DIGITAL TRANSFORMATION STRATEGY AND PERFORMANCE OF E-CLAIMS SYSTEMS AT NATIONAL HEALTH INSURANCE FUND, KENYA

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An Applied Research Project Submitted to the School of Business in Partial Fulfilment of the Requirements for the Award of Master of Business Administration Degree in the Business School of Africa Nazarene University

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DECLARATION

STUDENT'S DECLARATION

I declare that this research project is my original work and has not been presented for a degree in any other University.

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This applied research project was submitted for examination with our approval as the University Supervisors.

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2nd SUPERVIRSOR'S DECLARATION

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DEDICATION

I dedicate this thesis to my parents.

ACKNOWLEDGEMENT

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ABSTRACT

The automation of health claims and the implementation of an advanced claims management system plays a crucial role in ensuring high-quality healthcare for patients. Claims processing is a vital function for insurance companies, as the speed and convenience with which claims are handled directly impact the overall reputation of the insurer. In Kenya alone, approximately 30 million medical claims are processed annually. However, an inefficient claims management system presents significant challenges, including high costs, time consumption, and increased instances of medical fraud. This research examined the effect of digital transformation strategy on the performance of e-claims systems at the National Health Insurance Fund in Kenya. The study objectives included assessing the impact of integrating digital technologies, evaluating the effect of data security compliance, examining the role of user experience, and determining the effect of interoperability with external systems on the performance of e-claims systems. The study was grounded in the Innovation Diffusion Theory, Resource-Based Theory, and Digital Business Transformation Framework. A case study research design was employed, targeting 166 employees at the National Health Insurance Fund headquarters. The sample size was determined using Yamane's formula, resulting in 95 respondents. Stratified random sampling was utilized as the sampling procedure. Data analysis was conducted using SPSS version 27.0, encompassing preliminary analysis, and descriptive and inferential analysis. Measures of central tendency (mean, median, and mode) were employed to describe the data set, while measures of variability (range, standard deviation) will assess data dispersion. Pearson Correlation Analysis and multiple regression models were employed. The results were presented using tables and figures. The study results found that integration of digital technologies significantly affects the performance of E-Claims Systems ($B = .646$, $p < .001$); data security compliance has a significant and positive effect on the performance of E-Claims Systems ($B = .528$, $p < .001$); user-experience has a significant and positive effect on the performance of E-Claims Systems ($B = .618$, $p < .001$) and that compatibility with external systems has a significant and positive effect on the performance of E-Claims Systems ($B = .703$, $p < .001$). The study concludes that the integration of digital technologies, data security compliance, user experience, and interoperability with external systems is integral to enhancing E-Claims Systems performance at NHIF. The general recommendation for the study is to prioritize the integration of digital technologies, ensure data security compliance, optimize user experience, and foster interoperability with external systems within E-Claims Systems at NHIF.

LIST OF ABBREVIATIONS

AI	Artificial Intelligence
EDI	Electronic Data Interchange
KPIs	Key Performance Indicators
ML	Machine Learning
NHIF	National Health Insurance Fund
RBT	Resource-Based Theory
VRIN	Valuable, Rare, Inimitable, and Non-Substitutable

DEFINITION OF TERMS

Data security compliance: Refers to the measures, policies, and practices implemented to safeguard the confidentiality, integrity, and availability of data within an organization's digital systems.

Integration of digital technologies: Involves the seamless incorporation and harmonization of various digital tools, systems, and platforms within an organization's existing infrastructure.

Interoperability with external systems: Refers to the ability of digital systems, such as e-claims systems, to seamlessly exchange data, information, and services with external systems or platforms.

Performance of e-claims systems: Relates to the effectiveness, efficiency, and overall outcomes achieved by electronic claims (e-claims) systems within the context of healthcare organizations.

Digital transformation strategy: Refers to the deliberate and planned adoption and integration of digital technologies and practices into an organization's overall strategy and operations to drive significant improvements, innovation, and competitive advantage.

User experience: Encompasses the quality and satisfaction experienced by users when interacting with digital systems, platforms, or applications. It involves aspects such as ease of use, intuitive design, responsiveness, and customization options.

CHAPTER ONE
INTRODUCTION AND BACKGROUND OF THE STUDY

1.1 Introduction

This chapter presents an overview of the background of the study, statement of the problem, purpose of the study, research objectives which consist of both general and specific objectives, research questions, significance of the study, scope of the study, limitation of the study, delimitation of the study and the conceptual framework.

1.2 Background of the Study

The automation of health claims and the implementation of advanced claims management systems are increasingly recognized as pivotal elements in enhancing the efficiency and quality of healthcare services. In the insurance sector, the speed and convenience of claims processing are critical factors that influence customer satisfaction and the overall reputation of insurers (Antony, Menon & Vargese, 2022). Efficient claims management not only ensures timely reimbursement to healthcare providers but also reduces administrative costs and minimizes instances of fraud. Digital transformation in the healthcare insurance sector involves integrating digital technologies into existing workflows, enhancing data security measures, improving user experience, and ensuring interoperability with external systems. These elements are essential in addressing the inefficiencies associated with manual claims processing (Zaoui & Souissi, 2020). The adoption of digital technologies such as electronic claims submission, automated adjudication, and real-time tracking can significantly reduce processing times and errors. Additionally, robust data security measures are critical in protecting sensitive patient information and maintaining compliance with regulatory standards (Kutnjak *et al.*, 2019).

1.2.1 Performance of E-Claims Systems

Performance refers to the degree of accomplishment of an organization's objectives (Choi, Poon & Davis, 2021). Venkatraman and Ramanujan (2023) emphasize that organizational performance is a multifaceted and complex aspect of strategic management. Armstrong (2019) asserts that performance is the outcome of work and tasks that align with an organization's strategic goals. These strategic goals encompass objectives such as

growth, customer focus, market share, company growth rates, profitability, operational efficiency, product quality, and other organizational targets (Short & Palmer, 2020). The performance of e-claims systems at NHIF can be evaluated through multiple dimensions, including operational efficiency, customer focus, data security and compliance, interoperability, and strategic impact on organizational goals. By addressing these aspects, NHIF can ensure that its e-claims systems not only meet but exceed the expectations of stakeholders, thereby enhancing the overall effectiveness of the organization's health insurance services.

1.2.2 Digital Transformation Strategy

Digital transformation strategy in the performance of e-claims systems can significantly improve the efficiency and effectiveness of insurance claims management. According to Zaoui and Souissi (2020), digital transformation refers to the incorporation of digital technologies across all aspects of an organization, including claims management. Within the insurance industry, this transformation has led to the adoption of technologies like Artificial Intelligence (AI), Machine Learning (ML), and data analytics, aiming to streamline processes and enhance customer satisfaction. Antony, Menon, and Vargese (2022) suggest that by utilizing digital tools and automated procedures, insurers can significantly reduce the time required for claim submission, validation, and settlement. Through digital transformation, insurers can improve customer service by offering personalized real-time communication and self-service options.

Digital transformation strategy involves the comprehensive use of digital technologies to reinvent processes and customer-comprehensive interactions and insurers need to stay competitive and better serve their customers (Satuluri, 2021). The process of digital transformation is pushing organizations to embrace flexible and adaptable structures that enable ongoing adaptation (Hanelt *et al*., 2020). To effectively compete in their respective industries amidst this transformation, organizational leaders need to devise and execute strategies aimed at enhancing operational performance (Dąbrowska *et al*., 2022). Musaigwa and Mutula, (2022) noted that some of the key advantages of digital transformation strategy is the insurance industry include cost efficiency through advanced technology, accelerated speed to market, and heightened productivity. Further, they claimed that implementation of digital transformation strategy requires a clear strategy that balances

efficiency, cost optimization, and growth, and it should be accompanied by clear and measurable Key Performance Indicators (KPIs). Digital transformation in this study will constitute the integration of digital technologies, data security compliance, user experience and interoperability with external systems (Butt, 2020).

According to Kanmani (2021), access to quality medical healthcare through claims processing is key to the patient, insurance company, and health care provider. An automated claims management system allows for efficiency since processes such as claim verification, patient referrals, treatment authorization, data entry editing, claim status determination, and electronic remittance processing are done online saving time and cost. Additionally, a web-based claims system unlike manual remittance allows for a payment tracking system that allows facilities to monitor disbursements during admission or at the point of discharge of a patient. The relationship between digital transformation and the performance of e-claims systems is significant and multifaceted. At its core, digital transformation aims to streamline operations, reduce manual interventions, and improve the overall user experience. This transformation can lead to substantial improvements in the performance of e-claims systems in several key areas:

1.2.2.1 Integration of digital technologies

The adoption and integration of digital technologies as part of digital transformation can bring various benefits, including increased productivity, cost savings, improved agility, enhanced customer engagement, better data-driven insights, and the ability to innovate and adapt to changing market dynamics (Kolasani, 2023). Digital transformation involves the adoption and integration of digital technologies within the e-claims system at NHIF. This includes the implementation of electronic data interchange (EDI) systems, automation of claim processing workflows, utilization of real-time data analytics, and implementation of digital communication channels for stakeholders involved in the claims process.

In the context of the National Health Insurance Fund (NHIF), the integration of digital technologies refers to the seamless incorporation and harmonization of various digital tools, systems, and platforms within NHIF's existing infrastructure to enhance the functioning and outcomes of their e-claims systems (Kairu *et al.*, 2023).

This integration may involve the implementation of electronic data interchange (EDI) systems to enable the electronic exchange of claims data between NHIF and healthcare providers, the utilization of advanced analytics and machine learning algorithms to automate claims processing and fraud detection, and the adoption of mobile applications or online portals to facilitate convenient submission and tracking of claims by insured individuals (Kutnjak *et al.*, 2019). By effectively integrating these digital technologies, NHIF can streamline and optimize the e-claims process, leading to improved efficiency, accuracy, and timeliness of claims processing, reduced administrative burdens, enhanced customer satisfaction, and better decision-making based on real-time data insights (Zaoui & Souissi, 2020).

1.2.2.2 Data security compliance

Data security compliance involves evaluating the level of compliance with data security and privacy standards. This can involve assessing the robustness of the security measures in place, adherence to data protection regulations, and the effectiveness of strategies to safeguard patient information within the e-claims system. Digital transformation emphasizes the implementation of robust data security and privacy measures (Kutnjak *et al.*, 2019). It involves ensuring that the e-claims system at NHIF adheres to applicable data protection regulations and industry best practices. This includes implementing secure authentication mechanisms, encryption techniques, access controls, and regular security audits to safeguard sensitive patient and healthcare provider data (Moturi, 2019).

NHIF has the responsibility to develop strong measures for data security to ensure the protection of personal health information (PHI) and other sensitive data stored and transmitted through the e-claims systems. These measures encompass the implementation of robust access controls, encryption methods, and firewalls to prevent unauthorized access, data breaches, and cyber threats (Kutnjak *et al.*, 2019). NHIF should also conduct frequent security audits and assessments to identify any vulnerabilities and promptly address them. Furthermore, NHIF must comply with applicable privacy regulations, including data protection laws and healthcare privacy frameworks, to maintain privacy compliance. This involves obtaining informed consent from insured individuals regarding the collection, use, and disclosure of their personal information (Kairu *et*

al., 2023). NHIF must also establish policies and procedures for data retention, data sharing with authorized parties, and ensuring the secure disposal of data. By prioritizing data security compliance, NHIF can instill trust and confidence among insured individuals and healthcare providers in the e-claims systems. This, in turn, can contribute to improved performance by reducing the risk of data breaches, protecting sensitive information, and maintaining compliance with legal and regulatory obligations (Kutnjak *et al.*, 2019).

1.2.2.3 User experience

As a part of digital transformation, enhancing user experience is crucial (Gartner, 2020). This involves designing the e-claims system with a user-centric approach, ensuring that it is intuitive, easy to navigate, and provides a seamless experience for all stakeholders, including NHIF staff, healthcare providers, and claimants. Accessibility considerations should be taken into account to ensure that the system is usable by individuals with diverse abilities. User experience (UX) focuses on optimizing the ease of use, satisfaction, and overall experience for individuals interacting with the e-claims systems (Sauer et al., 2020). This involves designing intuitive user interfaces, streamlining workflows, and providing clear instructions and feedback throughout the claims submission and processing journey. A well-designed user experience can enhance efficiency, reduce errors, and increase user satisfaction with the e-claims systems.

Accessibility, on the other hand, involves making the e-claims systems inclusive and usable for individuals with disabilities or diverse needs. NHIF should ensure that the systems comply with accessibility standards, such as Web Content Accessibility Guidelines (WCAG), which provide guidelines for making digital content accessible to people with disabilities. This may include features like keyboard accessibility, alternative text for images, proper color contrast, and compatibility with assistive technologies (Kairu *et al.*, 2023). By prioritizing user experience, NHIF can provide a seamless and inclusive experience for all individuals interacting with the e-claims systems. This can lead to increased user satisfaction, improved efficiency in claims processing, and better overall performance of the systems. Additionally, it demonstrates NHIF's commitment to providing equitable access to healthcare services for all insured individuals, regardless of their abilities or disabilities.

1.2.2.4 Interoperability with external systems

Interoperability with external systems is a crucial aspect of digital transformation, enabling seamless data exchange and collaboration between different organizations, platforms, or applications (Kutnjak *et al.*, 2019). Digital transformation involves enabling interoperability between the e-claims system at NHIF and external systems, such as healthcare provider systems, government databases, and other relevant stakeholders. This allows for the seamless exchange of data, streamlined workflows, and improved coordination between different entities involved in the claims process. By considering these factors, organizations can achieve interoperability with external systems, enabling seamless data exchange, collaboration, and integration. This fosters efficiency, improves workflows, and enhances the overall effectiveness of digital transformation initiatives.

1.2.3 Health Insurance Sector

Electronic claim systems have gained popularity in the healthcare industry worldwide due to their potential to streamline claim processing, reduce administrative costs, and improve efficiency (Kanmani, 2021). In many developed countries, electronic claim systems have been widely implemented and have shown positive outcomes. They offer benefits such as faster claims processing, reduced paperwork, improved accuracy, and increased transparency. These systems often integrate with healthcare providers' electronic health records (EHRs) to streamline the claims submission process, resulting in improved efficiency and cost savings for both insurers and healthcare providers (Makayoto, 2019).

In Africa, the adoption and performance of electronic claim systems in medical insurance can vary significantly between countries (Ricciardi, 2019). Some countries have made progress in implementing such systems, while others are still in the early stages of adoption. Challenges in the African context include limited infrastructure, inadequate digital literacy, and varying regulatory frameworks (Echulet, 2023). However, electronic claim systems hold the potential to enhance claims processing, reduce fraud, and improve access to healthcare services.

In Kenya, the healthcare industry has been embracing digital innovation, including electronic claim systems. The National Health Insurance Fund (NHIF), the primary government-run insurer, has implemented an electronic claim system to streamline claims processing and reduce fraud. Private insurance companies in Kenya have also been adopting electronic systems to improve efficiency and customer experience (Mosiori, 2023). However, the overall performance and effectiveness of these systems may vary among different insurance providers and stakeholders. In the NHIF context, a claim refers to a formal request submitted to a health care services purchaser, such as an insurance company, government, or employer, seeking payment or reimbursement according to the terms outlined in a contractual agreement. NHIF distinguishes between a hospital claim and a general claim, as described by Ricciardi (2019). A hospital claim pertains to a reimbursement request made by a health care provider (HCP) for covered benefits. On the other hand, a general claim is submitted by an active NHIF member who has received in-patient care either individually or on behalf of a declared beneficiary at an NHIF-recognized health care provider. The process for both types of claims typically involves application and submission, claim capture, verification, approval, and finally, payment of claims, as outlined by the NHIF Research and Policy Division (2021).

1.2.4 National Health Insurance Fund (NHIF), Kenya

Aiming to improve the efficacy and efficiency of NHIF's operations, the National Health Insurance Fund (NHIF) was first established in 1966 as a department under the Kenyan Ministry of Health. Over time, the original Act of Parliament that created the Fund was revised to accommodate changes in the country's healthcare needs as well as changes in the health sector's restructuring and employment developments. In 1998, the relevant laws were repealed and replaced by the NHIF Act No. 9 of 1998, which transformed the Fund into an independent State Corporation overseen by a Board of Management (Gray & Vawda, 2019; Ogendi, 2020).

NHIF's primary goal is to cover all of its members' stated dependents, such as spouses and kids, for medical expenses. A Kenyan citizen over the age of eighteen who makes more than Ksh 1000 per month qualifies for participation in the NHIF. The 31 completely independent branches of NHIF, which are dispersed around the

nation, are the organization's main means of operation. They provide hospitals, members, and employers with a wide range of benefits. These branches are further supported by smaller satellite offices and service locations housed within district hospitals.

