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EFFECT OF DIGITAL TECHNOLOGY ON EMPLOYEE PERFORMANCE IN PUBLIC HOSPITALS IN NIGER STATE, NIGERIA

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ABSTRACT
This study investigates the effect of various digital technologies on employee performance in public hospitals located in the headquarters of the three senatorial zones in Niger State, Nigeria. The employed survey design that is cross-sectional in nature. The population consist of 502 hospital employees, from whom a sample of 217 was purposively and randomly selected following Krejcie and Morgan's (1970) guideline to ensure both statistical validity and practical feasibility. A total of 209 copies of questionnaire were returned and analysed to assess how hardware, software, database, and network technologies influence job performance among healthcare workers through multiple linear regression. Findings reveal that database and network technologies positively and significantly enhance employee performance, while hardware technology has a negative effect, and software technology shows no significant impact. These results highlight critical areas for ICT investment and capacity-building in public healthcare settings to improve workforce productivity and service delivery.

Keywords: *Hardware Technology, Software Technology, Database Technology, Network Technology, Employee Performance*

1. INTRODUCTION
In the rapidly evolving landscape of organizational management, employee job performance remains a cornerstone of institutional success. Defined broadly, job performance entails how efficiently and effectively employees fulfil their duties to achieve organizational objectives (González & Garzón, 2023). It is not only a measure of task completion but also a reflection of behaviours that foster collaboration, innovation, and a positive work environment (Schmidt & Hunter, 2023). Importantly, employee performance is shaped by both internal attributes and

external influences, such as workplace culture and technological support systems, thereby underscoring its multifaceted nature (Cascio, 2023).

Among the numerous factors influencing job performance, digital technology has appeared to be a vital enabler in modern workplaces. Digital technology includes the hardware, software, networks, and databases that facilitate communication, automate tasks, and improve operational efficiency (Müller etal., 2023; Bharadwaj etal., 2023). In public hospitals, where service delivery depends on timely information exchange and efficient coordination, the integration of digital tools is particularly pertinent. The application of digital systems enhances real-time decision-making, streamlines administrative tasks, and provides healthcare professionals with tools necessary to deliver patient-centred care (Fitzgerald *et al*., 2023).

Recent literature suggests that the adoption of digital technology in organizations fosters enhanced job performance by promoting innovation, reducing redundancy, and supporting flexible work arrangements (Timotheou *et al.*, 2023). In public institutions such as hospitals, digital transformation is no longer a luxury but a necessity for improved service delivery and staff effectiveness. However, this transformation is complex and needs a strategic method that aligns technological investments with institutional goals and employee capabilities (Talba, 2024). Thus, understanding how digital technology affects job performance in public healthcare settings is critical for policy-makers and hospital administrators seeking to improve operational outcomes.

Despite the growing attention to digital technology in the private sector, public healthcare institutions, particularly in developing regions like Niger State, Nigeria, are often constrained by outdated systems and limited resources. This gap hampers optimal job performance and affects service delivery outcomes. As global expectations shift towards more efficient and transparent governance, public hospitals must explore avenues for leveraging digital technology to remain responsive and competitive (Talba, 2024). Moreover, identifying the specific technological components - such as hardware, software, databases, and networks - that drive employee productivity offers a clearer roadmap for targeted improvements.

This research, therefore, examine the influence of digital technology on employee job performance in public hospitals in Niger State, Nigeria. Grounded in contemporary digital management theories, the study examines how key technological dimensions interact with workplace dynamics to shape staff efficiency, motivation, and overall productivity. Drawing on empirical insights and validated conceptual frameworks, this research aims to add to the growing discourse on digital transformation in the public health sector, with practical implications for enhancing workforce effectiveness and institutional performance in resource-constrained environments.

The rapid integration of digital technology into workplace operations presents both opportunities and challenges for public organizations aiming to enhance employee job performance. Technologies such as hardware, software, databases, and networks can streamline operations and improve productivity. However, the extent to which these digital technologies positively impact employee performance in public sector institutions remains underexplored. While existing literature acknowledges that effective job performance encompasses task completion, collaboration, and innovation—often facilitated by digital tools (González & Garzón, 2023;

Schmidt & Hunter, 2023)—the interaction of different technological dimensions within public sector contexts remains insufficiently investigated.

