Resource and training consistency | Effective resource allocation and consistent training programs |
| Uzochukwu et al. (2018) | Case study | Accountability mechanisms are essential for successful BHCPF implementation | Limited stakeholder engagement and inadequate monitoring systems | Stakeholder engagement and monitoring | Robust accountability frameworks and stakeholder involvement |

| Author(s) and Year | Methodology | Findings | Research Gap | Type of Research Gap(s) | Focus of the Current Study |
|---|---|---|---|---|---|
| Wainaina et al. (2016) | Survey | Leadership commitment, staff involvement, and adequate resources are critical for change management | Resistance to change and inconsistent policy implementation | Change resistance and policy consistency | Continuous training and development for change management |
| Kamau (2015) | Cross-sectional | Organizational structure, leadership, and resource availability influence strategic plan implementation | Organizational culture and limited financial resources | Organizational culture and financial resources | Addressing organizational culture and ensuring financial resources |

# CHAPTER THREE
# RESEARCH METHODOLOGY

## 3.1 Introduction

This section outlined the various methodological processes and phases that were utilized in the research. It presents the research model, population, insight collection, procedures and the data scrutiny.

## 3.2 Research Design

As per Sekaran and Bougie (2016), research design relates to framework majored at realization of a certain goal with less distraction. A descriptive design was optimized. The goal of this approach was to highlight the general attributes of particular element or themes. It also assisted in the identification of an individual's genuine views and perspectives in order to determine how the situation compares to the target group.

## 3.3 Target Population

Saunder et al. (2017) defines a population as a Total enumeration of all items that exhibit comparable traits being studied. The assessment's population consisted of Senior Hospital Managers, Hospital ICT managers and Hospital Medical Officers within the health care department in Nandi County, Kenya. Nandi county has one referral hospital and 6 sub county hospitals. Through aiming this particular group, the study seeks to attain in-depth, targeted insights from professionals who are directly involved in healthcare management and technology. This approach ensures that the findings are closely aligned with the operational challenges and opportunities within Nandi County's healthcare system. The results aim to inform policy, enhance system efficiency, and facilitate the integration of health technologies in similar regional contexts.

**Table 3.1: Target Population table**

| Category | Senior Hospital Managers | Hospital ICT Managers | Hospital Medical Officers |
|---|---|---|---|
| Kapsabet County Referral Hospital | 3 | 20 | 15 |
| Chesumei Sub County | 2 | 2 | 3 |
| Emgwen Sub County | 2 | 2 | 3 |
| Mosop Sub County | 2 | 2 | 3 |
| Nandi Hills Sub County | 2 | 2 | 3 |
| Tinderet Sub County | 2 | 2 | 3 |
| Aldai Sub County | 2 | 2 | 3 |
| **Total** | **15** | **32** | **33** |
| **Grand Totals** | | **80** | |

### 3.4 Sampling Frame

According to Muchaendepi et al. (2019), the sampling frame is the extensive series of all elements within a population that are utilized for data gathering. This series acts as background for highlighting sample from the population under study, ascertaining that every unit has a defined presence in the selection process. In this study, these individuals are divided into three categories: Senior Hospital Managers, Hospital ICT Managers, and Hospital Medical Officers. The sampling frame includes 15 Senior Hospital Managers, 32 Hospital ICT Managers and 33 Hospital Medical Officers. Together, these individuals make up the total population of 80 people from whom the study will draw its sample.

### 3.5 Sample Procedure and Sample Size

A sample size as described by Lakens (2022) refers to the number of elements selected from a population to estimate the characteristics of that population for the purpose of executing an assessment. The sampling size for this assessment includes all 80 individuals within the healthcare management department of Nandi County, Kenya. The study specifically encompassed 15 Senior Hospital Managers, 32 Hospital ICT Managers, and 33 Hospital Medical Officers.

### 3.5.1 Sampling Procedure

Sampling procedures are methods used to choose a portion (sample) of individuals or entities from a broader population to carry out research. The choice of sampling technique impacts the reliability, validity, and generalizability of the study's results. Sampling techniques can be broadly divided into probability sampling and non-probability sampling. The assessment optimized non-probability sampling procedure, a census approach, also known as complete enumeration, to select the sample. This method involved including every individual within the defined population, which, in this case, consisted of 80 individuals from the healthcare management department of Nandi County, Kenya. The population was composed of 15 Senior Hospital Managers, 32 Hospital ICT Managers, and 33 Hospital Medical Officers.

By adopting this approach, the study ensured comprehensive representation from all relevant stakeholders, which allowed for an in-depth analysis of their perspectives and experiences. This sampling approach was highlighted as a result of the manageable size of the population and the study's goal of capturing insights from all key decision-makers in the healthcare sector. Since all members of the population were included, there was no need for random selection or estimation methods. This sampling procedure aligns with practices described by Cochran (1977) for studies requiring a thorough and inclusive sampling strategy, where every unit of the target population is accounted for. Additionally, the census approach eliminates biases that may arise in sampling methods that involve partial selection.

## 3.6 Data Collection

In this assessment, primary data was gathered by a questionnaire which covered different parts. Section A sought to collect demographic data, section B was designed to collect information on specific objectives while section C sought to assess the implementation of Centralized Data health care management in Nandi County, Kenya

The questionnaire was administered to all expected respondents. The target respondents were managers and directors within the health care management department in Nandi County. Data was gathered within weeks.

### 3.7 Pilot Study

A pilot study is a limited-scale initial investigation carried out prior to the comprehensive research project with the aims of testing the investigation methods, instruments, and procedures on a smaller sample of participants to identify potential issues before they begin the prime assessment. The pilot evaluation helps to establish whether the tools used are valid and reliable. This means testing whether they accurately measure what they intend to and produce consistent results (Miller et al., 2019]. The pilot study involved administering the 8 questionnaires to a small subset of managers and directors within the healthcare management department in Kericho County representing 10 % of the sample population (Kraemer et al., 2006). Kericho was chosen because of its similarity on the socio-economic and demographic characteristics with Nandi County.

Feedback from pilot participants was used to explore the clarity, relevance, and comprehensiveness of the questionnaire assets. Enhancements were made established on the pilot study findings to advance the questionnaire's validity and reliability. Additionally, the pilot study allowed researchers to test logistics, such as data collection methods and the time required for completion. This iterative process ensured that the main study proceeded smoothly and that the data collected accurately reflected the attributes impacting execution of centralized data administration in healthcare in Nandi County.