The NHIF Act of 1998 serves as the primary governance framework for NHIF, defining the Fund's mandate, functions, and composition of its Board of Directors. The Board includes representatives from various organizations, encompassing government, employers, workers, private insurers, and medical professionals. NHIF has also entered into a performance contract with the government, focusing on delivering affordable, accessible, and high-quality healthcare services throughout the country (Kairu *et al.*, 2023).

1.3 Statement of the Problem

According to Deloitte (2020), Kenya processes a total of 30 million medical claims each year. Defective claims management systems present significant challenges, including high expenses, time consumption, and an increase in cases of medical fraud. To ensure quality patient healthcare, it is crucial to automate health claims and adopt advanced claims management systems (Thomson, Sagan & Massialos, 2020). Claims processing is a vital function for insurance companies, as it directly impacts their overall reputation. The Kenya Association of Insurers (2019) reports a general rise in health insurance fraud cases in the country, with 28% involving suspicious health insurance claims, 21% comprising fraudulent claims, and 48% involving the signing of claim forms before receiving health services. NHIF disclosed that the fund loses nearly 10 billion Kenyan shillings annually due to fraudulent claims. These losses occur through impersonation and fictitious claims made by both public and private hospitals, depriving deserving Kenyans of quality healthcare. In 2022, out of the 61 billion shillings collected from formal, informal sector, and sponsored members, over 91% was paid out for hospital claims, totaling 54 billion shillings. NHIF experiences a 20% loss from member contributions due to fraudulent and fictitious claims. As of December 2022, the fund has 19 active court cases involving hospital owners and individuals who submitted false claims.

Existing studies on the performance of e-claims systems at NHIF have produced varied, mixed, and contradictory results (Moturi, 2019; Njeru, 2022; Echulet, 2023; Shetty *et al.*, 2023). Echulet (2023) has out

research in Kenya, concentrating on NHIF, on the effects of overall quality management on the functionality of electronic claims systems in medical insurance companies. The study found a strong positive relationship between cooperation exercises, training interventions, leadership techniques, and e-claims system performance. The application of data mining methods to detect fraud in health insurance claims was examined in a different research by Moturi (2019). The findings indicated that the Naïve Bayes algorithm was effective in detecting fraudulent claims, achieving a classification accuracy of 91.790% and a testing hit rate of 74.12%. Shetty et al., (2023) explored the growing trend of insurance companies incorporating third-party administrator (TPA) services in-house. The study investigated whether the performance parameters of TPAs varied based on ownership. The research suggested that bringing TPAs in-house could lead to reduced insurance premiums, making health insurance a more affordable option and contributing to the objective of achieving universal health coverage. Njeru (2022) investigated the detection of fraudulent vehicle insurance claims using machine learning and found that insurance firms incur significant financial losses due to pricey fraudulent claims. Furthermore, most of these studies were conducted in the whole NHIF, and other studies were conducted in other sectors and not the health sector.

Methodologically, most studies have used descriptive research design, case studies, and mixed-method approaches (Moturi, 2019; Echulet, 2023; Kemboi, 2022; Muinga *et al.*, 2020; Abdille & Waithaka, 2023). Echulet (2023) adopted a descriptive research design which failed to establish causal relationships between variables. Moturi (2019) utilized classification models that require a sufficient amount of high-quality training data to effectively learn patterns and make accurate predictions. However, obtaining large and representative datasets for fraud detection in health insurance claims can be challenging. Kemboi (2022) studied the effect of claims digitalization on service delivery by insurance companies in Kenya and adopted a descriptive survey design. Muinga *et al*., (2020) studied digital health systems in Kenyan public hospitals using a mixed-methods survey. Abdille and Waithaka (2023) determined the relationship between innovation and realization of universal health care coverage in Kenya: A Case of National Health Insurance Fund. The study embraced an explanatory descriptive survey design.

Conceptually, while previous studies have examined factors such as total quality management, fraud detection, and innovation (Moturi, 2019; Echulet, 2023; Kemboi, 2022; Muinga *et al.*, 2020; Abdille & Waithaka, 2023), there may be limited research specifically exploring the impact of digital transformation strategy on e-claims system performance at NHIF. The findings suggest that the digital transformation strategy has had a positive impact on the performance of NHIF's e-claims systems. However, ongoing efforts are needed to address lingering challenges and ensure the sustainability of these improvements. This includes continued investment in infrastructure, training programs for staff, and user-centric design principles to enhance system usability and acceptance. The study underscores the importance of digital transformation in improving the efficiency and effectiveness of healthcare delivery systems such as e-claims systems. By leveraging technology and implementing sound strategies, NHIF can better serve their constituents and achieve their goals of providing accessible and quality healthcare services to the population.

1.4 Purpose of the Study

The purpose of undertaking a study on the effect of digital transformation strategy on the performance of E-Claims Systems at National Health Insurance Fund, Kenya is to evaluate how digital transformation strategy initiatives impact the efficiency and effectiveness of the e-claims system at NHIF. By undertaking this study, the goal is to gain insights into the impact of digital transformation strategy on the performance of the e-claims system at NHIF in Kenya, to improve operational efficiency, reduce costs, enhance customer experience, and mitigate fraud risks.

1.5 Objectives of the Study

The study was guided by both general and specific objectives.

1.5.1 General Objective

The general objective of the study was to determine the effect of digital transformation strategy on the performance of e-claims systems at the National Health Insurance Fund, Kenya.

1.5.2 Specific Objectives

The study was guided by the following objectives;

i. To establish the effect of integration of digital technologies on the performance of E-Claims Systems at the National Health Insurance Fund, Kenya
ii. To determine the effect of data security compliance on the performance of E-Claims Systems at the National Health Insurance Fund, Kenya.
iii. To establish the effect of user experience on the performance of E-Claims Systems at the National Health Insurance Fund, Kenya.
iv. To determine the effect of interoperability with external systems on the performance of E-Claims Systems at the National Health Insurance Fund, Kenya.

1.6 Research Hypotheses

The study sought to test the following research hypotheses

H_{01}: Integration of digital technologies has no statistically significant effect on the performance of E-Claims Systems at the National Health Insurance Fund, Kenya.

H_{02}: Data security compliance has no statistically significant effect on the performance of E-Claims Systems at the National Health Insurance Fund, Kenya.

H_{03}: User experience has no statistically significant effect on the performance of E-Claims Systems at the National Health Insurance Fund, Kenya.

H_{04}: Interoperability with external systems has no statistically significant effect on the performance of E-Claims Systems at the National Health Insurance Fund, Kenya.

1.7 Significance of the Study

The study on the effect of digital transformation strategy on the performance of e-claim systems at NHIF holds great significance for the government of Kenya. The findings can inform policy-making processes related to healthcare and insurance, enabling the government to develop effective strategies and guidelines for implementing digital transformation initiatives in the healthcare sector. By understanding the factors that affect e-claims system performance, the government can facilitate the adoption of digital technologies, improve data

security compliance, and promote interoperability among healthcare providers and insurance organizations. This study contributed to the government's efforts in achieving efficient and accessible healthcare services, cost reduction, and enhanced resource utilization.

The findings of this study have direct implications for healthcare practitioners, insurance professionals, and administrators at NHIF and other healthcare organizations. By identifying the factors that impact e-claims system performance, such as the integration of digital technologies and user experience, the study provided actionable insights for optimizing the system and enhancing operational efficiency. Practitioners can benefit from the study's recommendations on streamlining claim processes, reducing errors, and improving resource utilization. The study's outcomes contribute to enhanced practice and operational excellence in the healthcare and insurance sectors, leading to improved service delivery and patient experiences.

The study on the effect of digital transformation strategy on e-claims systems at NHIF contributes to academia by expanding the existing body of knowledge on digital transformation in healthcare. The empirical research and new insights generated by the study provide valuable information for researchers and scholars in the fields of healthcare management, information systems, and insurance. The study's findings can serve as a foundation for further research and exploration of digital transformation initiatives, e-claims system performance, and their impact on healthcare outcomes. Academics can build upon the study's methodologies and frameworks to conduct similar research in different contexts or explore related topics, ultimately advancing knowledge and understanding in the field of digital healthcare transformation.

1.8 Scope of the Study

According to Casteel and Bridier (2021), the scope of the study outlines all the things that the research study covered about the subject, geographical area, methodology, and population. This study's geographical scope was NHIF, Nairobi. On the subject scope, the study was focused on the integration of digital technologies, data security compliance, user experience, and interoperability with external systems and the effect they may have on the performance of e-claims systems at NHIF. Moreover, the study was retrospective and focused on the period from 2019 to 2024 when NHIF formulated and implemented the digital transformation strategy.

1.9 Delimitations of the Study

The study focused specifically on the National Health Insurance Fund (NHIF) and its e-claims system for several compelling reasons. Firstly, NHIF is the largest health insurance provider in Kenya, playing a crucial role in the nation's healthcare delivery system. Its extensive coverage and significant volume of claims make it an ideal case for examining the impact of digital transformation on e-claims systems. Secondly, NHIF has been actively pursuing digital transformation initiatives, providing a relevant and timely context for assessing the effectiveness of these strategies. The insights gained from NHIF's experiences can offer valuable lessons for other healthcare organizations and insurance systems, both within Kenya and in similar contexts globally. Moreover, the choice of NHIF allows for a detailed and focused analysis, providing in-depth insights into the specific challenges and opportunities associated with digital transformation in a large public sector insurance provider. This depth of analysis is essential for understanding the nuances and complexities of implementing digital technologies in e-claims processing. Although the study's findings and conclusions may not be directly generalizable to other healthcare organizations or insurance systems, they offer a foundational understanding that can inform further research and policy development.

The study acknowledges the limitations of operating within a specific timeframe, which may not capture long-term changes or effects. It also recognizes that the single case study approach, while providing detailed insights into NHIF's context, may not reflect the full range of variations in different healthcare organizations or insurance systems. External factors such as changes in healthcare policies, technological advancements, or socio-economic conditions, which were beyond the scope of this research, could also influence the performance of e-claims systems. Lastly, the study primarily considered the perspectives and experiences of stakeholders directly involved with NHIF’s e-claims system, which provided focused and relevant data for the research objectives.

1.10 Limitations of the Study

Findings from a single case study may not be easily generalized to the entire health sector or other sectors. The unique circumstances of NHIF's e-claims systems might not be representative of other claims systems.

To address this limitation, the study incorporated a comprehensive review of the literature and consulted experts in the field to ensure that the findings were contextualized within broader industry trends. Additionally, recommendations were framed in a way that highlights the need for further research across different organizations and contexts to validate the applicability of the findings.

The study relied on existing reports, documents, and questionnaires. The availability and accuracy of such data might be limited, impacting the comprehensiveness of the research. To mitigate this limitation, triangulation was employed by using multiple data sources, including interviews and secondary data, to cross-verify information and ensure a more comprehensive understanding. Moreover, data validation techniques were used to assess the reliability and accuracy of the existing data.

The research may not account for all external factors influencing the performance of e-claims systems, such as changes in healthcare policies, technological advancements, or socio-economic conditions. These external factors may impact the study's findings and their generalizability. The study included a detailed discussion of potential external factors and their possible impacts on the findings. Sensitivity analyses were conducted to explore how changes in key external variables might affect the results. This approach provided a more nuanced interpretation of the findings, acknowledging the influence of external factors while focusing on the core elements of digital transformation within the NHIF context.

The study primarily considered the perspectives and experiences of stakeholders directly involved with NHIF's e-claims system, which might not reflect the views of all relevant parties. Efforts were made to include a diverse range of stakeholders in the data collection process, including frontline employees, managers, and IT staff. This ensured that multiple viewpoints were considered, providing a more holistic understanding of the e-claims system's performance. Additionally, follow-up interviews and focus groups were conducted to validate the questionnaire findings and capture any overlooked perspectives.

1.11 Assumptions of the Study

The study assumes that digital transformation strategy initiatives have a significant effect on the performance of e-claims systems. It assumes that the adoption and integration of digital technologies lead to improvements

in overall performance. The study assumed that NHIF has actively pursued digital transformation strategy initiatives and invested resources in implementing and maintaining its e-claims system. The study assumed that stakeholders involved in the e-claims system at NHIF, including NHIF staff, healthcare providers, and claimants, are willing to participate and provide accurate and meaningful information. It assumes their cooperation in sharing their experiences, perspectives, and insights related to the e-claims system's performance.

The study assumed that the data collected through interviews, surveys, and document analysis was accurate and reliable. It assumed that participants provided truthful and comprehensive responses and that the documents analyzed was authentic and representative of the e-claims system's performance. The study assumed that the findings and conclusions derived from the research at NHIF can be generalized to some extent to other healthcare organizations or insurance systems facing similar challenges and implementing e-claims systems. However, it recognized that the specific context and unique characteristics of each organization may limit the generalizability of the findings. The study assumed that the selected performance indicators, such as claim processing time, claim accuracy, claim rejection/approval rate, and user satisfaction, effectively capture the performance of the e-claims system at NHIF. It assumed that these indicators provide meaningful insights into the system's efficiency, effectiveness, and user experience.

1.12 Theoretical Framework

The study was guided by Innovation Diffusion Theory and Resource-Based Theory.

1.12.1 Innovation Diffusion Theory

Innovation Diffusion Theory, also known as the Diffusion of Innovation (DOI) Theory, was developed by E.M Rogers in 1962 (García-Avilés, 2020). Roger explored the extent to which innovations, which can be ideas, technologies, or practices spread through societies over time. The theory identifies various factors that affect the adoption of innovations and categorizes individuals into different adopters categories based on their willingness to try new things. Okour et al., (2021) among the proponents of Innovation Diffusion Theory established the significance of the theory, particularly in agricultural innovations, their work emphasized the

role of communication channels and social networks in the diffusion process. Faisal and Idris (2020) perceived it as a prominent figure in the study of the innovation diffusion theory particularly through the lens of social network analysis. His significant contribution is based on creating an understanding of how ideas, behaviors, and products spread within networks. Valente's work emphasizes the importance of examining personal network exposure and thresholds in addition to behavior change and intervention effects. He has also developed a network threshold model that differs from previous models. The main focus was on the role of specific individuals or actors within social networks in the spread of information about innovations.

While Innovation Diffusion Theory has been widely applied in various contexts, including healthcare, there are certain critiques and limitations of the theory that should be considered in the study on the effect of digital transformation strategy on the performance of e-claims systems at NHIF. Innovation Diffusion Theory primarily emphasizes the role of individual characteristics, such as innovativeness and perceived attributes of innovation, in explaining the adoption and diffusion process. However, in the context of e-claims systems, the study may need to consider other factors beyond individual characteristics, such as organizational factors (leadership support, organizational culture, and resources) and contextual factors (regulatory environment, infrastructure availability). Neglecting these factors may limit the comprehensiveness of the study's findings and their applicability to real-world settings (Das, 2022). Innovation Diffusion Theory traditionally follows a linear perspective, assuming a sequential and predictable diffusion process. However, in complex systems like healthcare organizations, the adoption and diffusion of innovations are often non-linear and involve feedback loops. The study should consider the dynamic nature of innovation diffusion and explore how digital transformation strategy initiatives can evolve and adapt over time in response to feedback and contextual changes. This provides a more nuanced understanding of the interaction between digital transformation and e-claims system performance. While Innovation Diffusion Theory recognizes the role of social networks and communication channels in the diffusion process, it may not fully capture the complexity and effect of social interactions in the adoption and implementation of digital innovations in healthcare organizations (García-Avilés, 2020). The study could benefit from incorporating a social network analysis perspective to explore

how social relationships and communication patterns among stakeholders affect the diffusion of digital transformation strategy initiatives and their impact on e-claims system performance.

The relevance of Innovation Diffusion Theory helps NHIF understand the stages of adoption for the e-claims system among healthcare providers, policyholders, and other stakeholders. It identifies different adopter categories such as innovators, early adopters, early majority, later majority, and laggards, each with specific characteristics. This aids in tailoring strategies for different segments.