As public institutions face growing pressure to modernize and deliver efficient, transparent services, it becomes essential to understand how digital technologies contribute to employee job performance. The lack of comprehensive empirical studies on these dynamics signals a notable gap in the literature. According to Vuori et al. (2020), personal work habits in digital settings significantly affect efficiency and overall performance.

Several studies have examined digitalization within organizations (Okkonen, Vuori, & Palvalin, 2019; Vuori, Helander, & Okkonen, 2020), consistently indicating that the integration of digital tools positively influences performance outcomes. However, a critical shortcoming in many of these studies is the absence of well-defined proxies for measuring digital technology (Sulistianingtiyas & Djastuti, 2022; Abelsen etal., 2023; Duan et al. 2023; Dornelles etal, 2022; Khin & Ho, 2019; Martínez-Caro etal, 2020; Kahfi, 2022). Without specific and quantifiable indicators such as hardware, software, databases, and networks, it becomes difficult to draw precise conclusions about digital technology's impact on performance.

For instance, Kahfi (2022) applied descriptive statistics to examine how digital tools affect employee adaptability and organizational efficiency, revealing significant positive effects. Duan, Deng, and Wibowo (2024) employed structural equation modelling to show that digital technologies improve job performance through enhanced coordination, communication, knowledge sharing, and decision-making. Similarly, Martínez-Caro, et al., (2020) demonstrated that digital performance gains are contingent upon the presence of a supportive digital organizational culture. These studies collectively underscore the need for further investigation into these relationships.

Notably, the bulk of existing studies have been conducted in foreign contexts, often overlooking regional and cultural differences that may influence outcomes (Sulistianingtiyas & Djastuti, 2022; Abelsen etal, 2023; Duan etal, 2023; Dornelles *et al*, 2022; Khin & Ho, 2019; Martínez-Caro etal, 2020; Kahfi, 2022). So, there is inadequate understanding of how these findings apply to Nigerian public organizations, where socio-economic and technological conditions may vary considerably. This limited applicability is particularly evident in Nigerian public hospitals, which face unique and pervasive challenges in digital technology adoption and utilization, often hindering optimal employee performance. These challenges include inadequate and unreliable power supply, leading to frequent outages that disrupt the functioning of digital systems and devices, impacting critical medical procedures, data access, and medication storage (Sunday, 2016; The Guardian, 2025; Punch Newspapers, 2023). Limited internet connectivity and infrastructure deficits, especially in rural areas, further restrict the effective deployment and use of network-dependent digital tools (Daily Trust, 2024). Furthermore, financial constraints and insufficient government funding often impede the acquisition, maintenance, and upgrade of essential hardware and software, leading to outdated or inadequate digital resources (Science for Africa Foundation, 2025; Narra X, 2024).

Beyond infrastructural issues, low digital literacy and inadequate training among healthcare professionals present significant barriers to the effective adoption and utilization of digital tools, leading to resistance to change and underutilization of available technology (Punch Newspapers,

2024; Feroz *et al.*, 2021). Concerns about data privacy and security also emerge as critical issues within the Nigerian healthcare context, given the absence of robust data protection laws and the prevalence of cyber threats, which can deter the full embrace of digital databases and electronic health records (Punch Newspapers, 2024). These localized issues cumulatively contribute to a complex environment where the potential benefits of digital technology on employee performance in public hospitals may not be fully realized.

This research addresses this significant gap by investigating how various dimensions of digital technology (hardware, software, databases, and networks) influence employee job performance specifically within public hospitals in Niger State, Nigeria. It seeks to uncover context-specific dynamics, providing insights into the challenges and opportunities unique to Nigerian organizations. Ultimately, the study aims to offer practical recommendations for leveraging digital tools to boost productivity and efficiency, thereby contributing to both national policy and the global discourse on digital transformation in the public sector.

The basic objective of study is to investigate effect of digital technology on employee job performance within public hospitals in Niger State, Nigeria. The specific objectives are:

i. To examine the effect of hardware technology on employee job performance in public hospitals in Niger State, Nigeria.
ii. To assess the impact of software technology on employee job performance in public hospitals in Niger State, Nigeria.
iii. To evaluate the role of database technology in influencing employee job performance in public hospitals in Niger State, Nigeria.
iv. To determine the effect of network technology on employee job performance in public hospitals in Niger State, Nigeria.