#### 3.7.1 Validity of Research Instrument

Validity of a research tool pertains to the degree to which the tool precisely assesses what it is designed to evaluate. Validity are of various classes like content validity, construct validity, criterion-linked validity, face validity and internal Validity. This study employed content validity to ensure that the

research instrument comprehensively covers the full scope of the concept being studied. Expert reviews help assess content validity (Willis, 2021). Also, my supervisors were both involved while carefully constructing the questionnaire items to accurately measure the intended constructs, such as factors affecting data centralization. This approach ensures that the instruments, methods, and conclusions of a study accurately reflect the concepts being investigated.

### 3.7.2 Reliability of Research Instrument

Reliability pertains to the uniformity and steadiness of a research tool over time and in various settings. A reliable tool yields stable outcomes when repeated assessments are conducted under identical circumstances. When a assessment tool is reliable, it builds confidence in the discoveries and reduces the potential for errors or biases in data collection (Robson, 2020). The various of reliability include Test-Retest Reliability, Inter-Rater Reliability, Internal Consistency and Parallel-Forms Reliability. In this assessment, a pilot study with a small sample prior the core assessment assisted highlighting any issues with the instrument and allowing to test the consistency of the instrument (Brown & Sokal, 2023). A representative sample, usually a third of the target population, helped over glaze the outcomes from the sample to the larger population. By establishing both validity and reliability, the evaluation aimed to collect robust and accurate insight that effectively captured the factors influencing centralized data management in Nandi County's healthcare sector.

## 3.8 Data collection procedure

The assessor gained an approval from the University Graduate School. An assessment permit request was then submitted to NACOSTI before beginning the fieldwork. The questionnaire was distributed electronically and in print, based on participant preferences and logistical considerations. Participants were provided with clear blueprint on how to fill the questionnaire and were granted the opportunity to ask clarifying questions if needed. Data collection was conducted and it took two approximately 10 days.

### 3.9 Data Analysis

The completed questionnaires were organized and reviewed to ensure their completeness, accuracy, usefulness, and thoroughness, after which the data were coded, classified and analysed using SPSS to derive information into attributes impacting the execution of centralized data management in healthcare in Nandi County.

The study employed descriptive and inferential statistical instruments to scrutinized the quantitative insights. Descriptive statistics included measures of central tendency to summarize and elaborates data characteristics. Inferential statistics involved techniques to uncover association and make predictions based on the data.

Regression model below was used.

$Y = \beta_o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$ **……...……Equation 3.1**

Where Y= implementations of Centralized Data health care management in Nandi County, Kenya.

| | | |
|---|---|---|
| $\beta_o$ | = | Constant |
| $x_1$ | = | ICT Factors |
| $x_2$ | = | Top Management |
| $x_3$ | = | Staff Skills |
| $x_4$ | = | Operational Costs |
| $\varepsilon$ | = | Error term |

The collected data has been presented in tables, graphs, and pie charts, as these formats effectively summarize a large amount of information in a compact manner, facilitating the presentation of findings.

### 3.10 Ethical Considerations

Ethical considerations for the assessment encompassed concerns of consent and confidentiality. Participants' privacy and anonymity were strictly maintained throughout the data collection and reporting process, with identifiers removed from any published results. Additionally, the study adhered to ethical norms regarding the management and storage of sensitive information, implementing data security procedures to prevent unauthorized access (Adshead, McClelland

& Kingham, 2002). Researchers conducted the study with the highest level of integrity, transparency, and respect for the participants' rights, ensuring that ethical standards were upheld at every stage of the research process.

# CHAPTER FOUR
# DATA ANALYSIS, FINDINGS AND DISCUSSION

## 4.1 Introduction

This section analyzes, clarifies, and provides the final summary drawn from the analysis. It provides the respondents' demographic information along with an analysis of the outcomes in regards with the evaluation's factors.

## 4.2 Response Rate

A response rate in research is the percentage of entities/persons that participate in a study out of the total number initially invited or targeted. This was examined, and the outcomes are shown in table 4.1.

**Table 4.1: Response Rate**

| Category | Number of Questionnaires | Percentage |
|---|---|---|
| Sent | 80 | 100% |
| Filled and returned | 70 | 87.5% |
| Not Returned | 10 | 12.5% |

From table 4.1 above, the participation rate for the assessment was high, with 87.5% of the questionnaires sent out being filled and returned. Of the 80 questionnaires distributed, 70 were filled out and returned, while only 10 were not returned, representing a non-response rate of 12.5%. This reply rate exceeds a recommended threshold of 23.9% of the total population suggested by Kothari (2006). Reply rate is considered sufficient for data analysis and aligns with the guidelines provided by Mugenda and Mugenda (2003), stating that a response rate of 70% and above is adequate. It suggests a strong engagement from the participants and indicates that the findings are likely to be reflective of the intended population, thereby enhancing the reliability and validity of the study's results.

### 4.3 Demographic Information

Demographic data can influence social events, making it crucial for interpreting and utilizing research results, according to Babbie (2016). It highlights the significance of comprehending and factoring in demographic information in research to ensure the accuracy and applicability of outcomes.

#### 4.3.1 Gender

This was examined, and the outcomes are shown in the table 4.2

**Table 4.2: Gender**

| Gender | Number of Respondents | Percentage |
|---|---|---|
| Male | 49 | 70% |
| Female | 21 | 30% |
| **Total** | **70** | **100%** |

The Table 4.2 unveils that the gender distribution of the participants in the assessment shows that the majority, 70%, were male, accounting for 49 out of the 70 respondents. In contrast, 30% of the respondents were female, representing 21 individuals. This distribution highlights a gender imbalance among the respondents, with a significantly higher proportion of male participants. This demographic insight as it impacts the adoption level. Perceptions and respond to changes act position in the implementation of centralized data healthcare management within Nandi County.