1.12.2 Resource-Based Theory

Penrose (2009) introduced the Resource-Based Theory (RBT), which offers insights into how firms can effectively manage their resources, diversify their strategies, and seize productive opportunities. The central concept of RBT is the conceptualization of a firm as a coordinated collection of resources, addressing how it can achieve its objectives and exhibit strategic behavior. RBT provides a framework to understand and predict the key factors influencing organizational performance and competitive advantages. The emphasis of RBT on meso-perspectives, focusing on the firm's performance, was a response to earlier managerial interest primarily centered on industry structure, which encompassed a more macro perspective. Barney and Arikan (2005) are among the first proponents' figures associated with Resource-Based Theory. His work has been instrumental in shaping the foundational concepts of the theory. Barney emphasizes the role of firm-specific resources that are valuable, rare, inimitable, and non-substitutable (VRIN) as the basis for sustained competitive advantages. One critique of Resource-Based Theory (RBT) in the context of the study on the effect of digital transformation strategy on e-claims systems at NHIF is its limited consideration of external factors and the broader industry environment. RBT primarily focuses on the internal resources and capabilities of organizations, neglecting the impact of external forces, such as regulatory frameworks, competitive dynamics, and technological advancements. In the context of e-claims systems, the study should account for the effect of external factors on the performance of NHIF's digital transformation initiatives, as these factors can significantly shape the availability and effectiveness of resources, as well as the sustainability of competitive advantage. By considering both internal and external factors, the study can provide a more comprehensive analysis of the

relationship between digital transformation strategy, resource utilization, and e-claims system performance. Borchert, (2008) criticized the theory by claiming that RBV lacks clear managerial implications or operational validity, making it difficult for managers to apply the theory to practical strategic decision-making. On the other hand, Hitt, Carnes, and Xu (2016) also claimed that the theory has been criticized for implying an infinite degree where firms with a particular capability can be overtaken by a firm that can develop that capability better, leading to a lack of sustained competitive advantage.

The relevance of RBT to the study is that it emphasizes the role of a firm's unique resources and capabilities in achieving sustainable competitive advantage. RBT highlights the significance of resource integration and complementarity in achieving competitive advantage. In the study, it would be important to explore how different digital resources, such as interoperability with external systems, data security measures, and user-friendly interfaces, are integrated to enhance the performance of e-claims systems. Understanding the complementarity of these resources and how they work together to create value can provide insights into the effectiveness of digital transformation strategy initiatives.

1.13 Conceptual Framework

A conceptual framework refers to a structure that illustrates the expected relationships between variables and defines the relevant objectives for the research process. It helps in clarifying the research problem, refine the research questions, and guiding the data collection and analysis process (Varpio, Paradis, Uijtdehaage & Young, 2020).

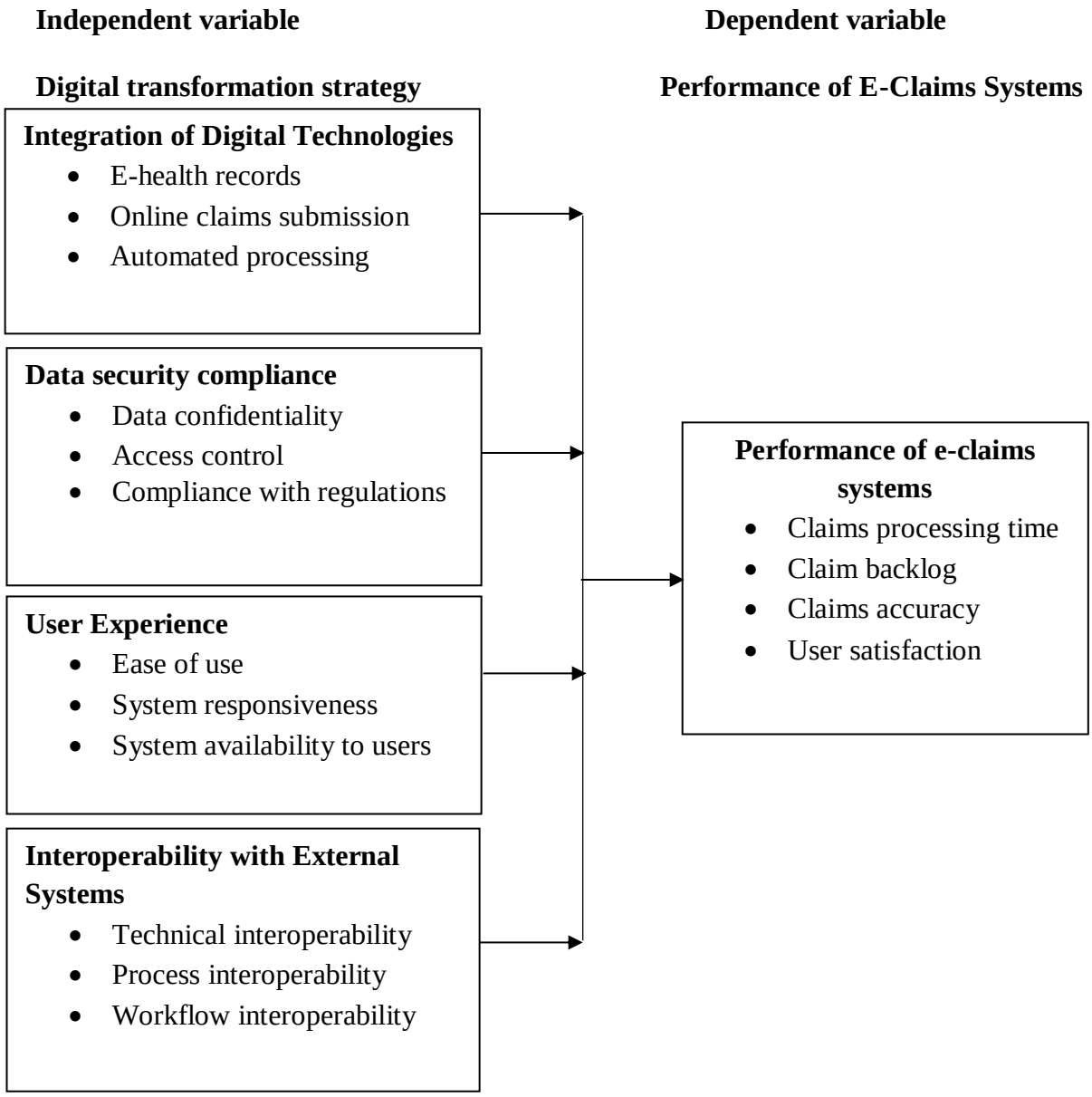


Figure 1.1 Conceptual Framework

Source: Author (2024)

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This section provided a thorough overview and evaluative analysis of existing research on the impact of digital transformation strategy on the performance of e-claim systems. It encompassed a summary of the main findings and a critical assessment of the strengths and limitations of the conducted studies. The primary objective of this literature review was to identify gaps in the current body of research and establish the foundation for future investigations in this area.

2.2 Empirical Literature Review

An empirical review is a thorough examination of various elements of an empirical study that are relevant to the ongoing research. The process of conducting an empirical literature review entails assessing previous empirical studies to address a specific research problem (Paul & Criado, 2020). During an empirical review, the researcher investigates similar studies in the field to identify gaps, areas of agreement, and contradictions that aid in accurately identifying, describing, and replicating the research process. This section reviews empirical studies on the specific objectives of the study.

2.2.1 Integration of digital technologies and performance of E-Claims Systems at NHIF

Li *et al*., (2020) conducted a study to examine the effect of digital technologies on economic and environmental performance within the framework of Industry 4.0. The research sought to investigate how digital technologies affect economic and environmental performance in the new era of Industry 4.0, building on the idea of information processing. Taking into account the moderating effect of environmental dynamism and the mediating function of digital supply chain platforms, the researchers designed and assessed a moderated mediation model. A survey of Chinese manufacturing companies was part of the study. According to the research, digital supply chain platforms moderate the impact of digital technology on environmental and economic outcomes. Additionally, it was discovered that stronger mediating effects occurred in environments with higher levels of dynamism. In the era of Industry 4.0, this study contributes to a better understanding of the effects of digital technologies on performance and offers management insights on how to promote

environmental and economic sustainability. It is worth noting that Li et al.'s study focused on the impact of digital technologies on economic and environmental performance in the manufacturing industry within the context of Industry 4.0, while the current study will specifically examine the effect of integrating digital technologies on the performance of e-claims within the health insurance industry.

Mitchell and Kan (2019) conducted a study in the United States to explore the impact of digital technology on health systems. They found that digital health has significantly transformed health systems by shifting the power dynamics between healthcare providers and patients, enabling new care models, and emphasizing client-centered healthcare, particularly in low- and middle-income countries. However, resistance to change has hindered the widespread implementation of these transformations, despite the inevitable growth of digital technology globally. The authors predict greater use of protocol-driven healthcare to improve care quality, increasing use of telemedicine for distant diagnosis and treatment, and enhanced access to products and services through modifications to delivery and transportation networks. Data was essential to health systems; big data and AI technologies will make monitoring, planning, and management easier; universal electronic record systems and tailored treatment plans will provide individualized data. However, there are drawbacks to the expansion of digital health as well, including issues with data ownership, control, and management as well as upholding confidentiality and privacy in an environment where data is abundant. It should be noted that while Mitchell and Kan focused on the United States, the current study examines the effect of integrating digital technologies specifically on the performance of e-claim systems at NHIF in Kenya.

Echulet (2023) studied how the National Health Insurance Fund (NHIF) in Kenya performed when it came to the effects of comprehensive quality management on the effectiveness of electronic claims systems in medical insurance companies. The study's objective was to characterize the impact of overall quality management on the functionality of e-claims systems in Kenyan medical insurance companies. To that end, a descriptive research approach was employed to collect both quantitative and qualitative data. The performance of e-claims systems was shown to be significantly positively correlated with leadership behaviors, collaborative activities, and training interventions. As a recommendation, the study suggested that the government should play a role

in formulating policies and laws governing public sector organizations involved in service delivery to ensure the provision of high-quality services to customers. While Echulet's study focused on total quality management and electronic claims systems, the current study will concentrate on the integration of digital technologies and the performance of e-claims at the NHIF.

Usai *et al*., (2021) investigated unveiling the impact of the adoption of digital technologies on firms' innovation performance. The study's conclusions showed that research and development (R&D) costs were the most accurate indicator of innovation, whereas digital technologies had little effect on innovation performance. The idea that digital technologies inherently improve innovation performance is called into question by these findings. Practically speaking, the results indicate that decision-makers should steer clear of the prejudice that holds that digital technologies are the only factors that determine whether a company is innovative and successful. This notion may end up working against them in the long run. While the present study will primarily focus on the effect of integrating digital technologies on the performance of e-claims systems, the previous study examined the implications of adopting digital technologies on enterprises' innovative performance.

Paiola, Khvatova, Schiavone, and Ferraris, (2023) conducted a study focusing on the impact of adopting digital technologies in the healthcare industry through a case-based analysis. The objective of the research was to contribute to the existing literature by demonstrating how the utilization of digital technologies effects business process improvements in the healthcare sector. The results showed that the performance of important healthcare business procedures may be improved by the use of digital technologies, especially those that could be made simpler by using information technology. Particularly, it was discovered that digital technologies assist a variety of stakeholders, including national health systems, physicians, and patients, by increasing efficiency, improving the quality of services, and reducing response times. The study did, however, also draw attention to a vacuum in the literature about the particular effects of implementing digital technology for healthcare companies' business process management.

Matenjwa (2020) conducted a study examining the impact of digital technologies on customer service delivery in Huduma Centres located in Nairobi County, Kenya. According to the study, automated queue management systems and cashless systems significantly improved the provision of customer service. Even while social media and telecommunications had beneficial impacts as well, their impact was not statistically significant. The study concluded that by enhancing the cashless system and queue management system, Huduma Centers could improve the quality of their customer service. To further improve customer service delivery, the research advised the management of Huduma Centers in Nairobi to keep improving the cashless system, automatic queue management system, telecommunications, and social media. It is important to note that Matenjwa's study focused on customer service delivery in Huduma Centres, whereas the current study will specifically examine the performance of e-claims systems at the National Health Insurance Fund.

Kemboi (2022) researched to investigate how Kenyan insurance firms' service delivery is affected by the digitization of claims. The 56 insurance firms in Kenya made up the study's population, which was surveyed descriptively. Regression analysis was used to examine the research data and found a high positive correlation between the digitalization of the claims function and service delivery, suggesting that the digitalization of the claims function affects service delivery. The most significant factor influencing the digitization of claims in terms of service delivery among the factors examined was claims automation, which was followed by audit controls and backend claims administration. The least significant factors were shown to be self-service tools and integration with third-party service providers. The results showed that although a large number of insurance firms have begun the process of digitizing claims, its full potential has not yet been reached. Although there was little usage of self-service technologies, claimants may file their claims via email, phone call, text message, or physical document submission. Most insurers have a panel of third-party service providers, but not fully integrated. The majority of the organizations were found to have well-implemented backend systems for claims administration, including audit controls to reduce leakages. It became clear that not all businesses have customer relationship management (CRM) software or specialized customer care teams to address client complaints when it comes to service delivery. On the other hand, most businesses undertake

evaluations to evaluate customer experience, give value-added services to consumers to improve their experience and offer customer service training to increase service delivery. It is noteworthy that Kemboi's research was restricted to the provision of services in Kenyan insurance firms, whereas the present investigation would concentrate on the efficacy of e-claims systems at NHIF.

2.2.2 Data security compliance and performance of E-Claims Systems at NHIF

Saputra and Prima (2022) examined the E-Claim System for Health Insurance and Social Security (BPJS) Types in Indonesia: Innovation and Effectiveness of Services. The researchers conducted statistical analyses using the Mann-Whitney test and logistic regression to analyze the data. The bivariate analysis revealed significant differences in variables such as effectiveness, data input time, data accuracy, completeness of medical record data, and unclear medical record writing. Additionally, the multivariate analysis indicated that the completeness of medical record data was the most influential variable in determining the effectiveness of claiming activities. It is important to note that this study was conducted in Indonesia and focused on innovation and service effectiveness, while the upcoming study will take place in Kenya and will specifically examine the impact of data security compliance on the performance of E-Claims Systems at NHIF.

Data security compliance refers to the adherence to regulations, standards, and best practices that ensure the protection, confidentiality, integrity, and availability of sensitive data involved in electronic claims processing. It involves implementing measures and controls to safeguard patients, providers, and other confidential information throughout the claims management lifecycle (Kutnjak *et al*., 2019). Strong access controls should be in place to restrict access to sensitive data within the e-claims system. To guarantee that only authorized users may access the system, user authentication measures like multi-factor authentication and strong passwords should be implemented. Compliance with data security regulations and best practices is essential in e-claims systems to protect patient privacy, maintain trust, and mitigate the risks of data breaches or unauthorized access (Kairu *et al*., 2023). By implementing robust security measures and ensuring adherence to data security compliance standards, organizations can enhance the overall performance and trustworthiness of e-claims systems.

However, the effect of data security compliance on the performance of E-Claims Systems can be undetermined in the literature. Moturi (2019) conducted a study focused on utilizing data mining techniques to identify fraud in health insurance claims. The research employed classification models, including Naïve Bayes, Decision tree, and K-Nearest Neighbor algorithms, to develop predictive models and guide the knowledge discovery process. The study discovered through a series of trials that the Naïve Bayes algorithm had a classification accuracy of 91.790% and a testing hit rate of 74.12%, indicating that it was effective in identifying fraud in claims. A real-time fraud detection prototype was created using principles derived from the Naïve Bayes model. If put into practice, this prototype might save expenses. In both developed and developing nations, fraud detection in health insurance firms is essential since it reduces financial losses and enhances patient care. Although the study successfully demonstrated the use of data mining for detecting fraud in health insurance claims, it did not address the effect of data security compliance on the performance of e-claims systems.

Adzakpah and Dwomoh (2023) looked into the use of an electronic claims management system by Ghana's National Health Insurance Scheme (NHIS) to increase efficiency and streamline the claims process in different research. Notwithstanding obstacles in technological, human resource, and financial domains, the NHIS skillfully handled these problems by employing evidence-based tactics. By regulating prescription and dispensing levels, tying diagnosis and treatment procedures together, decreasing mistakes in claims processing and payment, and identifying fraud to reduce system abuses, the e-claims system functioned as a cost-reduction strategy. Additionally, the e-claims system helped the NHIS by giving important information about the standard of care given, expediting the settlement of medical claims, and making it possible to extract reliable claims data for analysis and policy guidance. The difficulties the NHIS had managing claims in Ghana were the main topics of this case study. It also covered how the e-claims system was developed between 2010 and 2013 and how it increased the effectiveness of claims review and reimbursement, lowering claims costs by detecting errors, abuse, and fraud. It is important to remember that the study was carried out in Ghana, which has a different environment than Kenya.

Mwangi (2022) conducted a study that examined the factors influencing effective fraud risk management practices among medical insurance providers in Kenya. According to the research, Medical Insurance Providers (MIPs) in Kenya saw a beneficial effect from regulatory rules, but it was not statistically significant in connection to effective fraud risk management procedures. To improve the creation of rules and policies that would support efficient fraud risk management, the research suggested more interaction and collaboration between the insurance regulator and MIPs. In addition, the research recommended that medical insurance company management cultivate a collaborative atmosphere, assign tasks, and offer professional growth opportunities to augment staff competences, since these elements augment successful fraud risk control. Furthermore, the report suggested that MIPs in Kenya switch, whenever feasible, from manual to automated operations. To identify fraud and provide efficient fraud risk management among Kenyan MIPs, the implementation of digitalized forensic systems, fraud detection frameworks, machine learning technologies, and other new technologies was considered crucial. It's vital to remember that although there are several medical insurance companies in Kenya, the present study will concentrate on how well the NHIF's e-claims systems function.