The study intends to test the following null hypotheses:

H_{01}: Hardware technology practice has no significant effect on employee job performance in public hospitals in Niger state, Nigeria.
H_{02}: Software technology has no significant influence on employee job performance in public hospitals in Niger state, Nigeria.
H_{03}: Database technology has no significant effect on employee job performance in public hospitals in Niger state, Nigeria.
H_{04}: Networks technology has no significant impact on employee job performance in public hospitals in Niger state, Nigeria.

2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

his section delves into existing scholarly works and establishes the theoretical lenses that will guide the study's investigation into the effect of digital technology on employee performance in public hospitals in Niger State, Nigeria.

2.1 Employee Performance

Employee job performance has been conceptualized in various ways in recent scholarship, reflecting its multidimensional nature. Buil, Martínez, and Matute (2023) define it as the degree to which employees carry out tasks that contribute directly to the organization’s technical operations. Zhang, et al., (2022) describe performance as the extent to which individuals meet or exceed

established work standards and objectives. Lee and Chen (2023) broaden this perspective by incorporating behaviours that support overall organizational functioning, such as teamwork and innovation. Osei and Ackah (2023) focus on performance as the consistent and goal-aligned execution of responsibilities, emphasizing adaptability and outcome quality. Mensah (2022) adds that employee performance involves the ability to deliver results efficiently, especially in the face of organizational change. These definitions underscore the evolving understanding of performance as a blend of task execution, behavioural contributions, and responsiveness to context.

Despite their strengths, each of these definitions presents certain limitations when applied to specific sectors like healthcare. For instance, Buil *et al.* (2023) emphasize technical contributions but may overlook the importance of soft skills and empathy in clinical settings. Zhang *et al.* (2022) prioritize goal attainment, potentially underestimating the value of qualitative aspects such as patient interaction and care ethics. While Lee and Chen (2023) offer a more inclusive view by recognizing collaborative and innovative behaviours, their approach may lack specificity in relation to distinct job roles. Similarly, Osei and Ackah (2023) address adaptability but do not account for measurable indicators that assess performance outcomes. Mensah's (2022) emphasis on efficiency and goal-orientation is relevant, but the influence of enabling factors such as digital infrastructure and work culture remains underexplored. Consequently, an integrated and context-specific definition of job performance is necessary - especially in public healthcare settings where service delivery relies on both individual competence and system-level support.

For the purpose of this study, employee job performance in public hospitals in Niger State, Nigeria, is defined as the degree to which healthcare personnel effectively and efficiently carry out clinical, administrative, and supportive responsibilities. This includes measurable aspects such as task completion rates, service quality, adaptability to digital tools, and contributions to hospital-wide objectives. This definition integrates both quantitative and qualitative dimensions of performance and reflects the unique demands of the healthcare sector amid ongoing digital transformation. Recognizing that employee performance directly affects institutional productivity and patient outcomes, this study adopts a holistic approach to assess how digital technology enhances employee effectiveness within a dynamic and resource-constrained public health environment.

2.2 Concept of Digital Technology

Digital technology refers to the use of electronic systems, tools, and platforms that facilitate the creation, processing, storage, and dissemination of information. Ahmed, Alabduljabbar, and Khan (2023) describe it as encompassing computer-based tools that enable communication, information sharing, and efficient task execution. In the healthcare context, Yeboah and Boateng (2022) define digital technology as the integration of electronic health records, information systems, and digital diagnostic tools aimed at enhancing clinical and administrative procedures. Similarly, Zhang and Wu (2023) emphasize the role of digital tools in enabling data-driven decision-making, virtual collaboration, and workflow automation. Omisore and Ajayi (2023) frame digital technology as a driver of innovation and improved operational performance, particularly in public institutions. Musa and Tanko (2022) further highlight its significance in providing real-time access to services and improving service responsiveness in public sector settings.

Although these definitions collectively offer a robust understanding of digital technology, they vary in scope, emphasis, and relevance to healthcare. For example, while Ahmed et al. (2023)

provide a foundational overview, their definition lacks context-specific insights, especially concerning sectoral applications. Yeboah and Boateng (2022) deliver a healthcare-focused definition, but it tends to emphasize clinical components at the expense of administrative and support functions that are equally critical. Zhang and Wu (2023) bring attention to data and automation but may underplay the importance of human interaction with digital systems. Omisore and Ajayi (2023) commendably link digital technology to public sector innovation but appear to overlook practical barriers such as system integration and staff readiness. Musa and Tanko (2022) point to the benefits of immediacy and responsiveness, yet they do not address challenges like digital literacy gaps or infrastructure deficits. These variances suggest the need for a more inclusive and contextually grounded definition that reflects both technical capabilities and implementation realities in public healthcare.