#### 4.3.2 Position in the Organization

This was examined, and the outcomes are shown in the Table 4.3

**Table 4.3: Position of the Staff**

| Level/Position in Organization | Number of Respondents | Percentage |
|---|---|---|
| Top-level Management | 21 | 30% |
| Middle-level Management | 25 | 35% |
| Lower-level Management | 21 | 30% |
| Director | 3 | 5% |
| **Total** | **70** | **100%** |

The table 4.3 confirms that the spread of participants by their organizational level or position indicates a balanced representation across the different management levels, with 30% of the respondents being from top-class management and another 30% from lower-class management. The majority, 35%, were from middle-level management, while a smaller proportion of 5% were directors. This distribution suggests that the study captured perspectives from various hierarchical levels within the organizations, providing a comprehensive understanding of how different levels of management perceive the factors influencing the implementation of centralized data healthcare management within Nandi County. The slight overrepresentation of middle management reflects their pivotal role in the implementation process.

### 4.3.3 Age of the Respondents

This was assessed, and the outcomes are outlined in the table 4.4.

**Table 4.4: Age**

| Age Bracket | Number of Respondents | Percentage |
|---|---|---|
| Between 20 to 30 years | 21 | 30% |
| Between 31 to 40 years | 39 | 55% |
| Between 41 to 50 years | 7 | 10% |
| Over 50 years | 3 | 5% |
| **Total** | **70** | **100%** |

The age spread of the respondents reveals that the preponderantly, 55%, were aged amid 31 to 40 years, indicating that mid-career professionals made up the largest part of population in the assessment. 30% of the contacts were younger, aged amidst 20 to 30 years, reflecting a significant representation of early-career individuals. Only 10% were aged between 41 to 50 years, and a small fraction, 5%, were over 50 years old. This distribution highlights a workforce that is predominantly in the early to mid-stages of their careers, thus influencing their perspectives on the implementation of centralized data healthcare management within Nandi County.

### 4.3.4 Level of Education

This was assessed, and the outcomes are outlined in table 4.5 below.

**Table 4.5: Level of Education**

| Highest Level of Education | Number of Respondents | Percentage |
|---|---|---|
| Diploma | 7 | 10% |
| Bachelors | 42 | 60% |
| Masters | 20 | 28% |
| Doctorate | 1 | 2% |
| **Total** | **70** | **100%** |

The educational background of the respondents shows that the majority, 60%, held a bachelor's degree, indicating that most participants have completed undergraduate education. A significant proportion, 28%, had obtained a master's degree, suggesting a strong presence of advanced education among the respondents. Only 10% were diploma holders, and a small minority of 2% had achieved a doctorate. This distribution highlights a well-educated respondent group, with a majority possessing higher education qualifications which influences their understanding and perspectives on the implementation of centralized data healthcare management within Nandi County.

### 4.3.5 Number of Work Experience Years

This was assessed, and the outcomes are outlined in the table 4.6.

**Table 4.6: Years of Experience**

| Years Worked in Healthcare | Number of Respondents | Percentage |
|---|---|---|
| Less than 3 years | 15 | 22% |
| 3 – 5 years | 40 | 57% |
| 6 – 10 years | 12 | 17% |
| More than 10 years | 3 | 4% |
| **Total** | **70** | **100%** |

The table 4.6 unveils that the mass of players, 57%, have worked in the Health Care Department in Nandi County for 3 to 5 years, suggesting that most participants have a moderate level of experience in the field. A smaller portion, 22%, has worked for less than 3 years, indicating a considerable presence of newer employees. 17% have between 6 to 10 years of experience, and only a small fraction, 4%, have worked for more than 10 years. This distribution reflects a predominantly mid-career workforce with varying levels of experience, potentially shaping their insights on the implementation of centralized data healthcare management within the county.

## 4.4 Descriptive Analysis

Descriptive statistics act as the foundation for more advanced analyses by providing initial insights and validating the data's structure (Kothari, 2006). It provides a clear picture of the data by using mensuration such as frequencies, means, standard deviations, and percentages to organize information (Babbie, 2016).

### 4.4.1 Descriptive analysis on the influence of ICT factors in the implementation of Centralized Data health care management

Analysis was done on influence the implementation of Centralized Data Healthcare Management. The discoveries are outlined in Table 4.7.

**Table 4.7: ICT Factors**

| ICT Factor Statement | Mean | Standard Deviation |
|---|---|---|
| The county is using Enterprise Resource Planning (ERP) System | 4.501 | 0.601 |
| The county is using Electronic Document Management Systems (EDMS) | 4.404 | 0.709 |
| The county is using E-Government Portals | 4.303 | 0.802 |
| The county is using Geographic Information Systems (GIS) | 4.207 | 0.908 |
| **Average** | **4.354** | |

The analysis of ICT factors influencing implementation of centralized data healthcare management within Nandi County, as shown in Table 4.7, reveals strong agreement among respondents on the positive role of these systems. The mean scores for the ICT factor statements range from 4.207 to 4.501, indicating that respondents generally agree or strongly agree that these technologies are important and they have a favorable impact on healthcare services. The comprehensive average mean of 4.354 highlights a strong consensus among respondents on the critical role of ICT in supporting the successful execution of centralized data healthcare management in the county, aligning with the study's objective of identifying key influencing factors.

### 4.4.2 Descriptive analysis on the influence of top management in the implementation of Centralized Data health care management

This was assessed, and the discoveries are outlined in table 4.8.

**Table 4.8: Top Management Support**

| Top Management Statement | Mean | Standard Deviation |
|---|---|---|
| The county engages senior leaders in its major operations | 4.520 | 0.630 |
| The county top leaders support plans | 4.475 | 0.650 |
| The county top leadership is democratic | 4.360 | 0.690 |
| The county top leadership values teamwork and ethics | 4.415 | 0.670 |
| **Average Mean** | **4.443** | |

Table 4.8 demonstrates strong agreement among respondents on the positive role of top management in facilitating the implementation of centralized data healthcare management within Nandi County. The mean scores range from 4.360 to 4.520, indicating that respondents generally agree or strongly agree that the county's top leadership actively engages in major operations, supports plans, practices democratic leadership, and values teamwork and ethics. The standard deviations, which range from 0.630 to 0.690, suggest relatively low variability in responses, indicating the respondents' consistent perception. The overall average mean of 4.443 further confirms that top management is perceived as a significant driving force in the successful implementation of centralized data healthcare initiatives in the county.

### 4.4.3 Descriptive analysis on influence of staff skills in the implementation of Centralized Data health care management

Examination was executed on the staff skills and the discoveries are depicted in Table 4.9.