In another study by Zeebaree *et al*. (2019), a review of security approaches for integrated enterprise systems performance was conducted. The rapid advancements in Information and Communications Technology (ICT) have transformed the business landscape and introduced the concept of Electronic Business (E-Business), which encompasses various activities such as ordering, transacting, customer service, delivery, and payment. While E-Business offers numerous advantages over traditional business models, it also faces challenges related to data security. To address these challenges, a security management framework is necessary to control access to sensitive information in enterprise systems. The paper systematically reviews the latest research efforts in the field of E-Business security, including security approaches, techniques, and frameworks. However, it is important to note that this review paper does not specifically focus on the effect of data security compliance on the performance of E-Claims Systems at NHIF, which is the focus of the current study to be conducted in

Kenya. However, the paper failed to discuss the data security compliance on the performance of e-claims systems.

2.2.3 User experience and performance of E-Claims Systems at NHIF

User experience (UX) in the context of e-claims systems refers to the overall satisfaction, ease of use, and effectiveness of the system as perceived by the users, which typically include healthcare providers, insurance company representatives, and other stakeholders involved in the claims management process (Gartner, 2020). It focuses on designing and optimizing the system to meet the needs and expectations of the users, ultimately enhancing their productivity, efficiency, and satisfaction. By focusing on user experience, e-claims systems can enhance user satisfaction, increase productivity, and promote adoption and utilization of the system (Sauer et al., 2020). A well-designed and user-centric system can contribute to improved efficiency, reduced errors, and better overall performance in the processing and management of claims. However, the effect of user experience on the performance of E-Claims Systems can be undetermined in the literature.

Begum *et al*. (2020) looked into how district health information system software was perceived and used in Bangladesh to gather and use health data. The study's objectives were to develop a responsive health management information system and contribute to practical methods for the system's successful deployment. To encourage the use of the system for decision-making, the research recommended the necessity for recurring training, rewards, and a nationwide electronic health strategy. It is crucial to remember that this study was carried out in Bangladesh and could not be immediately applicable to the situation in Kenya.

Kaguthai (2021) examined challenges in motor vehicle claims in Kenya and developed a prototype for a Claims Bot application. The study identified challenges in motor vehicle claims and designed a mobile app prototype to streamline the claims process. The study aimed to improve operational efficiency for claims managers in the insurance industry and benefit the general public and policymakers. While this study focused on motor vehicle claims in Kenya, the current study will specifically focus on e-claims systems at NHIF.

Muinga *et al*. (2020) sought to empower the digital health community and decision-makers by conducting a survey on digital health systems in Kenyan public hospitals. The study underlined the necessity of system

interoperability and efficiency and highlighted difficulties encountered by hospital users and vendors while deploying digital health systems. Despite concentrating on digital health systems in Kenyan public hospitals, this study recognized the need for more investigation on clinical usability and workflow appropriateness.

2.2.4 Interoperability with external systems and performance of E-Claims Systems at NHIF

The literature does not provide a clear determination of the effect of integrating interoperability with external systems on the performance of e-claims systems. However, Lu *et al*. (2021) assessed eHealth development in the Philippines and found that eHealth services, including telemedicine, were being utilized to provide faster and more efficient healthcare services to the general public, including private-pay patients. The sustainability of eHealth in the Philippines depended on the institutionalization of an interconnected eHealth structure and system. It's important to note that this study was specific to the Philippines and may not directly apply to the current study in Kenya.

Li *et al*. (2022) conducted a study on the value of health information technology (HIT) interoperability, specifically focusing on inter-hospital transfers of heart attack patients. The study discovered that while HIT interoperability had minimal impact on lowering duplicate testing for moved patients, it dramatically lowered the throughput time of inter-hospital transfers. Though it still had no appreciable effect on duplicate testing, HIT interoperability offered through a single software provider considerably decreased throughput times as compared to several suppliers. HIT interoperability did, however, result in a drop in the 30-day readmission rate for patients who were transferred, which may indicate better patient outcomes. The report emphasizes how important it is to encourage the use of health information technology and provide incentives for its adoption to enhance patient outcomes and healthcare efficiency.

Alhumairan *et al*., (2023) explored the challenges and advantages of electronic health file systems. A systematic review of existing literature was conducted to identify key themes and trends in EHR research. Ten studies focusing on challenges, solutions, and best practices for EHR utilization were included in the analysis. The study identified several common challenges faced by healthcare organizations in EHR utilization, including issues related to data quality, usability, privacy, interoperability, and adoption. Various potential

solutions, such as the adoption of emerging technologies like blockchain and data mining, were also discussed. Electronic Health Records (EHRs) offer immense potential for improving patient care and healthcare delivery. However, the challenges associated with EHR utilization must be addressed to maximize their benefits. Collaborative efforts between policymakers, healthcare providers, and technology vendors are essential to overcome these challenges and optimize EHR utilization. The study explored the challenges and advantages of electronic health file systems while the current study will focus on the effect of integration of interoperability with external systems on the performance of e-claims systems.

Holmes *et al*. (2019) studied interoperability in health information systems: Standards, integration technologies, and collaboration for healthcare transformation. This study explores the importance of interoperability in healthcare information systems and discusses the integration of e-claims systems with external systems. Interoperability is crucial in healthcare information systems to ensure seamless communication and data exchange between different systems and stakeholders. When it comes to e-claims systems, integration with external systems plays a vital role in improving overall efficiency and effectiveness. It provides an overview of standards, integration technologies, and collaboration strategies for achieving interoperability. The study focused on interoperability in health information systems: Standards, integration technologies, and collaboration for healthcare transformation whereas the current study focuses on the effect of integration of interoperability with external systems on the performance of e-claims systems.

Torab-Miandoab, Samad-Soltani, Jodati, and Rezaei-Hachesu, (2023) examined interoperability and integration of healthcare systems: A Review. This paper presents a comprehensive review of interoperability and integration in healthcare systems. It discusses the challenges and benefits of integrating e-claims systems with various external systems, including EHRs, practice management systems, and insurance databases. Integration enables seamless data exchange between e-claims systems and external systems, reducing manual processes, duplicate data entry, and potential errors. This streamlines workflows and improves overall efficiency. Integration facilitates real-time access to accurate and up-to-date patient information from EHRs and practice management systems. This improves data accuracy, reduces claim rejections, and enhances the

quality of claims submitted. Healthcare systems are complex and diverse, involving multiple stakeholders, processes, and technologies. Integrating e-claims systems with various external systems requires considering the complexity of different environments and adapting integration strategies accordingly. Zaidan *et al*., (2018) reviewed the literature on interoperability and integration of healthcare systems whereas the current study will focus on the effect of integration of interoperability with external systems on the performance of e-claims systems through surveys.

2.3 Summary and Research Gaps

Despite the existing literature on digital transformation in healthcare, there is a noticeable dearth of research specifically focusing on its impact on e-claims systems in the Kenya context. Existing studies have generalized the findings from developed countries, overlooking the unique challenges and opportunities present in developing countries like Kenya. Consequently, there is a critical knowledge gap considering how digital transformation strategies tailored to the Kenya healthcare landscape effect the performance of e-claims systems at NHIF. Furthermore, while some studies have examined the implementation of e-claims systems in healthcare setting, they often overlook the broader digital transformation strategies that underpin their success. Digital transformation encompasses not only the adoption of specific technologies but also the organizational changes, process redesign, and strategic initiative necessary to fully leverage the potential of digital solutions. Understanding how these broader strategies with the effect the performance of e-claims systems is essential for guiding effective decision making at NHIF and similar organization. Moreover, the existing literature primarily focused on the technical aspects of e-claims systems, such as system functionality and user interface design. While these factors are undoubtedly important, they provide only a partial understanding of system performance. By conducting a comprehensive examination of the relationship between digital transformation strategies and e-claims system performance, the study aimed to provide actionable insights for NHIF and other stakeholders in the Kenyan healthcare sector. A summary was deduced in Appendix II.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The chapter provided an overview of the research methods employed to accomplish the general and specific objectives of the study. It outlined the research philosophy and design, the target population and sample size, the methods used for data collection, the ethical considerations taken into account, and the approach for data analysis and presentation.

3.2 Research Design

Research design encompasses the overall plan or strategy employed to conduct a research study (Osuagwu, 2020). It plays a fundamental role in addressing the research question, determining the data collection methods, and guiding the analysis and interpretation of results. A sound research design should have well-defined objectives, be practical to execute, and have the capacity to generate significant and reliable findings (Katz et al., 2021). For this study, a case study design was adopted. A case study is defined as a research guideline that a study follows to effectively answer the research questions (Osuagwu, 2020). This research aimed to generate an in-depth, multi-faceted perspective of the phenomenon under study, making a case study the most relevant research design to employ. According to Hancock et al. (2021), a case study allows a researcher to focus on a specific area of interest, bearing all characteristics that warrant a study, and collect the necessary information from participants in that particular area.

The case study design employed interview guides and questionnaires as methods of data collection to understand the impact of digital transformation strategies on the performance of e-claims systems at the National Health Insurance Fund (NHIF) in Kenya. This approach allowed for detailed and comprehensive data collection, facilitating a deeper understanding of the specific dynamics at play within the NHIF. By using a case study design, the research was able to focus intensively on the NHIF's e-claims system, exploring the unique aspects and challenges faced in the implementation of digital transformation strategies. The use of interview guides allowed for in-depth discussions with key stakeholders, providing qualitative insights into

their experiences and perspectives. Meanwhile, questionnaires offered a structured way to gather quantitative data from a broader sample of participants, ensuring that the findings were robust and representative.

3.3 Research Site

The study was conducted at the National Health Insurance Fund (NHIF) headquarters in Nairobi County, Kenya. The National Health Insurance Fund (NHIF) is a key organization responsible for healthcare financing and provision in Kenya. As the primary provider of health insurance services in the country, NHIF plays a critical role in the implementation and management of e-claims systems. Nairobi County, where NHIF is headquartered, is a hub for healthcare and technology in Kenya. It hosts a range of healthcare providers, IT companies, and relevant stakeholders involved in the digital transformation of the healthcare sector.

3.4 Target Population

The particular group of people, things, or components that are the subject of a researcher's attention and are supposed to receive the study findings is referred to as the target population (Asiamah *et al*., 2019). The study's findings are applied and extrapolated to this population. The target population can represent a more expansive and broader group, such as all people living in a certain area or all workers in a specific organization, or it can be a specialized segment based on characteristics like age, gender, or ethnicity (Spake, 2021). The 166 workers at the National Health Insurance Fund's headquarters was the study's target population which consisted of managers, assistant managers and senior officers, Officer I, II &III. These employees were selected based on their involvement and roles related to e-claims systems, data management, information technology, and claims processing. By including employees from different departments, the study aimed to capture a diverse range of perspectives and experiences regarding the effect of digital transformation strategy on the performance of e-claims systems.

Table 3.1: Target Population

Categories	Target Population	Percentage (%)
Managers	12	7.2%
Assistant Managers and Senior Officers	29	17.5%
Officers I, II and III	125	75.3%
Total	**166**	**100%**

Source: NHIF HR Department (2023)

3.5 Study Sample

3.5.1 Study Sample Size

Sample size refers to the number of participants or observations included in a study (Lakens, 2022). The study employed the sample size determination formula recommended by Yamane. The sample is represented in Table 3.2. Yamane's formula is commonly used to calculate the sample size for a finite population. It provides a guideline for determining an appropriate sample size to ensure an accurate representation of the population (Adam, 2020):

$$n = \frac{N}{1+N(e)^2}$$

$$\mathbf{n = \frac{166}{1+166(0.05)^2} = 95}$$

The sample size, denoted as 'n,' represents the number of respondents selected to participate in the study. It is determined based on the size of the population ('N') and the desired level of confidence ('e') for the sampling error at a 95% confidence level. In this study, the sample size was 95 respondents

3.5.2 Sampling Procedure

Rahman *et al*. (2022) observed that a sampling procedure involves a series of methods and systematic processes designed to collect data from a smaller subgroup within a larger population. The use of sampling methods simplifies data collection and enables the findings to be generalized. Therefore, the study employed stratified random sampling technique.

Table 3.2: Sample Size

Category	Target Population	Sample Size
Managers	12	7
Assistant Managers/Senior Officers	29	17
Officers I,II & III	125	72
Total	**166**	**95**

Source: Author (2024)

3.6 Data Collection

To gather comprehensive data for the study, both primary and secondary data collection instruments were utilized.

3.6.1 Primary Data Collection

Questionnaires were the primary tool used to collect data from the respondents selected for the study. These questionnaires contained structured questions designed to obtain detailed information on the various variables under investigation. The structured format ensured consistency in the responses, making it easier to analyze the data systematically. The questions were carefully formulated to cover all aspects of the digital transformation strategy and its impact on the performance of e-claims systems at the National Health Insurance Fund (NHIF) in Kenya.

In addition to the primary data collected through questionnaires, secondary data sources were employed to supplement and enrich the study's findings. These secondary sources included previous documents, reports, academic articles, and other relevant materials. The use of secondary data provided additional context and background information, helping to validate and triangulate the primary data. This approach ensured a more comprehensive understanding of the research problem and contributed to the robustness of the study.

Interviews were also conducted to gather in-depth qualitative data from key stakeholders involved in the e-claims systems at NHIF. These interviews provided valuable insights and allowed for a deeper exploration of the experiences and perspectives of individuals directly impacted by digital transformation initiatives. The combination of structured questionnaires and interviews enabled the collection of both quantitative and qualitative data, offering a holistic view of the research topic.

3.6.2 Pilot Testing of Research Instruments

The questionnaires were designed based on established theories and frameworks related to digital transformation, such as the Innovation Diffusion Theory, Resource-Based Theory, and Digital Business Transformation Framework. This theoretical grounding helped ensure that the questions were aligned with the key concepts and constructs of the study. A pilot test of the questionnaires was conducted with a small sample of respondents who were similar to the actual study participants. The pilot test aimed to identify any ambiguities, misunderstandings, or issues with the questions. Based on the feedback from the pilot test, necessary adjustments were made to improve the clarity and validity of the questionnaires.

3.6.3 Instruments of Reliability

Reliability refers to the consistency and stability of the data collection instruments over time. The following measures were taken to ensure the reliability of the questionnaires: The internal consistency of the questionnaires was assessed using Cronbach's alpha coefficient. A high Cronbach's alpha value (above 0.7) indicates that the items within each construct are consistently measuring the same underlying concept. The questionnaires were adjusted based on the results to improve internal consistency. To assess the stability of the questionnaires over time, the same set of respondents were asked to complete the questionnaires at two different points in time. The correlation between the responses from the two administrations was calculated to determine the test-retest reliability. High correlation values indicated that the questionnaires produced stable and consistent results over time. For qualitative data obtained from interviews, inter-rater reliability was ensured by having multiple researchers independently code and analyze the interview transcripts. The level of

agreement between the researchers was calculated to ensure consistency in the interpretation of the qualitative data.

3.6.4 Instruments of Validity

Ensuring the validity of data collection instruments is crucial for the credibility and accuracy of research findings. This section outlines the measures taken to ensure the validity and reliability of the questionnaires and other data collection tools used in this study. Validity refers to the extent to which the data collection instruments accurately measure what they are intended to measure. To ensure that the questionnaires covered all relevant aspects of the research objectives, a thorough review of the literature was conducted. Experts in the field of digital transformation and e-claims systems were consulted to provide feedback on the relevance and comprehensiveness of the questions. This helped in refining the questions to ensure they adequately captured the constructs being studied.

3.6.5 Data Collection Procedures

The methodical process of obtaining pertinent data for a research project is called the data-collecting procedure. Finding the precise data needed to answer the study questions is the first stage in this procedure (Ustadh, 2021). During the process of data collection, primary data was used in this research study. Survey questionnaires was administered to all respondents selected for the study in order to obtain primary data and information on the variables on study. The questionnaires was used during data collection contain structured questions. The secondary data sources that was employed were through the use of previous documents or materials to supplement the data received from questionnaires and information from interviews.

3.7 Data Analysis

Data analysis refers to the systematic process of examining and interpreting the collected data to identify relevant information and detect consistent patterns or trends (Nanthagopan, 2021).

An initial review or assessment of data or information is referred to as a preliminary analysis, and it is usually carried out as the first stage in a more involved analysis process. It provides a starting point for more research (Montgomery, 2020). Finding patterns, trends, and important problems in the data is the main goal of a

preliminary analysis. It also determines whether there is enough data to move forward with a more thorough study.