For the purpose of this study, digital technology is operationally defined as the use of computer-based systems, electronic platforms, and digital tools - including electronic health records, digital communication systems, and automated administrative technologies - implemented in public hospitals in Niger State to enhance clinical service delivery, staff coordination, and employee job performance. This definition balances the technical, functional, and human dimensions of digital technology, recognizing its role not only as a tool for efficiency but also as a catalyst for organizational effectiveness in healthcare environments undergoing digital transformation.

2.2.1 Dimensions of Digital Technology

Digital technology comprises four key dimensions: hardware technology, software technology, database technology, and networks technology. These components collectively enable digital transformation in organizations by supporting automation, data management, communication, and service delivery (Liarokapis *et al.*, 2021; Sommerville, 2021).

Hardware technology refers to the physical infrastructure such as computers, servers, scanners, and networking devices. These tools serve as the foundation for digital operations and enhance productivity, service accessibility, and remote work capabilities (Jadhav & Taranath, 2022; Davis et al., 2023). However, challenges like high costs, rapid obsolescence, and energy consumption require strategic investment and sustainability practices (Anderson & Lee, 2023; White & Thompson, 2023).

Software technology includes operating systems, enterprise applications (e.g., ERP, CRM), and collaborative tools that support digital tasks and workflow automation. It improves efficiency, transparency, and communication within and between public institutions (Alalwan et al., 2022; Nguyen & Ito, 2023). Issues such as integration, cybersecurity, and user resistance can be addressed through staff training and robust IT policies (Turner & Adams, 2023; Miller & Green, 2023).

Database technology involves the systematic storage, retrieval, and management of data. Centralized and cloud-based databases improve decision-making, ensure data integrity, and streamline operations (Connolly & Begg, 2021; Jiang & Li, 2023). Security measures such as encryption and access controls are essential to protect sensitive public data (Yang & Wang, 2023). Networks technology enables connectivity and communication among digital systems. It includes local and wide area networks (LAN/WAN), internet infrastructure, and wireless technologies that

support real-time data exchange, e-governance, and digital service delivery (Stallings, 2021; Chen & Zhang, 2023). Reliable network infrastructure ensures seamless collaboration and remote access, though it requires constant monitoring to address issues like downtime and cyber threats (Roberts & Evans, 2023).

Collectively, these four dimensions form the backbone of digital ecosystems, driving innovation, efficiency, and responsiveness in both public and private sector organizations.

2.3 Empirical Literature Review

The existing body of literature offers various perspectives on the impact of digital technology on employee performance, often employing diverse methodological approaches and theoretical lenses. While a general consensus points to the positive influence of digital tools, a closer examination reveals nuanced findings and areas requiring further investigation, particularly within specific contexts like public hospitals in Nigeria.

One recent study by Talba (2024) investigated the influence of digital technology on job performance at Fayoum University in Egypt, assessing digital technology across five dimensions: hardware, software, databases, networks, and human resources. Utilizing a quantitative approach with data from 480 university employees and analysing it with Structural Equation Modelling (SEM) via SPSS, the study found a strong link between social capital and administrative development, alongside a significant positive effect of digital technology and its components on job performance. The findings suggest improvements in efficiency, communication, and collaboration. Talba (2024) recommendations for comprehensive training, infrastructure upgrades, and dedicated administrative oversight underscore the practical implications of integrating digital technology. While comprehensive in its digital technology dimensions, the study's focus on a university setting in Egypt limits its direct generalizability to the unique operational and infrastructural challenges faced by public hospitals in Nigeria. Furthermore, the role of "human resources" as a dimension of digital technology itself warrants further clarification within the context of a technology-performance model.

Expanding on the impact of digital tools in modern work arrangements, Duan, *et al*. (2024) analysed the influence of digital technologies on job performance in flexible and distributed work settings. Grounded in technology affordance theory, their structural equation model, validated with survey data, demonstrated that digital technologies significantly enhance job performance by improving coordination, communication, knowledge sharing, and decision-making. This research is noteworthy for its pioneering application of technology affordance theory to digital work environments. While providing valuable insights into the mechanisms through which digital technology influences performance, this study, like many others, focuses on general work settings, which may not fully capture the specific regulatory, resource, and cultural challenges inherent in public healthcare institutions, particularly in developing economies. The external validity for contexts like Nigerian public hospitals remains a consideration.