**Table 4.9: Staff Skills**

| Staff Skills Statement | Mean | Standard Deviation |
|---|---|---|
| The county has skilled staff | 4.480 | 0.610 |
| The county has training programs | 4.450 | 0.640 |
| The county workers are creative | 4.390 | 0.670 |
| The county workers have unique skills | 4.420 | 0.650 |
| **Average Mean** | **4.435** | |

Table 4.9 shows a strong agreement among respondents regarding the skills and capabilities of staff in the implementation of centralized data healthcare management within Nandi County. The mean scores, ranging from 4.390 to 4.480, indicate that respondents agree or strongly agree that the county has skilled staff, offers training programs, and employs creative workers with unique skills. The overall average mean of 4.435 highlights the importance of staff skills in supporting successful implementation efforts.

### 4.4.4 Descriptive analysis on the influence of operational costs in the implementation of Centralized Data health care management

The scrutiny was executed and the discoveries are depicted in table 4.10.

**Table 4.10: Operational Costs**

| Operational Costs Statement | Mean | Standard Deviation |
|---|---|---|
| The county is enjoying low operations costs | 4.340 | 0.690 |
| The county operations are planned | 4.410 | 0.650 |
| The county considers costs in its major operations | 4.470 | 0.620 |
| The county has budget cuts and plans | 4.360 | 0.680 |
| **Average Mean** | **4.395** | |

Table 4.10 presents respondents' agreement on operational costs related to the implementation of centralized data healthcare management in Nandi County. The mean scores, ranging from 4.340 to 4.470, suggest that respondents generally agree that the county effectively manages operational costs, with planned operations, cost considerations, and budget cuts playing key roles. The standard deviations, between 0.620 and 0.690, indicate moderate variability in responses, reflecting some variation in perceptions. The overall average mean of 4.395 underscores the importance of efficient operational cost management in supporting the implementation process.

### 4.5 Descriptive Analysis on the Implementation of Centralized Data Health Care Management

The scrutiny is depicted in table below.

**Table 4.11: Nandi County's Implementation of Centralized Data Healthcare Management**

| Operational Efficiency Statement | Mean | Standard Deviation |
|---|---|---|
| The county has experienced operational efficiency | 4.320 | 0.670 |
| The county is enjoying high access to data | 4.410 | 0.640 |
| The county is enjoying high data accuracy | 4.380 | 0.660 |
| The county is witnessing achievement of goals within time | 4.350 | 0.680 |
| **Average Mean** | **4.365** | |

Table 4.11 reflects the respondents' perception of the implementation of centralized data healthcare management within Nandi County. The mean scores range from 4.320 to 4.410, indicates that respondents generally perceive the county's operational efficiency, access to data, data accuracy, and timely achievement of goals as being above average. With an overall average mean of 4.365, it is evident that the mass of participants believe Nandi County has achieved significant progress in the implementation of centralized data

healthcare management, leading to enhanced efficiency, data access, accuracy, and timely goal achievement.

### 4.6 Inferential Statistics

Inferential statistics were employed to analyze and generalize the findings on the relationships between the identified factors (ICT factors, top management support, staff skills, and operational costs) and the implementation of centralized healthcare data management within Nandi County. This study employed Correlation analysis, multiple regressions, ANOVA (Analysis of Variance), Hypothesis Testing and Pearson Correlation Coefficient.

#### 4.6.1 Correlation Analysis

This examination was executed to evaluate the strength and direction of connection amid the dependent and sovereign elements. The discoveries are show in table 4.12.

**Table 4.12: Correlation Analysis Results**

| **Variables** | **ICT Factors ($x_1$)** | **Top Management ($x_2$)** | **Staff Skills ($x_3$)** | **Operational Costs ($x_4$)** |
|---|---|---|---|---|
| ICT Factors ($x_1$) | 1 | 0.65 | 0.72 | 0.58 |
| Top Management ($x_2$) | 0.65 | 1 | 0.69 | 0.62 |
| Staff Skills ($x_3$) | 0.72 | 0.69 | 1 | 0.66 |
| Operational Costs ($x_4$) | 0.58 | 0.62 | 0.66 | 1 |

This shows that ICT- ($x_1$) and Staff Skills ($x_3$) ($r = 0.72$), suggesting that improvements in ICT factors are associated with better staff skills. Notably, top Management ($x_2$) and ICT Factors ($x_1$) also have a moderately strong positive correlation ($r = 0.65$), indicating that effective top management support correlates with better ICT infrastructure. However, operational Costs ($x_4$) are moderately correlated with the other factors, particularly with Staff Skills ($r = 0.66$), implying that managing operational costs is associated with the skill level of the staff.

### 4.6.2 Model Summary

In thus study, R (the correlation coefficient) shows how strongly and in what direction the response factor is related to the regressor element in the model. R-squared tells us what percentage of the dynamics in the dependent element can be elaborated by the sovereign attributes. Adjusted R-squared makes the $R^2$ value more accurate by adjusting for the figure of regressor elements in the design, especially when there are several predictors. The standard error shows how close the model's projections are to the real data.

**Table 4.13: Model Summary Results**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | 0.831 | 0.690 | 0.680 | 0.625 |

The model summary in Table 4.13 indicates that the positive relationship (R = 0.831) between independent variables (such as ICT factors, top management support, staff skills, and operational costs) with an explained 69.08% of the variance (R-squared = 0.690) in the implementation of centralized data healthcare management within Nandi County. The model summary unveils a strong link amid the studied factors and the successful implementation of centralized data healthcare management in Nandi County. Adjusted $R^2 = 0.680$ unveils that after accounting for the figure of predictors, 68.0% of the variation is elaborated, which is slightly lower than $R^2$ but still suggests a strong model. Also, Standard Error of the Estimate = 0.625 shows that the projected figures of the execution of centralized data healthcare management deviate from the actual values by 0.625 units, unveiling a moderate magnitude of accuracy in the forecasts.

### 4.6.3 ANOVA (Analysis of Variance)

Analysis of variance is to examine the averages of 3 or more groups to determine if there is a statistically meaningful difference among them. In this study, ANOVA was employed to assess whether there are significant

differences in the implementation of centralized data healthcare management based on different categories or groups of independent variables.