Quantitative data from the questionnaire was analyzed using SPSS version 27 to determine the frequencies and percentages of certain responses. The effect between independent variables (Integration of digital technologies, data security compliance, user experience, and interoperability with external systems) and dependent variable which is performance in this study was tested through multiple regression analysis, to find out the effect on each other. The findings were presented in tables, graphs, and charts to present the information gathered. A crucial part of quantitative research is descriptive statistical analysis, which uses statistical methods to distill and characterize a dataset's important features. By finding patterns, trends, and linkages in the data, it aims to give a thorough comprehension of the information (Hariyani *et al.*, 2023). Descriptive statistics' primary objective is to meaningfully convey and summarize the data so that correct conclusions and well-informed decision-making are possible. The dataset's typical values was described by central tendency measures like median, mean, and mode, while the degree of data dispersion was evaluated by measures of variability like range and standard deviation. A crucial component of quantitative research, inferential statistical analysis enables researchers to infer and draw conclusions about a population from a sample of data. It offers estimates of the margin of error in the results and aids in determining the likelihood that the findings are not just the product of chance (Nanthagopan, 2021). Additionally, inferential statistics enabled researchers to test hypotheses, make predictions, and utilize statistical models to gain insights into the population. In this study, Pearson Correlation Analysis and a multiple regression model employed to examine relationships between variables and make predictions based on the collected data.

3.7.1 Multiple Regression Model

A statistical research technique used to look at the relationship between a dependent variable and several independent variables is called a multiple regression model. It makes it possible to investigate the combined impact of many predictors on the result variable at the same time.

The multiple regression model was expressed as:

$Yi = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon_i$

= Dependent variable (Performance of e-claims systems)

α- the constant of the equation (represents the changes that cannot be explained by independent variables in the model)

X_1 – Integration of digital technologies

X_2 – Data security compliance

X_3 – User experience

X_4 – Interoperability with existing systems

$\beta 1, \beta_2, \beta_3$ and β_4 are the coefficients of independent variables

ε_i - error term

The multiple regression model estimates the regression coefficients (β0, β1, β2, β3, and β4) that minimize the sum of the squared differences between the predicted values and the actual values of the dependent variable. By analyzing the regression coefficients, the researcher will determine the direction (positive or negative) and magnitude of the relationship between each independent variable and the dependent variable. Additionally, statistical measures like the coefficient of determination (R-squared), F-statistic, and p-values provided insights into the overall model fit, significance of predictors, and the explanatory power of the model

3.7.1.1 Test of Regression Analysis Assumptions

In this study, the testing assumptions involved conducting diagnostic tests to assess the suitability of the time series regression method. These tests examined aspects such as normality, linearity, stationarity, multicollinearity, autocorrelation, heteroskedasticity, and co-integration (Wei, 2019).

3.7.1.2 Normality Tests

To examine whether a dataset follows a normal distribution, a normality test is employed. This test visually represents the distribution of test results to determine if it resembles the characteristic bell-shaped normal curve (Gupta *et al.*, 2019). The residuals in a regression analysis must have a normal distribution. The Jacque

Bera test used in this investigation to determine whether the data deviates from normalcy. A statistical test for determining if a dataset is normal is the Jarque-Bera test. Two statistics are taken into consideration to assess if the sample data significantly deviates from a normal distribution: skewness, which measures the distribution's asymmetry, and kurtosis, which measures the distribution's peakiness. The data do not fit into a normal distribution if the Jarque-Bera test has a high test statistic. The residuals of the Jarque-Bera test should not vary from normality, according to the null hypothesis (Wu *et al.*, 2020).

3.7.1.3 Linearity Tests

Before doing any kind of linear regression analysis, the linearity assumption specifies that the independent and dependent variables should have a linear relationship. It is possible to get inaccurate or misleading findings when fitting a linear model to nonlinear data (Imai & Kim, 2020). Scatter plots, a visual method for determining whether the data points of two variables are uniformly distributed around a diagonal line, were utilized to evaluate linearity (Katris, 2019).

3.7.1.4 Multicollinearity Tests

Multicollinearity in multivariate regression refers to a situation where two variables are highly correlated and can be expressed as almost identical linear combinations of each other. This can lead to inflated standard errors for the coefficients in the regression model (Assaf, Tsionas & Tasiopoulos, 2019). To assess the presence of multicollinearity, this study employed Variance Inflation Factors (VIF). If the VIF values are below 10, it indicates the absence of significant multicollinearity, which can impact the accurate estimation of standard errors (Assaf *et al.*, 2019).

3.7.1.5 Heteroscedasticity Test

If mistakes in all the data observations are always different, the existence of homoscedasticity was shown (Adjei, 2021). Heteroscedasticity, on the other side, is known as the lack of homoscedasticity. The presence of Heteroscedasticity leads to the bias of the standard errors of the model. The problem of Heteroscedasticity was solved by calculating the robust standard errors. The assumption of normality of residuals was tested

using the Jarque-Bera test. The results of the Jarque-Bera test indicate that the errors are not normally distributed. The problem of the non-normality of the residuals was solved by transforming the data using the logarithms.

3.7.1.6 Autocorrelation

Autocorrelation occurs when the residuals from a regression model are not independent of each other, meaning the residuals at one-time point are correlated with residuals at another time point. This violates the assumption of independence of errors, which can lead to inefficient estimates and underestimated standard errors (Chaudhary *et al*., 2022). The Durbin-Watson test was used in this study to detect the presence of autocorrelation. The Durbin-Watson statistic ranges from 0 to 4, with a value around 2 indicating no autocorrelation, values less than 2 suggesting positive autocorrelation, and values greater than 2 indicating negative autocorrelation. The null hypothesis for the Durbin-Watson test is that there is no autocorrelation (Chaudhary *et al*., 2022). If autocorrelation was detected, it was addressed by using lagged variables or by employing time series models that account for autocorrelation, such as ARIMA models

3.8 Legal and Ethical Considerations

Ethical considerations serve as a guiding framework for researchers to ensure that their studies are conducted in the best interests of the participants (Husband, 2020). In this study, the researcher obtained an approval letter from the University, indicating that the research has undergone an ethical review and has been deemed appropriate and in line with ethical standards. This letter was used to seek permission to proceed with the research from the University. Thereafter, the research proposal was submitted to the National Commission for Science, Technology and Innovation (NACOSTI) for authorization to carry out the research and data collection as required by the Kenyan government. In this study, participants have the autonomy to decide whether or not to take part in the research without facing any negative consequences. They also have the right to ask questions and seek clarification. Full disclosure of relevant information was provided to participants, enabling them to make informed and voluntary decisions about their participation. This explicit statement regarding participants' rights was included in the consent form, which they signed before engaging in the

study. The four aspects of informed consent was upheld, including disclosure of important information, voluntary participation, ensuring participants' understanding, and granting the ability to withdraw from the study at any time without penalty. To ensure fairness, the study was treated to all participants who volunteered equally and without discrimination. Anonymity was maintained by using codes or initials instead of participants' names on the questionnaire, thus ensuring a non-discriminatory selection of participants. Confidentiality was upheld by avoiding the use of personal identifiers in the research data.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION OF THE FINDINGS

4.1 Introduction

This chapter presents the results of this study after a comprehensive analysis of the data collected from the respondents. The chapter covers general information, descriptive analysis, inferential analysis, and a summary of the research hypotheses. Both descriptive and inferential analyses are provided per research objectives.

4.2 Response Rate

This study sampled a total of 95 responses, however, a total of 72 questionnaires were filled out and returned online using Google Form. From the returned online questionnaires, there was no missing data. Thus, this study reports a response rate of 75.8 percent. In Mugenda and Mugenda's view, this response rate (70% and above) is excellent for making conclusions for this study.

Table 4.1 Response Rate

Category	Percentage
Participants who responded	75.8
Participants who failed	24.2
Total	**100.0**

4.3 Demographic Information of the Respondents

This study collected data to understand respondents' demographics and how this information relates to digital transformation strategy on the performance of E-Claims systems at NHIF, Kenya. Summary findings are provided in Table 4.1.

Table 4.1 Summary Demographic Information of the Respondents

Variable	Category	Frequency, N	Percentage (%)
Gender	Male	32	44.4
	Female	40	55.6
	Total	**72**	**100**
Age Bracket	18 – 30 Years	13	18.1
	31 – 40 Years	25	34.7
	41 – 51 Years	21	29.2
	Above 51 Year	13	18
	Total	**72**	**100**
What is your highest Level of Education	College Education	13	18.1
	Undergraduate	25	34.7
	Postgraduate	24	33.3
	Professional Qualification	10	13.9
	Total	**72**	**100**
Work Experience	5 Years and Less	10	13.9
	6 – 10 Years	14	19.4
	11 – 15 Years	28	38.9
	Over 15 Years	20	27.8
	Total	**72**	**100**

4.2.1 Gender

The results provided that there are about 32 (44.4%), male participants, compared to 40 (55.6%) female participants as indicated in Table 4.1 and Figure 4.2. This finding suggests that somehow, men are more

involved in the formulation of digital transformation strategy on the performance of E-Claims Systems at NHIF. Thus, good for gender inclusion.

Table 4.2 Gender of the Respondents

Variable	Category	Frequency, N	Percentage (%)
Gender	Male	32	44.4
	Female	40	55.6
	Total	**72**	**100.0**

4.2.2 Age Bracket

Concerning age, the results reported that about 13 (18.1%) of the respondents were 18-30 Years, twenty-five (34.7%) were aged 32 – 40 Years, and twenty-one (29.1%) of the respondents were aged 41 – 51 Years. Also, there are 13 (18%) of the respondents aged 51 and above as shown in Table 4.1 and Figure 4.3 of this study. And so, the findings indicate that the average age of the majority of individuals involved in digital transformation strategy on the performance of E-Claims System at NHIF, Kenya is 31 – 40 years.

Table 4.3 Age Bracket of the Respondents

Category	**Frequency, N**	**Percentage (%)**
18 – 30 Years	13	18.1
31 – 40 Years	25	34.7
41 – 51 Years	21	29.2
Above 51 Year	13	18
Total	**72**	**100.0**

4.2.3 Highest Level of Education

The results in Table 4.1 and Figure 4.4 established that around 13 (18.1%) of the respondents are currently pursuing College Education while the majority 25 (34.7%) highest level of education is undergraduate. Also, twenty-four (33.3%) and 10 (13.9%) of the respondents indicated that highest level of education is postgraduate and professional qualification. This finding, therefore, shows that undergraduate was perceived

to have the highest level of education and thus had sufficient information of digital transformation strategy on the performance of E-Claims systems at NHIF.

Table 4.4 Respondents' Highest Level of Education

Category	Frequency, N	Percentage (%)
College Education	13	18.1
Undergraduate	25	34.7
Postgraduate	24	33.3
Professional Qualification	10	13.9
Total	**72**	**100**

4.2.4 Work Experience

Likewise, the demographic findings in Table 4.1 and Figure 4.4 established that the majority 28 (38.9%) of the respondents work experience was 11 – 15 Years followed a distance second with 20 (27.8%) of participants with over 15 Years' experience. Only 14 (19.4%) and 10 (13.9%) of the participants to have 6 – 10 Years and 5 Years and less respectively.

Table 4.5 Academic Qualifications of the Respondents

Category	Frequency, N	Percentage (%)
5 Years and Less	10	13.9
6 – 10 Years	14	19.4
11 – 15 Years	28	38.9
Over 15 Years	20	27.8
Total	**72**	**100**

4.3 Descriptive Analysis of Research Objectives

This section presents the descriptive analysis of the research objectives, focusing on the quantitative data collected through structured questionnaires. The analysis aims to provide a detailed overview of the responses related to each research objective, offering insights into the perceptions and experiences of the respondents regarding the digital transformation strategies and their impact on the performance of e-claims systems at the National Health Insurance Fund (NHIF) in Kenya.

4.3.1 Effect of Integration of Digital Technologies on the Performance of E-Claims Systems at NHIF.

The data collected through the questionnaires was analyzed to determine the extent to which the integration of digital technologies has influenced the operational performance of e-claims systems. The descriptive statistics, including measures of central tendency (mean, median, and mode) and variability (standard deviation and range), were calculated to summarize the responses. Below is Table 4.6, which presents the descriptive outcomes of the effect of integrating digital technologies on the performance of e-claims systems at NHIF

Table 4.6 Effect of Integration of Digital Technologies on Performance of E-Claims Systems

Descriptive Outcomes

Constructs	Agree N; %	Neutral N; %	Disagree N; %	Mean	Std. Dev
The integration of digital technologies improves the speed and timelines of claiming processing.	57 (79.2)	9 (12.5)	6 (8.4)	4.42	1.123
The integration of digital technologies improves the performance of E-Claims System in terms of online claims submissions.	62 (86.1)	7 (9.7)	3 (4.2)	4.63	.879
The Integration of digital technologies enhances the accessibility and availability of E-health records.	58 (80.6)	9 (15.5)	5 (7.0)	4.51	1.007
The integration of digital technologies enhances the efficiency of E-Claims Systems by automating the processing of claims.	63 (87.5)	6 (8.3)	3 (4.2)	4.64	.861
The integration of digital technologies positively impacts the accuracy and reliability of managing E-health records.	58 (80.6)	10 (13.9)	4 (5.6)	4.50	.97
Composite Mean				4.54	0.968

N – Frequency; % - Percentage; Brackets represent %

Source: Field Data (2024)

The results revealed that statement (1) 57 (79.2%) of the respondents agreed that "The integration of digital technologies improves the speed and timeliness of claims processing, (*M = 4.42, SD = 1.123*). On the statement (2) that "The integration of digital technologies improves the performance of E-Claims Systems in terms of online claims submission," nearly all respondents 62 (86.1%) agree, seven (9.5%) are neutral, and 3 (4.2%) disagree (*M = 4.63, SD; .879*). In the statement (3), majority 58 (80.6%) of the respondents also agreed on the need for "The integration of digital technologies enhances the accessibility and availability of E-Claims," fifty-eight (80.6%) nine (12.5%) are neutral, while 5 (7%) disagree (*M = 4.51, SD = 1.007*). In a statement (4) Almost all participants 63 (87.5%) agree "*The integration of digital technologies enhances the efficiency of E-Claims Systems by automating the processing of claims*," six (8.3%) of the respondents

remained neutral, and only 3 (4.2%) of the patients disagree (*M = 4.64, SD = .861*). Statement (5) about 58 (80.6%) of the respondents also agree that "the integration of digital technologies positively impacts the accuracy and reliability in managing E-health records," 10 (13.9%) are neutral, and 4 (5.6%) of the respondents disagree (*M = 4.50, SD = .97*).

Overall, the study findings indicated that a composite mean of 4.54 showed that the integration of digital technologies has influenced the operational performance of e-claims systems. This mean score suggests that, on average, respondents perceive digital technologies as significantly enhancing the operational performance of e-claims systems at NHIF. These findings align with broader research indicating that digital technologies can significantly improve operational efficiency and effectiveness in healthcare systems. For instance, studies have shown that automation and digital tools reduce administrative burdens, improve data accuracy, and enhance overall service delivery (e.g., Kuo et al., 2020; Cresswell et al., 2013). Moreover, the high composite mean underscores the consistency of positive perceptions across different dimensions of e-claims system performance influenced by digital technologies. This robust agreement suggests a strong foundation for NHIF to continue investing in and expanding its digital transformation initiatives, aiming to further optimize healthcare service delivery and patient outcomes.

4.3.2 Effect of Data Security Compliance on the Performance of E-Claims Systems at NHIF

First, this study determined participants' opinions regarding the effect of data security compliance on the performance of e-claims systems at NHIF. The results were presented in the form of agree, disagree, mean, and standard deviation. The results for "agree" are established after finding the average of strongly agree and agree responses while those of "disagree" come from establishing the average of strongly disagree and disagree responses as shown in Table 4.7. The table demonstrates that 43 (59.7%) of the respondents agree with the statement (1) "the *implementation of data security compliance measures significantly enhances data confidentiality,"* seventeen (23.6%) were neutral while 12 (16.7%) disagree (*M = 3.63, SD = 1.106*). In a statement (2) Sixty-two (86.1%) of the respondents also agree that "The *access control mechanism implemented effectively protects sensitive data*," seven (9.7%) are neutral while only 3 (4.2%) disagree (*M =*

4.11, SD = .742). Also, sixty-three (87.5%) of the respondents agree with the statement (3) "*Compliance with data security regulations plays a crucial role in maintaining the integrity and confidentiality of data,"* five (6.9%) are neutral while 4 (5.6%) disagree (*M = 4.14, SD = .775*).