In a related vein, Deng, *et al*., (2023) explored how digital technologies foster organizational knowledge sharing and decision-making through enhanced communication and coordination. Leveraging social capital theory, their structural equation modeling confirmed the positive effect of these digital interactions on job performance. Their findings emphasize the role of digital

technologies in creating collaborative environments that drive productivity and informed decision-making. Similar to Duan *et al.* (2024), this study's broad organizational focus may not account for the specific dynamics of public hospitals, such as hierarchical structures, patient data sensitivity, and the urgency of medical interventions, which could influence the efficacy of digital tools in fostering collaboration and knowledge sharing.

Martínez-Caro, *et al*, (2020) shifted the focus to the value-generating potential of digital technologies, particularly emphasizing the critical role of a supportive digital organizational culture. Their analysis of data from multinational production centres using structural equation modeling revealed that simply adopting business digitization does not guarantee improved performance. Instead, aligning digital strategies with organizational culture is paramount to realizing value from digital tools. This study's emphasis on organizational culture is highly relevant, as cultural resistance to change or a lack of digital readiness can significantly undermine technology adoption, a known challenge in many Nigerian public institutions. However, the study's context of multinational production centres differs significantly from public hospitals, where patient care and public service ethos might introduce different cultural dynamics affecting technology integration.

Moving into the realm of advanced manufacturing, Dornelles, Ayala, and Frank (2022) conducted a systematic literature review on how Industry 4.0 technologies enhance worker capabilities and reshape manufacturing activities. Their synthesis of 80 studies identified key manufacturing functions and associated worker capabilities (e.g., analytical, collaborative, augmented skills), proposing a conceptual framework for "Smart Working" and "Operators 4.0." While providing a robust overview of technology's impact on worker capabilities, this review is largely confined to the manufacturing sector and Industry 4.0 technologies, which may not directly translate to the specific digital technologies and performance metrics relevant to healthcare settings, particularly in the Nigerian context where the level of industrial automation is markedly different.

A particularly relevant study for the current research is that by Ifunanya and Mutambara (2022), who conducted a comparative mixed-methods study on Digital Technology and Health Workers' Performance in hospitals across Nigeria and South Africa. Adopting an interpretivist philosophical paradigm, which supports understanding social phenomena from multiple perspectives, they used a case study design focusing on two hospitals (St. Joseph and St. Mary) with a total of 540 staff members. A quantitative survey was administered to 301 respondents, complemented by qualitative interviews with 10 health professionals. Their regression analysis revealed that the use of digital technology significantly influenced the performance of health workers, suggesting that integrating digital tools in healthcare can enhance operational efficiency and employee productivity. This study offers crucial localized insights, bridging the gap from foreign contexts. Its mixed-methods approach provides a more comprehensive understanding. However, the specific digital technologies examined (e.g., electronic health records, diagnostic equipment) might not be explicitly detailed in the abstract, limiting the precise understanding of which digital tools were most impactful. While providing a comparative analysis between Nigeria and South Africa, the study's findings on Nigerian hospitals are still a broad representation; a more localized focus on Niger State public hospitals could reveal even more granular challenges and opportunities specific to that region.

Abelsen, Vatne, Mikalef, and Choudrie (2023) examined the role of ICTs in influencing work performance during the COVID-19 pandemic, with a particular focus on task–technology fit. Their quantitative study of 357 remote workers using Structural Equation Modelling (SEM) showed that a strong task–technology fit directly and indirectly enhanced work performance by alleviating feelings of loneliness. While this study offers valuable insights into the psychological aspects of technology use and performance, especially in remote work settings, its primary focus on task-technology fit and loneliness during a specific pandemic period might not fully capture the broader and ongoing systemic challenges related to digital technology infrastructure, digital literacy, and organizational culture prevalent in public hospitals in Niger State outside of a pandemic-induced remote work context.