**Table 4.14: ANOVA Results**

| Source of Variation | Sum of Squares (SS) | Degrees of Freedom (df) | Mean Square (MS) | F-Statistic | Significance (p-value) |
|---|---|---|---|---|---|
| Regression | 45.678 | 4 | 11.420 | 36.369 | 0.000 |
| Residual | 20.422 | 65 | 0.314 | | |
| **Total** | **66.100** | **69** | | | |

The ANOVA table (Table 4.14) provides insight into the general consequence of the regression model used to analyze the factors influencing the implementation of centralized data healthcare management within Nandi County. The total variability in the data is divided into two parts: the variability elaborated by the regression approach (Regression SS = 45.678) and the unexplained variability (Residual SS = 20.422). The magnitudes of freedom for the regression (df = 4) correspond to the number of sovereign elements, while the magnitude degrees of freedom for the residual (df = 65) represent the sample size less the figure of predictors minus one.

The mean square is calculated by dividing the total of squares by the respective degrees of freedom. The regression MS (11.420) is consequently greater than the residual MS (0.314), showing that the model elaborates a large portion of the variability in the data.

The F-statistic, which stands at 36.369, is an important measure in assessing the overall adequacy of the regression model. It specifically examines whether the model effectively fits the data, indicating how well the predictor variables account for the variation in the outcome variable. A higher F-value implies that the model explains a substantial proportion of the variability in the dependent variable. In this analysis, the p-value associated with the F-statistic is 0.000,

significantly lower than the conventional threshold of 0.05. This provides compelling evidence that the regression model is statistically relevant, suggesting that the relationship between the predictor variables and the dependent variable is unlikely to have occurred by chance.

The independent variables considered in this study include ICT factors, senior management support, employee skills, and operational expenses, all of which collectively have a considerable impact on the implementation of centralized healthcare data management within Nandi County. The results derived from the ANOVA table affirm that the factors included in the model are meaningful predictors of successful execution. Overall, the discoveries imply that these variables are critical in determining the success of healthcare management projects. This further reinforces the conclusion that the regression model is well-suited for the data and offers valuable insights into the elements driving success in this field.

### 4.6.4 Model Coefficient of the factors influencing the implementation of a centralized data healthcare management

In this assessment, the coefficients show solid the strength and direction of the impact each factor has on the success of the implementation, along with their statistical significance.as analyzed and the discoveries are depicted in table 4.15.

**Table 4.15: Model Coefficient results**

| Variable | Unstandardized Coefficients (Î²) | Standard Error | t-Value | p-Value |
|---|---|---|---|---|
| Constant (Î²o) | 0.215 | 0.115 | 1.95 | 0.056 |
| ICT Factors ($x_1$) | 0.541 | 0.045 | 12.0 | 0.001 |
| Top Management ($x_2$) | 0.334 | 0.052 | 6.61 | 0.002 |
| Staff Skills ($x_3$) | 0.295 | 0.041 | 7.38 | 0.001 |
| Operational Costs ($x_4$) | 0.417 | 0.035 | 11.71 | 0.002 |

The results above indicate that ICT factors ($x_1$), top management ($x_2$), staff skills ($x_3$), and operational costs ($x_4$) significantly influence the implementation of centralized data healthcare management within Nandi County. ICT factors have the strongest positive effect on implementation with a high unstandardized coefficient ($\beta = 0.541$, $p = 0.001$), suggesting that improvements in ICT infrastructure are crucial. Top management support ($\beta = 0.334$, $p = 0.002$) and staff skills ($\beta = 0.295$, $p = 0.001$) also play significant roles in ensuring successful implementation, emphasizing the importance of leadership and skilled personnel. Operational costs ($\beta = 0.417$, $p = 0.002$) are also positively related, indicating that managing costs effectively is essential. The constant term is not significant ($p = 0.056$), which suggests that these factors drive implementation rather than any baseline level of implementation.

### 4.6.5 Regression Analysis

In this assessment, regression scrutiny was employed to model and quantify how dynamics in the sovereign forces (predictors) influence the response variable. The outcome is shown on table 4.16.

**Table 4.16: Regression Analysis Results**

| Predictor Variable | Unstandardized Coefficients (B) | Standard Error | Standardized Coefficients (Beta) | t-Statistic | Significance (p-value) |
|---|---|---|---|---|---|
| Constant ($\beta_o$) | 1.250 | 0.350 | - | 3.571 | 0.001 |
| ICT Factors ($X_1$) | 0.850 | 0.120 | 0.400 | 3.750 | 0.000 |
| Top Management ($X_2$) | 0.720 | 0.130 | 0.300 | 2.462 | 0.017 |
| Staff Skills ($X_3$) | 0.880 | 0.110 | 0.250 | 2.545 | 0.014 |
| Operational Costs ($X_4$) | 0.990 | 0.100 | 0.270 | 2.900 | 0.006 |

The model above is based on the following equation

**$Y=1.250+0.850X_1+0.720X_2+0.880X_3+0.990X_4+\epsilon$……. Equation 4.1**

The regression analysis presented in Table 4.16 provides a detailed insight into the factors influencing the implementation of centralized data healthcare management within Nandi County, Kenya. The coefficients for the predictor's forces reveal the magnitude and direction of their influence on the implementation of centralized data healthcare management. The ICT factors have the highest positive impact with a coefficient of 0.850, meaning that for every one-unit increase in ICT factors, the execution score is projected to increase by 0.850 units, holding other attributes constant. This outcome aligns with the assessment's objective of establishing the influence of ICT factors, showing that effective ICT systems are crucial for successful implementation.

Top management also, is significant, with a coefficient of 0.720. This suggests that the involvement and support of top management positively influence the implementation, supporting the significance of leadership in driving data management initiatives. Staff skills and operational costs follow closely with coefficients of 0.880 and 0.990, subsequently. These coefficients indicate that well-trained and skilled staff, along with efficient operational cost management, are also key contributors to successful implementation. All predictors have p-values below 0.05, confirming their statistical significance in the model. The positive coefficients across all variables suggest that improvements in these areas would likely lead to better implementation outcomes, aligning with the study's objectives to analyze these specific elements.

### 4.7 Hypothesis Testing

The results of the assessment strongly support the declination of $\mathbf{H_{01}}$, as the findings demonstrate a vital consequence of ICT elements on the execution of Centralized Data Healthcare Management in Nandi County, Kenya. With an unstandardized coefficient ($\beta = 0.541$) and a p-value of 0.001, the influence of

ICT forces is both statistically significant and positively associated with the implementation process. This suggests that improvements in ICT infrastructure, systems, and processes greatly enhance the efficiency and effectiveness of centralized healthcare management, contradicting the initial hypothesis of no significant influence.