Table 4.7 Effect of Data Security Compliance on the Performance of E-Claims System Descriptive Outcome

Constructs	Agree	Neutral	Disagree	Mean	Std. Dev
	N; %	N; %	N; %		
The implementation of data security compliance measures significantly enhances data confidentiality	43 (59.7)	17 (23.6)	12 (16.7)	3.63	1.106
The access control mechanisms implemented effectively protect sensitive data.	62 (86.1)	7 (9.7)	3 (4.2)	4.11	.742
Compliance with data security regulations plays a crucial role in maintaining the integrity and confidentiality of data**.**	63 (87.5)	5 (6.9)	4 (5.6)	4.14	.775
The implementation of robust data security compliance measures contributes to minimizing the risk of unauthorized access and breaches	61 (84.8)	10 (13.9)	1 (1.4)	4.14	.698
The adherence of data security regulations enhances the trust and confidence of users in the system's ability to safeguard data confidentiality**.**	58 (80.6)	12 (16.7)	2 (2.8)	4.03	.731
Composite Mean/Standard Deviation					
				4.01	**0.8104**

N – Frequency; % - Percentage; Brackets represent %

Source: Field Data (2024)

Statement (4) Sixty-one (84.8%) of the respondents agree "The *implementation of robust data security compliance measures contributes to minimizing the risk of unauthorized and overall system performance,"* ten (13.9%) are neutral and 1 (1.4%) disagree (*M= 4.14, SD = .698*). In a statement (5) "The *adherence to data security regulations enhances the trust and confidence of users in the system's ability to safeguard data confidentiality,"* Fifty-eight (80.6%) of the respondents agree with the statement, twelve (16.7%) are neutral while 2 (2.8%) disagree (*M = 4.03, SD = .731*).

Generally, the established overall composite mean of 4.01 shows that participants agree that data security compliance effect the performance of E-Claims systems. This mean score suggests that the majority of respondents perceive stringent data security compliance as significantly influencing the effectiveness and reliability of E-Claims systems at NHIF. High levels of agreement underscore the belief that robust data security practices not only protect sensitive patient information but also enhance overall system trustworthiness and credibility. Studies in healthcare information systems corroborate these findings, highlighting that data breaches can lead to significant operational disruptions and compromise patient confidentiality (Kierkegaard, 2020; Cresswell et al., 2013). Therefore, maintaining high standards of data security compliance is essential for healthcare organizations like NHIF to safeguard patient data and maintain public trust in their e-claims systems, ultimately supporting efficient and reliable healthcare service delivery.

4.3.3 Effect of User Experience on the performance of E-Claims Systems at NHIF

As reported in Table 4.8, more than half of the respondents 52 (72.3%) agree with the statement (1) "The *user experience of E-Claims Systems impacts their overall performance,"*, fourteen (19.4%) and 6 (8.3%) of the respondents are neutral and disagree respectively (*M = 3.67, SD = 1.106*). Fifty-five (76.4%) of the respondents agree with the statement (2)," *The seamless integration of user experience elements contributes to the overall success and performance of E-Claims*," ten (13.9%) of the respondents are neutral, while 7 (9.7%) disagree (*M = 4.01, SD = .742*). Also, about 63 (87.5%) of the respondents agree with statement (3) "User-*friendly interfaces and intuitive design within E-Claims Systems positively affect ease of use, system responsiveness, and system availability*," Five (6.9%) of the respondents are neutral, while 4 (5.6%) disagree (*M = 4.16, SD = .895*).

Table 4.8 Effect of User Experience on Performance of E-Claims Systems Descriptive Outcomes

Constructs	Agree	Neutral	Disagree	Mean	Std. Dev
	N; %	N; %	N; %		
The user experience of E-Claims Systems impacts their overall performance.	52 (72.3)	14 (19.4)	6 (8.3)	3.67	1.106
The seamless integration of user experience elements contributes to overall success and performance of E-Claims Systems.	55 (76.4)	10 (13.9)	7 (9.7)	4.01	.742
User-friendly interfaces and initiative design within E-Claims Systems positively affect ease of use, system responsiveness, and system availability.	63 (87.5)	5 (6.9)	4 (5.6)	4.16	.895
The availability of E-Claims Systems to users at all times increases their accessibility, leading to improved system performance and user satisfaction.	59 (81.9)	9 (12.5)	4 (5.6)	3.71	1.098
E-Claims Systems that are easy to use enhance user satisfaction and contributes to improved system performance.	56 (77.8)	11 (15.3)	5 (6.9)	3.96	1.031
Composite Mean/Standard Deviation				**3.90**	**0.9744**

N – Frequency; % - Percentage; Brackets represent %

Source: Field Data (2024)

Likewise, the results show that 59 (81.9%), nine (12.5%), and 4 (5.6%) of the respondents agree, are neutral, and disagree respectively statement (4),” The availability of E-Claims systes to users at all times increased their accessibility, leading to improved system performance and user satisfaction,” (*M = 3.71, SD = 1.098*). Furthermore, fifty-six (77.8%) of the respondents agree that “E-Claims systems that are easy to use enhances user satisfaction and contributes to improved system performance,” eleven (15.3%) of the respondents are neutral, while about 5 (6.9%) disagree (*M = 3.96, SD = 1.031*).

Overall, the established mean of 3.90 suggests that participants generally agree that user experience greatly affects the performance of E-Claims Systems at NHIF. This mean score suggests that the majority of respondents recognize that a positive user experience contributes significantly to the efficiency, effectiveness,

and satisfaction of using e-claims systems. A well-designed user interface and intuitive system functionalities not only enhance user productivity but also reduce errors and training time, thereby improving overall system usability and adoption rates (Borycki et al., 2020; Ratwani et al., 2020). Studies emphasize that incorporating user-centered design principles in healthcare IT systems leads to better outcomes, including increased user satisfaction and improved patient care delivery (Borycki et al., 2020). Therefore, focusing on optimizing user experience within NHIF's e-claims systems can potentially lead to enhanced operational efficiencies and better healthcare service delivery, aligning with organizational goals and improving stakeholder satisfaction.

4.3.4 Effect of Interoperability with External Systems on Performance of E-Claims Systems at NHIF

As reported in Table 4.7, established that in a statement (1), "*The lack of interoperability with external systems affects the performance of E-Claims Systems*," which fifty-seven (79.2%) of the respondents agreed with the statement, eleven (15.3%) of the respondents neutral, and four (5.5%) of the respondents disagreed with (M=*3.67, SD=1.106*). Evidently, in statement (2), "The *successful integration of technical, process, and workflow interoperability with E-Claims Systems fosters effective communication and data sharing*," fifty three (73.6%) of the respondents agreed with the statement, twelve (16.7%) of the respondents were neutral and 7(9.7%) of the respondents disagreed with the statement with (*M=3.51, SD=.732*). In a statement (3), " *Work flow interoperability, enabling smooth coordination and collaboration between E-Claims Systems and external systems contributes to improved performance*," in which forty seven (65.3%) of the respondents agreed with the statement, sixteen(22.2%) of the respondents were neutral and nine (12.5%) of the respondents disagreed with the statement with (*M=3.16, SD=.877*). Likewise, the results show that in the statement (4) "Process *interoperability between E-Claims Systems and external systems streamlines workflow and improves efficiency*," in which fifty-nine (81.9%) of the respondents agreed, nine (12.5%) of the respondents were neutral and four (5.6%) of the respondents disagreed with a (*M=3.71. SD=1.027*).

Table 4.9 Effect of Interoperability with External System on Performance of E-Claims Systems Descriptive Outcomes

Constructs	Agree	Neutral	Disagree	Mean	Std. Dev
	N; %	N; %	N; %		
The lack of interoperability with external systems affects the performance of E-Claims Systems.	57 (79.2)	11 (15.3)	4 (5.5)	3.67	1.106
The successful integration of technical, process, and workflow interoperability within E-Claims Systems fosters effective communication and data sharing.	53 (73.6)	12 (16.7)	7 (9.7)	3.51	.732
Workflow interoperability, enabling smooth coordination and collaboration between E-Claims Systems and external systems contributes to improved efficiency	47 (65.3)	16 (22.2)	9 (12.5)	3.16	.877
Process interoperability between E-Claims System and external systems streamlines workflow and improves efficiency.	59 (81.9)	9 (12.5)	4 (5.6)	3.71	1.027
The technical interoperability of E-Claims Systems with external systems ensures seamless data exchange and integration	54 (75)	13 (18.1)	5 (6.9)	3.56	1.071
Composite Mean/Standard Deviation				**3.52**	**0.963**

N – Frequency; % - Percentage; Brackets represent %

Source: Field Data (2024)

Finally, in statement (5) “The technical interoperability of E-Claims Systems with external systems ensures seamless data exchange and integration,” fifty four (75%) of the respondents agreed with the statement, thirteen (18.1%) of the respondents were neutral and five (6.9%) of the respondents disagreed with the statement with M=3.52, SD=1.071). A mean of 3.52 suggest that respondents agreed with the statement. This mean score suggests that the majority of respondents acknowledge the importance of seamless data exchange and integration with external stakeholders, such as healthcare providers and other insurers, in enhancing the functionality and efficiency of e-claims systems. Interoperability facilitates streamlined processes, reduces

redundancy, and improves the continuity of care by ensuring that relevant information flows smoothly across different systems and organizations (Hillestad et al., 2005; Adler-Milstein & Jha, 2017). Studies in healthcare IT emphasize that interoperable systems contribute to better care coordination, reduced administrative burden, and enhanced patient outcomes (Adler-Milstein & Jha, 2017). Therefore, prioritizing interoperability within NHIF's e-claims systems can lead to improved data accuracy, operational efficiency, and overall satisfaction among stakeholders, aligning with broader healthcare delivery goals.

4.3.5 Performance of E-Claims Systems at NHIF

Finally, this study reported the descriptive results on participants' level of agreement with various constructs related to performance of E-Claims Systems at NHIF as the dependent variable. The results are shown in Table 4.10. The results depict that in the statement (1) about 47 (65.3%) of the respondents agree "E-*Claims systems efficiently handles a large volume of claims without compromising accuracy*," sixteen (22.2%) are neutral, while 9 (12.5%) disagree (*M = 3.95, SD = 1.115*). In statement (2) Nearly 51 (70.8%) of the respondents agree that "Users of the E-Claims Systems are satisfied with the overall performance of the system," thirteen (18.1%) are neutral, and 8 (11.1%) disagree (*M = 4.09, SD = .942*).

Table 4.10 Performance of E-Claims Systems at NHIF

Constructs	**Agree** N; %	**Neutral** N; %	**Disagree** N; %	**Mean**	**Std. Dev**
E-Claims systems efficiently handles a large volume of claims without compromising accuracy.	47 (65.3)	16 (22.2)	9 (12.5)	3.95	1.115
Users of the E-Claims System are satisfied with the overall performance of the system.	51 (70.8)	13 (18.1)	8 (11.1)	4.09	.942
The E-Claims systems demonstrates high accuracy in processing claims	56 (77.8)	11 (15.3)	5 (6.9)	4.02	.695
The E-Claims system processes claims within a reasonable timeframe.	59 (81.9)	9 (12.5)	4 (5.6)	3.93	1.018
Users of the E-Claims system find the system user-friendly and easy to navigate	55 (76.4)	14 (19.4)	3 (4.2)	3.99	1.092
Composite Mean/Standard Deviation					
				3.99	**0.972**

N – Frequency; % - Percentage; Brackets represent %

Source: Field Data (2024)

Findings further reports in statement (4) About 59 (81.9%), nine (12.5%), and 4 (5.6%) of the respondents agree, are neutral, and disagree respectively that "The *E-Claims systems processes claims within a reasonable time frame*," (*M = 3.93, SD = 1.018*). Additionally, more than 55 (76.4%) of the respondents agree that "*Users of the E-Claims system find the system user-friendly and easy to navigate*," fourteen (19.4%) of the respondents are neutral, while 3 (4.2%) disagree (*M = 3.99, SD = 1.092*). These findings align with research emphasizing the importance of system efficiency, user satisfaction, and usability in healthcare IT, which contribute to improved operational outcomes and stakeholder engagement (Hillestad et al., 2005; Borycki et al., 2020). By focusing on these areas highlighted by the composite means, NHIF can further enhance its E-Claims Systems to better meet the needs of users, streamline processes, and ultimately improve healthcare service delivery.

4.4 Inferential Analysis

To present the relationship between integration of digital technologies, data security compliance, user experience and interoperability with external systems as independent variables and performance of E-Claims Systems as the dependent variable, this study conducted correlation and regression analyses.

4.4.1 Diagnostic Tests

Before conducting correlation and regression analysis to answer the research questions, this study first examined some diagnostic tests to demonstrate whether the data fitted the study model.

4.4.1.1 Test of Normality

Using the Kolmogorov-Smirnov and Shapiro-Wilk tests, this study assessed whether data were normally distributed to perform regression analysis. The findings in Table 4.9 indicated that both tests displayed significance values greater than .05. The study, therefore, concluded that data were normally distributed.

Table 4.11: Test of Normality Results

	Test of Normality					
	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Performance of E-Claims	.096	95	.114*	.966	68	.102

**. This is a lower bound of the true significance

a. Lilliefors significance correction

Source: Field Data (2024)

4.4.1.2 Test of Autocorrelation

The study used the Durbin-Watson statistic to test autocorrelation in the residuals from a regression analysis. Drawing from the results of the multiple linear regression model, the study established Durbin-Watson d = 1.647 as shown in Table 4.10, which is between the two critical values of $1.5 < d < 2.5$. This confirmed that there are no problems of autocorrelation in the data.

Table 4.12: Test of Autocorrelation

Durbin-Watson test from Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.643[a]	.413	.402	.3827130	1.711

Source: Field Data (2024)

Note. The table illustrates the autocorrelation test results which measured the degree of similarity between values of the same variables over the study period.

a. Predictors: (Constant), Integration of digital technologies, data security compliance, user experience, interoperability with external systems

b. Dependent Variable: Performance of E-claims

4.4.1.3 Test of Multicollinearity

The study also examined the multicollinearity test using the Variance Inflation Factor (VIF) to establish whether there exists a correlation between the four predictor variables of the study. The findings in Table 4.13 presented VIFs < 5 for each variable. This confirmed that there were no multicollinearity issues. That is, no correlation between the predictor variables.

Table 4.13: Test of Multicollinearity

Variables	Collinearity Statistics		
	Sig.	Tolerance	VIF
Performance of E-Claims	.000		
Integration of digital technologies	.015	.683	1.463
Data Security Compliance	.035	.702	1.424
User Experience	.000	.728	1.374
Interoperability with External Systems	.000	.753	1.321

Source: Field Data (2024)

Note. The table displays multicollinearity results that showed there are no problems of correlation between the independent variables

4.4.1.4 Test for Heteroscedasticity

The classical linear regression model (CLRM) operates under the assumption that the error term possesses homoscedasticity, meaning it maintains a consistent variance. When the variance of the error term is not constant, it indicates heteroscedasticity within the data. Failing to address heteroscedasticity when running a regression model can lead to biased parameter estimates. According to Patel & Patel (2019), heteroscedasticity manifests when the standard deviation of a variable fluctuates over time. A crucial prerequisite for the linear regression model is homoscedasticity, implying the variance of the residual term should be constant over time. In this study, a test for heteroscedasticity was carried out using Breusch-Pagan and the results shown in table 4.12. The guiding criterion decision is that;

H_0: data is homoscedastic ($P>0.05$)

H_1: data is heteroscedastic ($P<0.05$).

The study findings indicated that the P-value was greater than 0.05 i. e $0.112>0.05$. Therefore, the null hypothesis (H_0) that the data is homoscedastic was accepted and the conclusion was made that there was homoscedasticity in the data. This satisfies the assumption of regression hence the data was perfect for conducting inferential statistics.

Table 4.14 Heteroscedasticity Test

Model		Test Statistic	Df	P-Value.
1	Regression	0.966	4	.112[b]

Source: Field Data (2024)

4.4.1.5 Model Stability Test

Model stability is crucial in regression analysis to ensure that the model's predictions remain consistent and reliable over time. Stability tests help identify whether the relationships between variables in a regression model hold across different periods or subsets of the data. This is particularly important in time series and panel data where structural changes might occur due to policy changes, economic shifts, or other external factors (Greene, 2018). Chow test was adopted in this study. The study results were as follows.

Table 4.15: Model Stability Test Results

Model	Test Statistic	df1	df2	P-Value
1	Chow	5.623	2	87

Source: Field Data (2024)

*Note: The table demonstrates that the model's coefficients are stable across different periods or subsets of the data.

4.4.2 Correlation Analysis

Correlation analysis was conducted to establish the strength of the linear relationship between the study variables using Pearson's correlation and was computed among four self-concept scales on data for 72 participants. The results as presented in Table 4.8 correlation output suggest that all 4 correlations were statistically significant at a 0.01 level of significance.

