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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.

Key Words: *Digital Transformation Strategy, Integrating Digital Technologies, Data Security Compliance, User Experience, Interoperability with External Systems.*

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BACKGROUND

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.

Digital Transformation Strategy

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.

Digital Transformation Strategy

This transformation can lead to substantial improvements in the performance of e-claims systems in several key areas:

- ***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.

- ***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).

- ***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.

- ***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.

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).

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).

Problem Statement

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.

Objectives of the Study

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.

Specific Objectives

The study was guided by the following objectives;

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

Research Hypothesis

The study sought to test the following research hypotheses

- $\mathbf{H_{01}}$: Integration of digital technologies has no statistically significant effect on the performance of E-Claims Systems at the National Health Insurance Fund, Kenya.
- $\mathbf{H_{02}}$: Data security compliance has no statistically significant effect on the performance of E-Claims Systems at the National Health Insurance Fund, Kenya.
- $\mathbf{H_{03}}$: User experience has no statistically significant effect on the performance of E-Claims Systems at the National Health Insurance Fund, Kenya.
- $\mathbf{H_{04}}$: Interoperability with external systems has no statistically significant effect on the performance of E-Claims Systems at the National Health Insurance Fund, Kenya.

LITERATURE REVIEW

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

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.

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.

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).

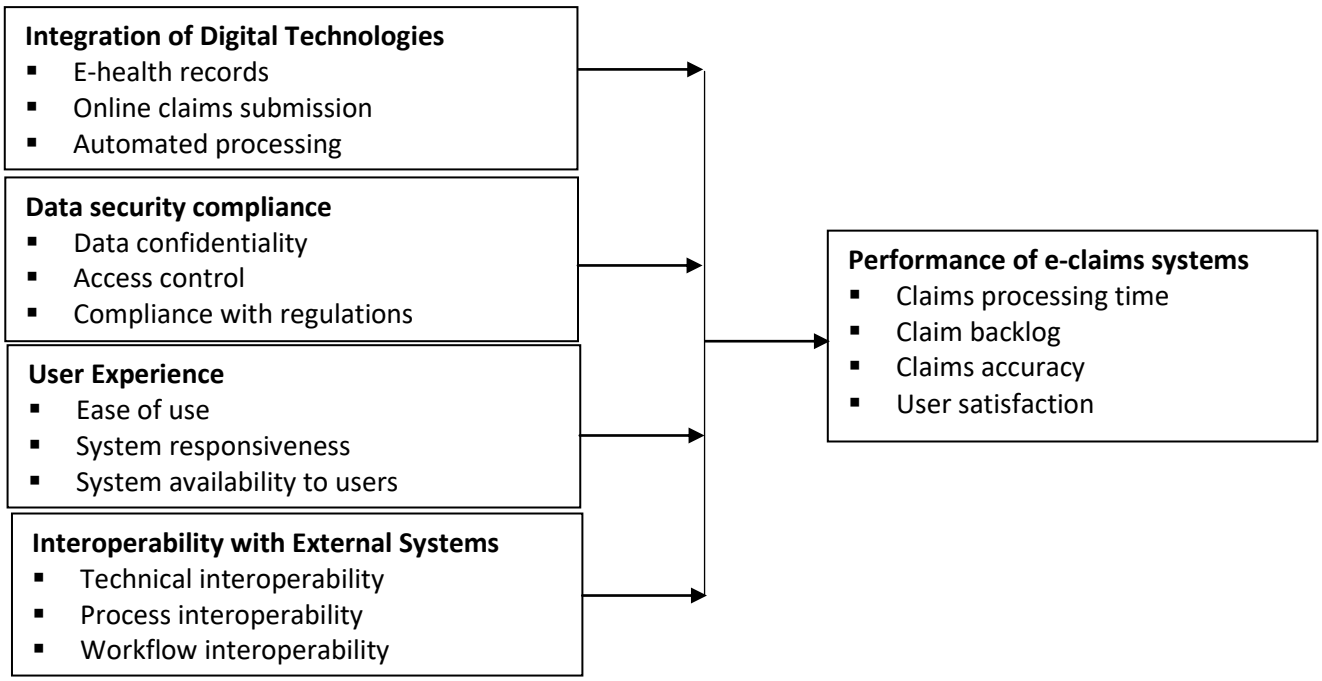

Figure 1: Conceptual Framework

Source: Author (2024)

METHODOLOGY

The study adopted a case study. The case study aimed to generate an in-depth, multi-faceted perspective of the phenomenon. The target population for this study was 166 workers at the National Health Insurance Fund's headquarter was the study's target population which consisted of managers, assistant managers, and senior officers, Officer I, II & III. The study employed the sample size determination formula recommended by

Yamane. A sample of 95 was considered. To gather comprehensive data for the study, both primary and secondary data collection instruments were utilized. 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 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.

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). 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. 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.

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:

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

= 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.

FINDINGS

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 1, which presents the descriptive outcomes of the effect of integrating digital technologies on the performance of e-claims systems at NHIF

Table 1: 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.					
The integration of digital technologies enhances the efficiency of E-Claims Systems by automating the processing of claims.	58 (80.6)	9 (15.5)	5 (7.0)	4.51	1.007
The integration of digital technologies positively impacts the accuracy and reliability of managing E-health records.	63 (87.5)	6 (8.3)	3 (4.2)	4.64	.861
Composite Mean	58 (80.6)	10 (13.9)	4 (5.6)	4.50 4.54	.97 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.

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 2. 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 2: 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.

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

As reported in Table 3, 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 3: 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.		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.	63 (87.5)				
E-Claims Systems that are easy to use enhance user satisfaction and contributes to improved system performance.		9 (12.5)	4 (5.6)	3.71	1.098
	59 (81.9)	11 (15.3)	5 (6.9)	3.96	1.031
	56 (77.8)				
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.

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

As reported in Table 4, 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: 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.

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 5. 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 5: 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.

Inferential Statistics

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 6 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 6 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 6 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 6 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 6: 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*.

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 7 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 7: 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 8 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 8: 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 8.

Generally, Table 8 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 8 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 9: 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 **$Y = 2.173 + .646X_1 + .528X_2 + .618X_3 + .703X_4$**

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.

Hypothesis Testing

This study tested the hypothesis based on the regression coefficient results. As presented in Table 9, 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 9: 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.

DISCUSSIONS

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.

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.

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.

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.

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.

RECOMMENDATIONS

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.

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.

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