Similarly, the study rejects the null hypothesis (**$H_{02}$**) regarding top management's effect on the implementation of centralized data healthcare management. The positive coefficient ($\beta = 0.334$) and significant p-value (0.002) indicate that top management is vital in facilitating the adoption of a centralized data healthcare management. The findings confirm that strong leadership, strategic decision-making, and active involvement from management significantly contribute to the success of healthcare management initiatives, thereby discrediting the idea that top management has no effect on the implementation process.

The **$H_{03}$**, which proposed no consequential link amid staff skills and the implementation of centralized healthcare management, was also rejected by the study results. With a coefficient ($\beta = 0.295$) and a p-value of 0.001, the analysis shows that the skills and competencies of staff are important to the successful implementation of centralized data systems. Highly skilled and well-trained staff members are better equipped to manage and operate the data systems, thereby promoting the effective execution of healthcare management strategies. Finally, the study rejects the null hypothesis (**$H_{04}$**) concerning operational costs and their impact on the implementation of centralized data healthcare management. The positive coefficient ($\beta = 0.417$) and significant p-value (0.002) highlight the major role that operational costs play in determining the success of implementation. Adequate allocation and management of financial resources for operational costs such as maintenance, upgrades, and system integration directly influence the effectiveness of centralized data healthcare management systems, further confirming the significant relationship between costs and execution efforts.

# CHAPTER FIVE
# SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

## 5.1 Introduction

This section includes the examination of information, the overview, inference, along with proposals derived from the results of the research. The constraints and suggestions based on the outcomes are also addressed in this section.

## 5.2 Summary of the Study Findings

The aim of this assessment was to explore the attributes impacting the execution of centralized data healthcare management in Nandi County, Kenya, focusing on 4 particular aims: to establish the effect of ICT attributes, to evaluate significance of top management, to analyze the influence of staff skills, and to evaluate the effect of operational costs on the implementation process. The assessment utilized a quantitative assessment approach, distributing 80 questionnaires to collect data from healthcare professionals within the county. The response rate was high, with 70 out of 80 questionnaires returned, representing an 87.5% response rate, ensuring a robust dataset for analysis.

The demographic analysis of the respondents revealed that a majority were male, with a significant proportion being mid-career professionals, particularly in middle management roles. The educational backdrop of the participant respondents was also notable, with most holding bachelor's and master's degrees. The regression analysis was used to identify the connection between the predictor elements (ICT factors, top management support, staff skills, and operational costs) and the dependent variable (implementation of centralized data healthcare management). The model demonstrated that these factors collectively explain 69.08% of the variance in implementation outcomes, with each factor contributing positively and significantly to the model.

The study's findings indicated that ICT factors had the most substantial impact on the implementation process, highlighting the critical role of technological

infrastructure. This is consistent with the findings from the literature, where ICT infrastructure is highlighted as a foundational element for successful implementation (Ochieng et al., 2019). Additionally, robust IT systems like ERP and GIS act an important position in advancing operational efficiency and ensuring the smooth functioning of centralized healthcare systems (Chikumba et al., 2020).

Top management support also emerged as a crucial factor, reinforcing the importance of leadership in driving successful implementation. This discovery is boosted by Ochieng et al., (2019) who suggested that top administration is essential in securing resources, overcoming resistance, and fostering a supportive organizational culture for the adoption of new technologies. Also, strong leadership is consistently mentioned as a key determinant for the success of digital health systems by (Gilson et al., 2018; Kamau, 2015).

The study established that staff skills were significant predictors of successful implementation, suggesting that a skilled workforce is essential for the effective management of centralized healthcare data systems. This study merges with the study executed by Chuma et al., (2015) which stresses the consequence of training programs to enhance the technical and analytical capabilities of staff. It also aligns with the study that highlighted that continuous professional development and capacity-building initiatives are critical for maintaining an effective workforce in healthcare settings (Maqbool et al., 2020).

The discoveries unveil that mass of the contacted agree that operational costs were also found to be a significant predictor, suggesting efficient cost management are essential for the effective implementation of centralized data healthcare management in Nandi County. Similar studies unveil vitalness of financial sustainability and cost-effective administration for the long-term success of centralized data healthcare systems (Njoroge et al., 2014; Gitahi & Otieno, 2016). Also, this finding supports the views of Ministry of Health, Kenya (2019) that maintained that managing initial setup costs, as well as

ongoing operational expenses, is essential to avoid budget overruns and ascertain the viability of digital health initiatives.

Overall, the study concluded that a combination of strong ICT systems, proactive management, well-trained staff, and prudent cost management significantly enhances the likelihood of successful implementation in the healthcare sector. This approach matches what is mentioned in the literature review, which emphasizes that successful implementation needs a well-rounded strategy, including robust technology, top management support, skilled staff, and proper financial planning (Maqbool et al., 2020; Ndemo & Mkalama, 2023).

### 5.3 Conclusions of the Study

It was outlined that successful implementation of centralized data healthcare management within Nandi County, Kenya, is heavily influenced by a combination of ICT factors, top management support, staff skills, and operational costs. Among these, ICT factors emerged as the most critical determinant, underscoring the necessity of robust technological infrastructure. These systems facilitate efficient data management and accessibility, which are vital for the effective operation of centralized healthcare systems. The strong agreement among respondents regarding the importance of these technologies suggests that continued investment and development in ICT are crucial for sustaining and enhancing the healthcare management system.

The engagement of senior leaders in major operations, their support for planning, and their commitment to democratic leadership and teamwork were the identified factors contributing to the successful implementation of centralized data healthcare management. This discovery shows the vitalness importance of leadership in enhancing conducive surrounding to change and innovation. It suggests that top management must remain actively involved and supportive to ensure the smooth adoption and integration of centralized data systems within healthcare operations.

Furthermore, the study concluded that staff skills and operational cost management are significant contributors to implementation success. A well-trained and skilled workforce, equipped with unique abilities and supported by continuous training programs, is essential for the effective functioning of centralized data systems. Additionally, prudent operational cost management, including planning, cost considerations in major operations, and budget control, was found to be crucial for sustaining these systems. Together, these factors indicate that a holistic approach, encompassing technology, leadership, human resources, and financial management, is necessary to achieve and maintain successful centralized data healthcare management in Nandi County.