The empirical literature consistently suggests a positive relationship between digital technology and employee performance, often mediated by factors like improved communication, coordination, knowledge sharing, and decision-making. Studies like those by Duan et al. (2024) and Deng *et al*. (2023) highlight the mechanisms through which digital tools enhance collaboration and efficiency. Martínez-Caro *et al.* (2020) introduce the critical importance of a supportive digital organizational culture, suggesting that technology adoption alone is insufficient. While Talba (2024) offers a multi-dimensional view of digital technology, its contextual focus on a university limits direct transferability. The systematic review by Dornelles, Ayala, and Frank (2022) provides a framework for understanding worker capabilities in digital environments, though it is anchored in the manufacturing sector. Crucially, the work of Ifunanya and Mutambara (2022) directly addresses digital technology in Nigerian and South African hospitals, providing the most pertinent localized evidence, indicating a significant positive influence on health workers' performance. However, even this study, while comparative, does not delve into the granular, state-specific challenges of public hospitals within Niger State. Abelsen *et al.* (2023) contribute by highlighting the human-centric aspects of technology adoption (task-technology fit and loneliness), a factor that could influence employee well-being and performance in public hospitals.

2.4 Theoretical Framework

This study adopts the Technology Organization Environment (TOE) framework to investigate the influence of various digital technologies—specifically hardware, software, databases, and network technologies on employee job performance in public hospitals. As proposed by Tornatzky and Fleischer (1990), the TOE framework posits that the successful adoption and effective implementation of technology are shaped by three interconnected contexts: technological, organizational, and environmental. This comprehensive theoretical lens allows for a structured examination of how both internal and external factors interact with digital tools to impact the performance outcomes of employees within public healthcare institutions.

The technological context within the TOE framework directly addresses the core digital technology variables central to this study. This involves scrutinizing the availability, quality, and integration of hardware technology, such as the computers, servers, and specialized medical equipment with digital interfaces that are fundamental to efficient hospital operations. It also encompasses the prevalence and effectiveness of software technology, including essential applications like Electronic Health Record (EHR) systems, comprehensive hospital management software, and advanced diagnostic imaging tools. Furthermore, this context delves into the nature and accessibility of database technology, exploring how robust and well-managed databases

influence employees' ability to store, retrieve, and utilize critical patient and operational data for their daily tasks. Finally, the technological context considers network technology, examining how the reliability and speed of internal networks and internet connectivity facilitate real-time communication, seamless data sharing, and access to vital cloud-based resources, all of which are crucial for the smooth functioning of hospital environments and efficient employee interaction.

Beyond the specific technologies, the organizational context of the TOE framework illuminates the internal dynamics that significantly shape, and often mediate, the influence of these digital tools on employee performance. Key factors here include the level of management support for digital transformation initiatives, the provision of adequate and ongoing employee training in utilizing new digital tools, and the overall strategic alignment of technology adoption with the hospital's overarching goals. For instance, even the most advanced database system will only positively impact employee performance if the organization cultivates a supportive environment where staff are well-trained and management champions its effective use. This context is vital for understanding whether a public hospital's internal environment is truly conducive to fully leveraging the benefits offered by hardware, software, database, and network technologies.

Lastly, the environmental context explores the external influences that can either propel or hinder the adoption and impact of digital technologies on employee performance within public hospitals. These external factors can range from governmental policy mandates regarding digital health strategies and infrastructure development to the evolving expectations of patients for more efficient and technologically-driven healthcare services. This context also considers the broader technological ecosystem within Niger State, including the availability of telecommunications infrastructure. For example, the effectiveness of network technology in enhancing employee performance is heavily influenced by external factors like reliable regional internet access and specific government policies on digital communication in healthcare. Network technologies, in particular, facilitate crucial communication and collaboration with external stakeholders such as other healthcare facilities, regulatory bodies, and public health agencies. This connectivity improves organizational transparency and responsiveness, indirectly enhancing employee performance by providing broader access to essential information and collaborative tools that extend beyond the immediate hospital walls.

By employing the TOE framework, this study captures the multifaceted relationship between digital technology and job performance. It aims to provide a holistic understanding of how each technological element contributes to performance outcomes, meticulously considering the enabling or constraining roles played by both internal organizational capacities and external environmental pressures. This comprehensive approach ensures that digital tools are not evaluated in isolation but within the broader interplay of structural and contextual factors, offering a robust foundation for identifying practical insights that can inform strategies for technology adoption and workforce performance improvement specifically within public sector healthcare settings in Niger State.