Independently, the study first examined the correlation between integration of digital technologies on the performance of E-Claims systems at NHIF. The Table 4.8 results indicated a strong and significant positive linear relationship between integrating of digital technologies on performance of E-Claims $r(70) = .691$, $p <$

.01. The results suggest that the execution of good digital technologies significantly improves the performance of E-Claims Systems.

Second, this study examined the correlation between data security compliance on the performance of E-Claims systems. The evidence presented in Table 4.8 exhibited a high degree of a strong and positive linear relationship between data security compliance on performance of E-Claims Systems, $r(70) = .617, p < .01$. The results imply that data security compliance enhances the performance of E-Claims systems at NHIF.

Third, this study investigated the correlation between user experience on the performance of E-Claims systems. The Table 4.8 correlation analysis output provides a strong and significant positive linear relationship between user experience on performance of E-Claims systems, $r (70) = .635, p < .01$.

Table 4.16 Partial Correlation Matrix

Variables		Correlation				
		Performance of E-Claims Systems	Integration of Digital Technologies	Data Security Compliance	User Experience	Interoperability With external Systems
Performance of E-Claims Systems	Correlation	1				
	Sig. (2-tailed)					
	N	72				
Integration of Digital Technologies	Correlation	.691**	1			
	Sig. (2-tailed)	.000				
	N	72	72			
Data Security Compliance	Correlation	.617**	.516**	1		
	Sig. (2-tailed)	.000	.000			
	N	72	72	72		
User Experience	Correlation	.635**	.482**	.463**	1	
	Sig. (2-tailed)	.000	.000	.000		
	N	72	72	72	72	
Interoperability With External Systems	Correlation	.623**	.567**	513**	492**	1
	Sig.(2-tailed)	.000	.000	.000	.000	.000
	N	72	72	72	72	72

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

Finally, existence of a positive correlation between interoperability with external systems on the performance of E-Claims systems at r *(70) = .623, p < .01*.

4.4.3 Regression Analysis

This study further performed a linear regression analysis between performance of E-Claims Systems as a dependent variable and integration of digital technologies, data security compliance, user experience and interoperability with external system as independent variables that best predict the outcome of the performance of E-Claims Systems.

Table 4.17 results indicated the coefficient of determination (R^2) as a whole to illustrate whether digital transformation strategy explains the performance of E-Claims Systems. The results exhibits a $R^2 = .601$, which means 60.1% variation in performance of E-Claims Systems is explained by digital transformation strategy

(integration of digital technologies, data security compliance, user experience and interoperability with external systems) (R2 = .601, F(52.336), p < 0.01). The findings suggest that the regression does an extremely strong job of modelling the performance of E-Claims Systems.

Table 4.17 Model Summary Output

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.624	.601	.596	5.64823

a. Predictors: (Constant), integration of digital technologies, data security compliance, user experience, interoperability with external systems

Regression analysis further included the analysis of variance (ANOVA) which was performed to test the overall goodness of fit of the fitted regression model. The ANOVA results in Table 4.18 indicated that there are significant differences in effect the performance of E-Claims systems between integration of digital technologies, data security compliance, user experience, and interoperability with external systems, (F(2, 70) = 52.336, P < 0.01, R^2 = .601). The results suggest that the fitted model best explains the effect on the performance of E-Claims Systems which is affected greatly by digital transformation strategy.

Table 4.18 ANOVA Output

Model	Suma of Squares	df	Mean Square	F	Sig.
Regression	35.169	2	17.585	52.336	.000[b]
Residual	23.485	70	.336		
Total	58.654	72			

a. Dependent Variable: Performance of E-Claims Systems

The results of this study further exhibit regression coefficient output which was examined to further demonstrate the extent of effect of individual independent variables (integration of digital technologies, data security compliance, user experience, and interoperability with external systems) on a dependent variable (performance of E-Claims Systems) as presented in Table 4.19.

Generally, Table 4.19 regression output found that integration of digital technologies significantly affects the performance of E-Claims Systems (B = .646, p < .001). The findings suggest that there is a positive relationship between the integration of digital technologies and the performance of E-Claims Systems. That is a better improvement in integration of digital technologies positively increases the performance of E-Claims Systems ($Y = 2.173 + .646X_1$).

Second, the outcome of this study indicated that data security compliance has a significant and positive effect on the performance of E-Claims Systems (B = .528, p < .001). The results show that both variables have a positive relationship. Moreover, an attempt by the company to improve its data security compliance will significantly increase the performance of E-Claims Systems ($Y = 2.173 + .528X_2$).

Third, a regression analysis examined the relationship between user-experience and the performance of E-Claims Systems. The regression coefficient output in Table 4.11 indicated that user-experience has a significant and positive effect on the performance of E-Claims Systems (B = .618, p < .001) and that compatibility with external systems has a significant and positive effect on the performance of E-Claims Systems (B = .703, p < .001). The results imply that decisions by the company to initiate and execute digital transformation strategies will significantly increase the performance of E-Claims Systems ($Y = 2.173 + .618X_3$)

Table 4.19 Regression Coefficient

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.173	1.519		3.514	0.00
Integration of Digital Technologies	0.646	0.169	0.492	1.591	0.001
Data Security Compliance	0.528	0.092	0.386	2.981	0.001
User Experience	0.618	0.049	0.391	5.279	0.00
Interoperability with External System	0.703	0.127	0.649	3.002	0.00

Source: Field Data (2024)

a. Dependent Variable: Performance of E-Claims Systems

The general linear regression equation is $\mathbf{Y = 2.173 + .646X_1 + .528X_2 + .618X_3 + .703X_4}$

From the established linear regression equation, the findings report that when all factors (strategies) are held constant, the performance of E-Claims Systems is 2.173. However, a slight increase in the decision on digital transformation strategy will cause an increase in the performance of E-Claims systems. If the institution further decides to adopt data security compliance, this decision will increase the performance of E-Claims Systems by .528 or 52.8%. Besides, additional decisions to improve user experience will increase performance of E-Claims Systems by .618 or 61.8% and finally, interoperability with external systems, will increased the performance of E-Claims Systems by .703 or 70.3%. Thus, the findings suggest that NHIF should effectively execute the identified digital transformation strategies which significantly increases the performance of E-Claims Systems.

The findings of the study reveal that each of the identified digital transformation strategies—digital transformation strategy, data security compliance, user experience, and interoperability with external systems—significantly impacts the performance of E-Claims systems. These results align with existing literature on the importance of digital transformation in enhancing organizational performance, particularly in the healthcare sector. The study indicates that an improvement in the digital transformation strategy increases the performance of E-Claims systems by 64.6%. This is consistent with the findings of Verhoef et al. (2021), who emphasize that a well-defined digital transformation strategy is crucial for organizations to leverage technology effectively, streamline operations, and improve service delivery. They argue that digital transformation enables organizations to become more agile, improve customer experiences, and achieve operational efficiencies.

Data security compliance was found to increase the performance of E-Claims systems by 52.8%. This aligns with the work of Smith and Kosslyn (2020), who highlight that data security is paramount in the digital age, especially for healthcare organizations that handle sensitive patient information. Ensuring compliance with data security regulations not only protects against breaches but also builds trust with stakeholders, which is essential for the successful implementation of digital health initiatives.

Improving user experience boosts the performance of E-Claims systems by 61.8%. This finding is supported by research from Norman and Nielsen (2016), who argue that user experience (UX) design is critical in digital systems. A positive UX leads to higher user satisfaction, increased adoption rates, and better overall performance of digital services. In the context of E-Claims systems, a user-friendly interface can facilitate smoother interactions for both healthcare providers and patients, enhancing efficiency and satisfaction.

Finally, the study finds that interoperability with external systems enhances the performance of E-Claims systems by 70.3%. This is in line with the research of Adler-Milstein et al. (2017), who assert that interoperability is a key factor in the success of health information systems. Interoperable systems allow for seamless data exchange between different healthcare entities, reducing redundancies, improving care coordination, and enhancing the overall efficiency of health services.

The study's findings suggest that the NHIF should effectively execute the identified digital transformation strategies to significantly increase the performance of E-Claims systems. These results are corroborated by extensive literature, which emphasizes the critical role of a comprehensive digital transformation strategy, stringent data security measures, a focus on user experience, and robust interoperability in driving the success of digital health initiatives. Implementing these strategies can lead to more efficient, secure, and user-friendly E-Claims systems, ultimately improving the performance and service delivery of healthcare organizations.

4.4.4 Hypothesis Testing

This study tested the hypothesis based on the regression coefficient results. As presented in Table 4.20, the results accepted the alternative hypothesis and indicated that there exists a significant and positive effect of integration of digital technologies on the performance of E-Claims Systems ($p < .001$). Second, the results further accepted the alternative hypothesis that there is a significant and positive effect of data security compliance on the performance of E-Claims Systems ($p < .001$). Third, the result accepted the alternative hypotheses, where there was a positive correlation between user experiences on the performance of E-Claims Systems. Finally, the evidence further indicates that there is a significant and positive effect of interoperability with external systems on the performance of E-Claims Systems.

Table 4.20 Summary of Hypothesis Testing

Hypothesis	Sig.	Decision
H_1: Integration of digital technologies has a statistically significant effect on the performance of E-Claims Systems at the National Health Insurance Fund, Kenya	.001	Failed to reject
H_2: Data Security Compliance has a statistically significant effect on performance of E-Claims Systems at the National Health Insurance Fund, Kenya	.001	Failed to reject
H_3: User Experience has a statistically significant effect on performance of E-Claims Systems at the National Health Insurance Fund, Kenya.	.001	Failed to reject
H_4: Interoperability with external systems has a statistically significant effect on performance of E-Claims Systems at the National Health Insurance Fund, Kenya.	.000	Failed to reject

The significant and positive effect of the integration of digital technologies on the performance of e-claims systems ($p < .001$) implies that NHIF can achieve substantial improvements in operational efficiency. Automation and advanced digital tools streamline the claims processing workflow, reducing processing times and administrative burdens. This enhancement can lead to faster service delivery, which is crucial for patient satisfaction and operational effectiveness. The positive impact of data security compliance ($p < .001$) suggests that robust security measures are integral to the performance of e-claims systems. By ensuring data integrity and compliance with regulatory standards, NHIF can mitigate risks associated with data breaches and fraud. This not only protects sensitive patient information but also builds trust among stakeholders, including patients and healthcare providers. The correlation between positive user experiences and the performance of e-claims systems indicates that user-friendly interfaces and intuitive systems are critical for successful digital transformation. NHIF should prioritize designing e-claims systems that are easy to navigate and responsive to user needs. Improved user experience can lead to higher adoption rates, fewer errors, and greater overall satisfaction among users, contributing to the system's effectiveness.

The significant and positive effect of interoperability with external systems on e-claims systems' performance underscores the importance of seamless data exchange. NHIF's ability to integrate its e-claims systems with other healthcare platforms, such as electronic health records (EHRs) and other insurers' databases, enhances the completeness and accuracy of claims data. This interoperability facilitates better coordination, reduces redundancy, and improves the overall quality of healthcare services. The overall positive impact of digital transformation strategies on the performance of e-claims systems aligns with NHIF's strategic goals of growth, customer satisfaction, and market share expansion. By leveraging digital technologies, NHIF can achieve cost savings, improve service delivery, and maintain a competitive edge in the health insurance market. These improvements position NHIF as a forward-thinking organization committed to innovation and efficiency.

CHAPTER FIVE

SUMMARY OF FINDINGS, DISCUSSION, CONCLUSION, AND RECOMMENDATIONS

5.1 Introduction

This chapter concludes the study by presenting a summary of the research findings, followed by a detailed discussion and comparison with previous studies. The chapter ends with conclusions drawn from the findings and recommendations for future research.

5.2 Discussions

The discussion focused on comparing the regression analysis results with previous studies outlined in the literature review.

5.2.1 Effect of Integration of Digital Technologies

The study found a significant positive effect of integrating digital technologies on E-Claims Systems performance in Kenya. Descriptive findings supported this, indicating enhanced accessibility and availability of E-Claims health records. The study's findings are consistent with the descriptive findings, which show that integrating digital technologies has improved the accessibility and availability of E-Claims health records. This integration allows for real-time data access and efficient processing of claims, leading to improved service delivery and patient satisfaction. Mitchell and Kan (2019) found that the adoption of digital technologies in healthcare systems significantly improves operational efficiency and patient outcomes. Their study highlighted that digital technologies facilitate the seamless exchange of health information, reduce administrative burdens, and enhance the accuracy of health records. These improvements lead to better decision-making and improved patient care. The findings of Mitchell and Kan (2019) corroborate the current study's results, demonstrating that digital technologies play a crucial role in enhancing the performance of E-Claims systems.

Echulet (2023) also emphasized the transformative impact of digital technologies on healthcare systems. According to Echulet, digital technologies enable healthcare providers to offer more timely and accurate services by improving data management and accessibility. The study pointed out that digital technologies help

in reducing errors, streamlining workflows, and improving overall healthcare delivery. The positive effects noted by Echulet (2023) are in line with the current study's findings, indicating that integrating digital technologies into E-Claims systems enhances their performance by making health records more accessible and available.

Agarwal *et al*., (2021) conducted a comprehensive review of digital health interventions and their impact on healthcare delivery. Their findings showed that digital technologies, such as electronic health records (EHRs) and telemedicine, significantly improve healthcare accessibility, patient engagement, and service efficiency. The study found that digital health interventions lead to cost savings, better health outcomes, and increased patient satisfaction. These results support the current study's conclusion that digital technologies positively affect the performance of E-Claims systems by enhancing the accessibility and availability of health records.

Wang *et al*., (2020) investigated the impact of digital health technologies on healthcare systems in developing countries. Their study revealed that digital technologies help overcome many challenges faced by healthcare systems in these regions, such as limited access to healthcare services and insufficient health infrastructure. By improving the management and accessibility of health information, digital technologies contribute to more efficient healthcare delivery and better patient outcomes. Wang *et al.*'s (2020) findings align with the current study's results, highlighting the significant positive impact of digital technologies on E-Claims systems' performance in Kenya.

The study's findings, supported by descriptive data and corroborated by existing empirical literature, demonstrate the significant positive effect of integrating digital technologies on the performance of E-Claims systems in Kenya. The integration of digital technologies enhances the accessibility and availability of health records, leading to improved service delivery, operational efficiency, and patient satisfaction. The consistency of these findings with previous studies by Mitchell and Kan (2019), Echulet (2023), Agarwal *et al*., (2021), and Wang *et al*., (2020) underscores the critical role of digital technologies in transforming healthcare systems and improving their performance.

5.2.2 Effect of Data Security Compliance

Similarly, the research confirmed the significance of data security compliance in enhancing E-Claims Systems performance. Descriptive results aligned with regression analysis outcomes, highlighting the importance of protecting sensitive information. The study's descriptive results, which emphasize the importance of data security compliance, align with the regression analysis outcomes, demonstrating a positive impact on E-Claims systems' performance. Ensuring the security of sensitive information is crucial for maintaining the trust of stakeholders and ensuring the smooth operation of digital claims systems. Previous study by Kutnjak *et al*., (2019) discussed the role of data security compliance in mitigating fraud risks and enhancing the performance of health information systems. Their study found that stringent data security measures, such as encryption, access controls, and regular audits, are essential in protecting sensitive health information from unauthorized access and breaches. These measures not only protect patient data but also enhance the efficiency and reliability of health information systems. The findings of Kutnjak *et al*., (2019) corroborate the current study's results, reinforcing the idea that data security compliance is a key factor in improving the performance of E-Claims systems. Mwangi (2022) emphasized the importance of regulatory compliance in managing fraud risks within healthcare systems. The study highlighted that adherence to data protection regulations, such as the Health Insurance Portability and Accountability Act (HIPAA) in the US or similar frameworks in other countries, is critical in preventing fraud and ensuring the integrity of health information systems. Mwangi (2022) found that compliance with these regulations not only reduces the risk of fraud but also improves the overall performance and credibility of healthcare systems. These findings align with the current study's results, demonstrating that data security compliance plays a vital role in enhancing the performance of E-Claims systems by ensuring the protection of sensitive information.

Gordon *et al*., (2020) examined the impact of data security compliance on the performance of health information systems. Their study concluded that organizations that prioritize data security compliance experience fewer data breaches and higher levels of data integrity. This leads to increased trust among users and stakeholders, ultimately enhancing system performance. The study highlighted that compliance with data

security standards is a critical factor in maintaining the confidentiality, integrity, and availability of health information. These findings are consistent with the current study's conclusion that data security compliance improves the performance of E-Claims Systems by ensurig the protection of sensitive information. Ramli and Osman (2021) investigated the relationship between data security compliance and system performance in the healthcare sector. Their findings showed that compliance with data security regulations, such as the Health Insurance Portability and Accountability Act (HIPAA), is associated with better system performance and reduced instances of fraud. The study emphasized that regulatory compliance helps organizations implement effective security measures, which are crucial for maintaining system reliability and preventing fraud. These results corroborate the current study's findings, highlighting the importance of data security compliance in enhancing the performance of E-Claims Systems.