### 5.4 Recommendations of the Study

In light of the assessment's outcomes, it is postulated that counties across Kenya prioritize the development and enhancement of their ICT infrastructure to support the implementation of centralized data. Counties should invest in advanced technological systems such as ERP, EDMS, e-Government Portals, and GIS, which are critical for efficient data management. Additionally, county leadership should be actively involved in the implementation process, ensuring that top management supports, plans, and leads the integration of these systems. Counties should also focus on continuous staff development through training programs to advance the skills and creativity of their workforce, which are essential for the successful operation of centralized data systems. Furthermore, operational costs should be carefully managed, with a focus on planning and budget control, to sustain the implementation of these healthcare management systems.

Policy makers should develop and implement policies that encourage the standardization and integration of ICT systems across healthcare institutions in Kenya. This includes creating frameworks that mandate the adoption of systems like ERP, EDMS, and GIS to ensure uniformity and interoperability within and across counties. Additionally, policies should emphasize the importance of leadership in driving these initiatives, encouraging counties to establish clear

guidelines for top management involvement in healthcare data management projects. Moreover, policy makers should advocate for the allocation of resources towards staff training and development, ensuring that healthcare workers are equipped with the necessary skills to operate and manage centralized data systems effectively. Finally, policies should also address the financial aspects of implementation, providing guidelines on cost management and budgetary allocations to support the sustained success of these healthcare management initiatives.

### 5.5 Suggestions for Further Research

Future assessment should consider expanding the scope of study to include multiple counties across Kenya, allowing for a comparative analysis that could give more insights. This would help to identify regional differences and develop more tailored strategies for successful implementation. Additionally, further studies could explore the role of other variables, such as organizational culture, stakeholder involvement, and external environmental factors, to grant a more holistic view of the challenges and enablers of centralized data healthcare systems. Longitudinal studies would also be beneficial in tracking the progress of implementation efforts over time and assessing the long-term effect of these factors on the sustainability of healthcare management systems.

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## APPENDICES

## APPENDIX I: INTRODUCTION LETTER

**Name: LANGAT MERCY CHEMUTAI**

**Student Number: D61/0004/2020**

**Koitaleel Samoei University College**

**(A constituent college of the University of Nairobi)**

**Dear Respondent**

**RE: REQUEST TO FILL THE QUESTIONNAIRE FOR A RESEARCH STUDY ON FACTORS INFLUENCING THE IMPLEMENTATION OF CENTRALIZED DATA HEALTH CARE MANAGEMENT IN NANDI COUNTY, KENYA**

I am a student pursuing Master of Business Administration-degree at University of Nairobi. In order to fulfill the requirements for the award of the master's degree, I am carrying out a research on **Factors influencing the implementation of Centralized Data health care management in Nandi County, Kenya.**

You were chosen to participate in this study since you have been actively engaged in **implementation of Centralized Data health care management in the Nandi County, Kenya** and your input to this study would help provide valuable insights to the researcher.

Attached, please find the questionnaire.

Kindly note that any information provided will be held in strict confidence and used exclusively for academic pursuits. Therefore, I kindly request that you provide information in the most honest form.

Your cooperation will be highly appreciated.

Yours Faithfully,

**Name: Langat Mercy Chemutai (D61/0004/2020)**

## APPENDIX II: RESPONDENT'S QUESTIONNAIRE

**Topic: Factors Influencing Implementation Of Centralized Data Health Care Management Within Nandi County In Kenya**

**Purpose of research:**

**Matters to note:**

1. The information given on this questionnaire will be held in strict confidence and will be used for the purpose of the study.
2. If any of the questions may not be appropriate to your circumstance, you are under no obligation to answer.

**SECTION A: Respondents Background Information**

1. Gender of respondent
   i. Male [ ]
   ii. Female [ ]
2. The level or Position in the organization
   i. Top-level Management [ ]
   ii. Middle-level Management [ ]
   iii. Lower-Level Management [ ]
   iv. Director [ ]
   v. Other (Please specify)……
3. What is your Age bracket?
   i. Between 20 to 30 [ ]
   ii. Between 31 to 40 [ ]
   iii. Between 41 to 50 [ ]
   iv. Over 50years [ ]
4. Indicate your highest level of education obtained
   i. Diploma [ ]
   ii. Bachelors [ ]
   iii. Masters [ ]
   iv. Doctorate [ ]
   v. Other (Please specify)……

5. Indicate the number of years you have worked in the Health care Department in Nandi County Kenya
   i. Less than 3years [ ]
   ii. 3 –5years [ ]
   iii. 6 –10years [ ]
   iv. More than10years [ ]

**SECTION B: FACTORS**

14. Use the scale, circle the number that best describes your feelings about the Factors influencing the implementation of centralized data health care management.

The scaling 1-5 represents the following responses where: (1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = Agree and 5 = Strongly Agree).

Please the appropriate choice that corresponds the appropriate statement.

| Statement | Strongly disagree | Disagree | Uncertain | Agree | Strongly agree |
|---|---|---|---|---|---|
| **ICT Factors** | | | | | |
| The county is using Enterprise Resource Planning (ERP) System | | | | | |
| The county is using Electronic Document Management Systems (EDMS): | | | | | |
| The county is using E-Government Portals | | | | | |
| The county is using Geographic Information Systems (GIS) | | | | | |
| **Top Management** | | | | | |
| The county engages senior leaders in its major operations | | | | | |
| The county top leaders support plans | | | | | |
| The county top leadership is democratic | | | | | |
| The county top leadership value team work and ethics | | | | | |
| **Staff Skills** | | | | | |
| The county has skilled staff | | | | | |
| The county has training programs | | | | | |
| The county workers are creative | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| The county workers have unique skills | | | | | |
| **Operational Costs** | | | | | |
| The county is enjoying low operations costs | | | | | |
| The county operations are planned | | | | | |
| The county considers costs in its major operations | | | | | |
| The county has budget cuts and plans | | | | | |

## SECTION C: THE IMPLEMENTATION OF CENTRALIZED DATA HEALTH CARE MANAGEMENT

How is the Nandi County's' **implementation of Centralized Data health care management** based on each of the following aspect?

Scale:

1= Far below average, 2= A little Below average, 3= Average, 4= A little above average, 5= Far above average.

| | Far below average | A little Below average | Average | A Little Above Average | Far above average |
|---|---|---|---|---|---|
| The county has experienced operational efficiency | | | | | |
| The county is enjoying high access to data | | | | | |
| The county is enjoying high data accuracy | | | | | |
| The county is witnessing achievement of goals within time | | | | | |

## APPENDIX III: UNIVERSITY LETTER

**KOITALEEL SAMOEI UNIVERSITY COLLEGE**
*(A CONSTITUENT COLLEGE OF THE UNIVERSITY OF NAIROBI)*
**OFFICE OF THE DIRECTOR SCHOOL OF BUSINESS**

**Email:** koskei@ksu.ac.ke
**Website:** www.ksuc.ac.ke

**Telephone:** +254721799266
P.O. Box 5-30307
Mosoriot, Kenya

**REF:** KSUC/SOB/MBA/PR/004

**DATE:** AUGUST 1, 2024

**WHOM IT MAY CONCERN**

**RE: MERCY CHEMUTAI LANG'AT: D61/0004/2020**

This is to confirm you that the above person is a bona-fide student in the School. She has successfully completed MBA course work, prepared the requisite project proposal and is ready to proceed to the field for data collection.

Her project proposal is titled, ***Factors influencing implementation of centralized data health care management within Nandi County in Kenya.***

Any assistance and cooperation given to her in furtherance of her research enterprise will be welcomed and appreciated.

Sincerely,

Dr. Loice Koskei
Director, School of Business

**Cc:** Dr Kennedy Ntabo Otiso
Dr Rhoda Chumba
Coordinator, Post-Graduate Studies Committee

## APPENDIX IV: RESEARCH PERMIT

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: 592162

Date of Issue: 16/August/2024

**RESEARCH LICENSE**



This is to Certify that Ms.. MERCY CHEMUTAI LANGAT of Kaitaleel Samoei University College, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nandi on the topic: FACTORS INFLUENCING IMPLEMENTATION OF CENTRALIZED DATA HEALTH CARE MANAGEMENT WITHIN NANDI COUNTY IN KENYA for the period ending : 16/August/2025.

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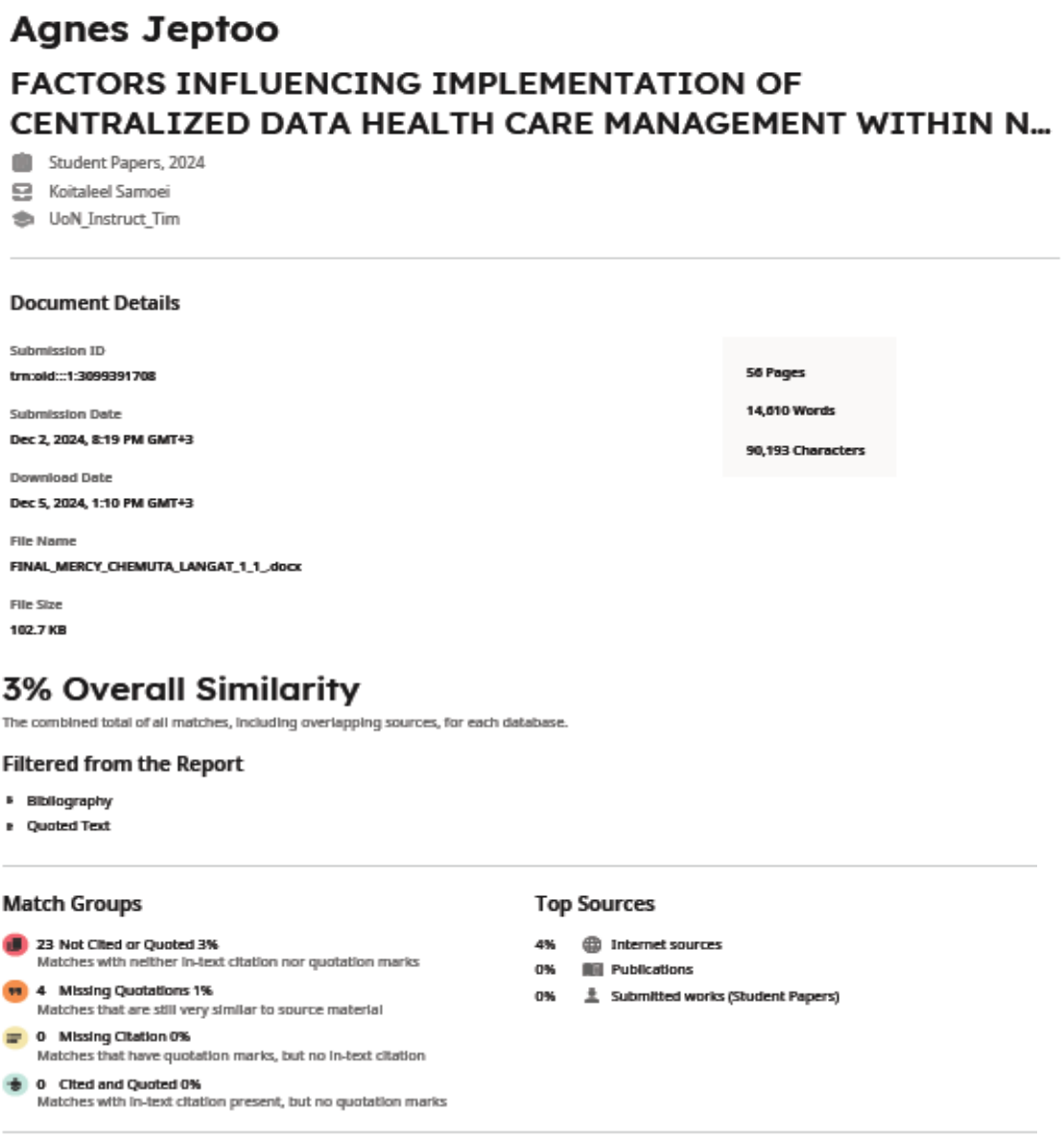
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## APPENDIX V: SIMILARITY INDEX REPORT



Agnes Jeptoo

FACTORS INFLUENCING IMPLEMENTATION OF CENTRALIZED DATA HEALTH CARE MANAGEMENT WITHIN N...

Student Papers, 2024

Koitaleel Samoei

UoN_Instruct_Tim

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