5.2.3 Effect of User Experience

The study demonstrated a significant positive effect of user experience on E-Claims Systems performance. Regression analysis indicated a significant positive impact of user experience on the performance of E-Claims Systems. A user-friendly interface was found to enhance efficiency and reduce errors, leading to improved system performance. Previous research by Begum *et al*., (2020) conducted a comprehensive study on the importance of user-centric design in healthcare information systems. Their research emphasized that user experience plays a crucial role in system adoption and effectiveness. A well-designed interface that prioritizes user needs and preferences leads to higher user satisfaction, increased productivity, and better overall system performance. Begum et al.'s findings support the current study's results, demonstrating that user experience significantly impacts the performance of E-Claims Systems by improving efficiency and reducing errors.

Chang *et al*., (2021) investigated the relationship between user experience design and system performance in healthcare settings. Their study found that healthcare information systems with intuitive, user-friendly interfaces are more likely to be adopted by healthcare professionals and patients. A positive user experience contributes to better system usability, increased user satisfaction, and improved task performance. Chang *et al*.'s research aligns with the current study's findings, highlighting the importance of user experience in

enhancing the performance of E-Claims Systems. Lee *et al*., (2021) conducted a systematic review of user experience design in healthcare information systems. Their findings revealed that a positive user experience is associated with higher levels of system acceptance and usage. User-centric design principles, such as simplicity, intuitiveness, and accessibility, contribute to better user engagement and satisfaction. Lee et al.'s study supports the current study's results, indicating that user experience design significantly influences the performance of E-Claims Systems by improving efficiency and reducing errors.

5.2.4 Effect of Interoperability with external systems

Interoperability with external systems was found to significantly enhance E-Claims Systems performance. The lack of interoperability was identified as a hindrance to system efficiency. The study's findings indicate that interoperability with external systems plays a crucial role in enhancing the performance of E-Claims Systems. Seamless integration with external systems enables efficient data exchange, improves coordination between healthcare providers, and enhances overall system functionality. Previous studies by Alhumairan *et al*., (2023) and Holmes *et al*., (2019) highlighted the challenges and advantages of interoperability in healthcare information systems.

Alhumairan *et al*., (2023) conducted a comprehensive study on interoperability challenges in healthcare information systems. Their research identified interoperability gaps as a significant barrier to effective information exchange and collaboration among healthcare entities. The study emphasized the importance of interoperability standards and protocols in promoting system interoperability and improving healthcare delivery. Alhumairan *et al.*'s findings align with the current study's results, highlighting the critical role of interoperability in enhancing the performance of E-Claims Systems. Holmes *et al*., (2019) investigated the advantages of interoperability in healthcare information systems. Their study found that interoperable systems facilitate seamless data exchange, improve care coordination, and enhance patient outcomes. Interoperability enables healthcare providers to access comprehensive patient information from various sources, leading to more informed decision-making and better quality of care. Holmes et al.'s research supports the current study's

findings, demonstrating that interoperability significantly contributes to the performance of E-Claims Systems by improving efficiency and coordination.

Raghupathi and Tan (2018) examined the impact of interoperability on healthcare system performance. Their research found that interoperable systems enable healthcare organizations to share data more effectively, streamline workflows, and improve care coordination. Interoperability reduces duplication of efforts, enhances communication between stakeholders, and ultimately leads to better patient outcomes. Raghupathi and Tan's study aligns with the current study's results, emphasizing the importance of interoperability in enhancing the performance of E-Claims Systems. Zhang *et al*., (2020) conducted a systematic review of interoperability in healthcare information systems. Their findings revealed that interoperable systems improve data accessibility, promote information exchange, and support collaborative care delivery. Interoperability enables healthcare organizations to integrate disparate systems, share resources, and facilitate seamless communication between different healthcare stakeholders. Zhang *et al.*'s study supports the current study's findings, indicating that interoperability significantly enhances the performance of E-Claims Systems.

5.3 Summary of Main Findings

This study investigated the impact of digital transformation strategies on the performance of E-Claims Systems at the National Health Insurance Fund (NHIF) in Kenya. The research objectives focused on the effects of integration of digital technologies, data security compliance, user experience, and interoperability with external systems on E-Claims Systems performance. A case study survey was conducted using interviews and questionnaires with 95 NHIF employees, including Assistant Managers, Senior Officers, and Officers I, II, & III. The study reported a response rate of 75.8%, with a majority of female participants aged 31-40 years, holding undergraduate degrees, and having 11-15 years of work experience.

The findings revealed significant positive effects of digital technology integration, data security compliance, user experience, and interoperability with external systems on E-Claims Systems performance at NHIF. Regression analysis supported these conclusions, indicating statistical significance in each case.

5.4 Conclusions

The study concludes that the integration of digital technologies, data security compliance, user experience, and interoperability with external systems is integral to enhancing E-Claims Systems performance at NHIF.

Firstly, digital technology integration has been identified as a key driver of efficiency and transparency within E-Claims Systems. By leveraging digital tools, NHIF can streamline processes, automate tasks, and improve overall system performance.

Secondly, data security compliance emerges as a critical factor in protecting sensitive information and fostering trust among stakeholders. Adhering to data security standards not only safeguards patient data but also enhances the credibility and reliability of the E-Claims Systems.

Thirdly, optimizing user experience is essential for reducing processing time and errors within E-Claims Systems. A user-friendly interface and intuitive design contribute to improved usability, increased productivity, and enhanced overall satisfaction among users.

Lastly, interoperability with external systems plays a crucial role in streamlining processes and improving satisfaction within E-Claims Systems. Seamless integration with external stakeholders facilitates data exchange, enhances collaboration, and supports more efficient decision-making

The study concludes that the integration of digital technologies, data security compliance, user experience optimization, and interoperability with external systems are crucial for enhancing the performance of e-claims systems at NHIF. Digital technology integration drives efficiency and transparency by streamlining processes and automating tasks. Data security compliance is vital for protecting sensitive information and fostering trust among stakeholders. Optimizing user experience reduces processing time and errors, improving usability and satisfaction. Lastly, interoperability with external systems enhances data exchange and collaboration, supporting efficient decision-making and overall system performance.

5.5 Recommendations

5.5.1 Recommendations for Policy

Government support for digital transformation: Governments can utilize the study's findings to develop policies that support digital transformation initiatives in public sector insurance systems. By promoting the adoption of advanced digital technologies and encouraging compliance with data security standards, governments can significantly improve the performance of e-claims systems nationwide. This includes providing incentives for digital upgrades and establishing regulations that ensure the protection of sensitive information.

5.5.2 Recommendations for Practice

NHIF management prioritization of digital strategies: NHIF management is advised to prioritize the incorporation of digital transformation strategies to enhance e-claims processing efficiency. This involves investing in advanced digital technologies, upgrading existing systems, and providing comprehensive training to staff to optimize the use of digital tools. Such initiatives will streamline processes, reduce processing times, and improve overall system performance.

Further research by academicians: Academicians are encouraged to conduct further research on digital transformation strategies and their impact on the performance of e-claims systems. This may involve exploring emerging technologies, evaluating best practices, and assessing the long-term effects of digital transformation initiatives on healthcare delivery. Continued research will provide valuable insights and guide future improvements in e-claims systems.

5.6 Areas of Further Research

In light of the study's findings, several avenues for further research are suggested to deepen understanding and address remaining gaps. Firstly, investigating the long-term effects of digital transformation strategies on E-Claims Systems performance could provide valuable insights into sustainability and scalability aspects. Secondly, exploring the impact of emerging technologies, such as artificial intelligence and blockchain, on E-Claims processing efficiency could uncover innovative solutions to enhance system capabilities. Additionally,

conducting comparative studies across different healthcare systems and regions could offer valuable insights into the transferability and adaptability of digital transformation strategies. Furthermore, examining the role of stakeholder engagement and organizational culture in driving successful digital transformation initiatives within healthcare insurance systems could provide practical recommendations for implementation. Overall, further research in these areas has the potential to advance knowledge and inform strategies for optimizing E-Claims Systems performance in healthcare settings.

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APPENDICES

APPENDIX I: QUESTIONNAIRE

This questionnaire is meant to collect information on "the effect of digital transformation strategy on the performance of e-claims systems at National Health Insurance Fund, Kenya". The purpose of seeking information is purely for academic reasons, and the data obtained was handled with strict confidentiality. Please provide your responses to the following questions in written format or by indicating your choices.

SECTION A: GENERAL INFORMATION

1. Your Gender:

   Male [ ]

   Female [ ]

2. Please indicate your age bracket

   18- 30yrs [ ]

   31-40 yrs. [ ]

   41–50 yrs. [ ]

   51 yrs. and over [ ]

3. What is your highest level of education?

   College education [ ]

   Undergraduate [ ]

   Postgraduate [ ]

   Professional qualification [ ]

4. Work Experience

   5 years and less [ ]

   6 – 10 years [ ]

   11 – 15 years [ ]

   Over 15 years [ ]

SECTION B: SPECIFIC VARIABLES

5. Please rate how you agree with the following statements regarding the effect of integration of digital technologies on performance of E-Claims Systems at National Health Insurance Fund. (Tick as appropriate)

Key: SA=Strongly Agree; A=Agree; N=Neutral; D=Disagree and SD=Strongly Disagree

Integration of digital technologies	**SA**	**A**	**N**	**D**	**SD**
The integration of digital technologies improves the speed and timeliness of claim processing					
The integration of digital technologies improves the performance of E-Claims Systems in terms of online claims submission.					
The integration of digital technologies enhances the accessibility and availability of E-health records.					
The integration of digital technologies enhances the efficiency of E-Claims Systems by automating the processing of claims					
The integration of digital technologies positively impacts the accuracy and reliability in managing E-health records					

6. Please rate how you agree with the following statements regarding the effect of data security compliance on performance of E-Claims Systems at National Health Insurance Fund. (Tick as appropriate)

Key: SA=Strongly Agree; A=Agree; N=Neutral; D=Disagree and SD=Strongly Disagree

Data security compliance	**SA**	**A**	**N**	**D**	**SD**
The implementation of data security compliance measures significantly enhances data confidentiality					
The access control mechanisms implemented effectively protect sensitive data.					
Compliance with data security regulations plays a crucial role in maintaining the integrity and confidentiality of data.					
The implementation of robust data security compliance measures contributes to minimizing the risk of unauthorized access and breaches					
Effective access control mechanisms are essential for maintaining data confidentiality and overall system performance					
The adherence to data security regulations enhances the trust and confidence of users in the system's ability to safeguard data confidentiality					

7. Please rate how you agree with the following statements regarding the effect of user experience on performance of E-Claims Systems at National Health Insurance Fund. (Tick as appropriate)

Key: SA=Strongly Agree; A=Agree; N=Neutral; D=Disagree and SD=Strongly Disagree

User experience	**SA**	**A**	**N**	**D**	**SD**
The user experience of E-Claims Systems impacts their overall performance					
The seamless integration of user experience elements contributes to the overall success and performance of E-Claims Systems.					
User-friendly interfaces and intuitive design within E-Claims Systems positively affect ease of use, system responsiveness, and system availability.					
The availability of E-Claims Systems to users at all times increases their accessibility, leading to improved system performance and user satisfaction					
System responsiveness effects the performance of E-Claims Systems					
E-Claims Systems that are easy to use enhance user satisfaction and contribute to improved system performance					

8. Please rate how you agree with the following statements regarding the effect of interoperability with external systems on the performance of E-Claims Systems at National Health Insurance Fund. (Tick as appropriate)

Key: SA=Strongly Agree; A=Agree; N=Neutral; D=Disagree and SD=Strongly Disagree

Interoperability with external systems	**SA**	**A**	**N**	**D**	**SD**
The lack of interoperability with external systems affects the performance of E-Claims Systems					
The successful integration of technical, process, and workflow interoperability within E-Claims Systems fosters effective communication and data sharing.					
Workflow interoperability, enabling smooth coordination and collaboration between E-Claims Systems and external systems contributes to improved performance					
Process interoperability between E-Claims Systems and external systems streamlines workflows and improves efficiency					
The technical interoperability of E-Claims Systems with external systems ensures seamless data exchange and integration					

9. Please rate how you agree with the following statements regarding performance of E-Claims Systems at National Health Insurance Fund. (Tick as appropriate)

Key: SA=Strongly Agree; A=Agree; N=Neutral; D=Disagree and SD=Strongly Disagree

Performance of E-Claims Systems	**SA**	**A**	**N**	**D**	**SD**
E-Claims system efficiently handles a large volume of claims without compromising accuracy					
Users of the E-Claims system are satisfied with the overall performance of the system.					
The E-Claims system demonstrates high accuracy in processing claims					
The E-Claims system effectively reduces the backlog of pending claims					
The E-Claims system processes claims within a reasonable timeframe					
Users of the E-Claims system find the system user-friendly and easy to navigate					

THE END

Thank You for Your Participation

APPENDIX II: NACOSTI PERMIT

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Ref No: 874929

Date of Issue: 30/May/2024

RESEARCH LICENSE



This is to Certify that Mr.. Geoffrey Mwangi Thaka of Africa Nazarene University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: EFFECT OF DIGITAL TRANSFORMATION STRATEGY ON THE PERFORMANCE OF E-CLAIMS SYSTEMS AT NATIONAL HEALTH INSURANCE FUND, KENYA for the period ending : 30/May/2025.

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THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013 (Rev. 2014)
Legal Notice No. 108: The Science, Technology and Innovation (Research Licensing) Regulations, 2014

The National Commission for Science, Technology and Innovation, hereafter referred to as the Commission, was the established under the Science, Technology and Innovation Act 2013 (Revised 2014) herein after referred to as the Act. The objective of the Commission shall be to regulate and assure quality in the science, technology and innovation sector and advise the Government in matters related thereto.

CONDITIONS OF THE RESEARCH LICENSE

1. The License is granted subject to provisions of the Constitution of Kenya, the Science, Technology and Innovation Act, and other relevant laws, policies and regulations. Accordingly, the licensee shall adhere to such procedures, standards, code of ethics and guidelines as may be prescribed by regulations made under the Act, or prescribed by provisions of International treaties of which Kenya is a signatory to
2. The research and its related activities as well as outcomes shall be beneficial to the country and shall not in any way;
    i. Endanger national security
    ii. Adversely affect the lives of Kenyans
    iii. Be in contravention of Kenya's international obligations including Biological Weapons Convention (BWC), Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), Chemical, Biological, Radiological and Nuclear (CBRN).
    iv. Result in exploitation of intellectual property rights of communities in Kenya
    v. Adversely affect the environment
    vi. Adversely affect the rights of communities
    vii. Endanger public safety and national cohesion
    viii. Plagiarize someone else's work
3. The License is valid for the proposed research, location and specified period.
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5. The Commission reserves the right to cancel the research at any time during the research period if in the opinion of the Commission the research is not implemented in conformity with the provisions of the Act or any other written law.
6. The Licensee shall inform the relevant County Director of Education, County Commissioner and County Governor before commencement of the research.
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9. The Commission may monitor and evaluate the licensed research project for the purpose of assessing and evaluating compliance with the conditions of the License.
10. The Licensee shall submit one hard copy, and upload a soft copy of their final report (thesis) onto a platform designated by the Commission within one year of completion of the research.
11. The Commission reserves the right to modify the conditions of the License including cancellation without prior notice.
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14. The Commission shall have powers to acquire from any person the right in, or to, any scientific innovation, invention or patent of strategic importance to the country.
15. Relevant Institutional Scientific and Ethical Review Committee shall monitor and evaluate the research periodically, and make a report of its findings to the Commission for necessary action.

National Commission for Science, Technology and Innovation(NACOSTI),
Off Waiyaki Way, Upper Kabete,
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APPENDIX III: AUTHORIZATION LETTER



2nd, May, 2024

E-mail: researchwriting.mba.anu@gmail.com

Tel. 0202711213

Our Ref: 110062168
The Director.
National Commission for Science,
Technology and Innovation (NACOSTI),
P. O. Box 30623, 00100
Nairobi. Kenya.

Dear Sir/Madam:

RE: RESEARCH AUTHORIZATION FOR: GEOFFREY MWANGI

Mr. Geoffrey is a postgraduate student at Africa Nazarene University in the Master of Business Administration (MBA) program.

In order to complete his program, Mr. Geoffrey is conducting research entitled: "**Effect of Digital Transformation Strategy on the Performance of E-Claims Systems at National Health Insurance Fund, Kenya**"

Any assistance offered to him will be highly appreciated.

Yours Faithfully,

DR. Kimani Gichuhi,

MBA, Coordinator,

School of Business,

Africa Nazarene University.

APPENDIX IV: MAP OF THE STUDY AREA