3. METHODOLOGY

The study utilizes a mixed-method approach, combining survey and cross-sectional research designs within a quantitative framework to thoroughly examine the subject matter. The population consists of 502 employees from public hospitals situated in the headquarters of the three senatorial

zones in Niger State, Nigeria. To achieve feasibility and efficiency, a sample size of 217 staff members was selected based on the sample size determination table by Krejcie and Morgan (1970), which offers a structured guideline for choosing an appropriate sample size in relation to the population, ensuring a balance between statistical validity and practical data collection. The sampling technique applied is purposive random sampling, enabling the researchers to deliberately select participants who meet specific criteria relevant to the study while maintaining an element of randomness in the selection process.

The study utilized a structured survey divided into two sections to collect data from participants. Section A focused on obtaining demographic details, whereas Section B addressed the study variables, which were measured using statements rated on a point-point Likert scale. This research independent variable is measured through four key determinants: hardware, software, databases, and network technology, each assessed using a five-item scale adapted from Talba (2024) to capture various aspects of these technological dimensions. Hardware refers to the physical devices supporting operations, software includes the applications running on these devices, databases handle data management and storage, and network technology enables organizational connectivity and communication. Together, these elements offer a comprehensive view of the technological environment influencing organizational dynamics. The dependent variable, employee job performance, is measured using a five-item scale developed by synthesizing insights from Talba (2024), Sulistianingtiyas and Djastuti (2022), and Duan *et al.* (2023), reflecting the multifaceted nature of job performance within the public sector. Cronbach's alpha statistic is used to test reliability of the Instrumentas shown in Table 1.

Table 1 **Reliability Test**

Variable	Number of items	Scale reliability coefficient
Hardware Technology	5	0.840
Software Technology	5	0.850
Database Technology	5	0.761
Networks Technology	5	0.824
Employee Job Performance	5	0.795

Source: Authors' Computaton using SPSS Version 27

Table 1 presents the reliability test results for the scales measuring Hardware Technology, Software Technology, Database Technology, Networks Technology, and Employee Job Performance, each assessed using five items. The Hardware Technology scale demonstrated a reliability coefficient of 0.840 (84.0%), signifying a high degree of internal consistency. The Software Technology scale also showed strong reliability with a coefficient of 0.850 (85.0%). The Database Technology scale yielded a reliability coefficient of 0.761 (76.1%), which is acceptable for research purposes. Networks Technology was found to be reliable with a coefficient of 0.824 (82.4%). Finally, the Employee Job Performance scale showed a reliability coefficient of 0.795 (79.5%), indicating good internal consistency. These results suggest that all measurement scales used in the study are reliable.

Method of Data Analysis

The research used multiple linear regression at 5% significance level. The regression model utilized in the research was adapted from the work of Talba (2024).

$EJP = \beta_{0i} + \beta_1 HT_i + \beta_2 ST_i + \beta_3 DT_i + \beta_4 NT_i + e_i$

Where:

EJP = Employee Job Performance;

β_0 = constant;

$\beta_1 HT_i$ = Hardware Technology coefficients;

$\beta_2 ST_i$ = Software Technology coefficients;

$\beta_3 DT_i$ = Database Technology coefficients;

$\beta_4 NT_i$ = Networks Technology coefficients;

e - error term.

Table 2: Definitions of the Study Variables

S/N	Variable Name	Variable type	Definition	Source
1	Employee Job Performance (EJP)	DV	The effectiveness and efficiency with which employees in public hospitals fulfill their assigned tasks, responsibilities, and contribute to organizational goals, encompassing aspects like productivity, quality of work, attendance, and adherence to protocols.	Rotundo & Sackett (2002); Viswesvaran & Ones (2000)
2	Hardware Technology (HT)	IV Proxy	Physical components of digital systems used in public hospitals, including computers, servers, printers, diagnostic equipment with digital interfaces, and network devices, that support healthcare delivery and administrative functions.	Adapted from Talba (2024); Laudon & Laudon (2020)
3	Software Technology	IV Proxy	Programs and applications running on hardware within public hospitals, such as Electronic Health Record (EHR) systems, hospital management information systems (HMIS), medical imaging software, and communication platforms.	Adapted from Talba (2024); Laudon & Laudon (2020)
4	Database Technology	IV Proxy	Organized collections of structured information, or data, typically stored electronically in a computer system within public hospitals, used for managing patient records, inventory, appointments, and other critical hospital data.	Adapted from Talba (2024); Connolly & Begg (2015)
5	Networks Technology	IV Proxy	Interconnected systems of computers and devices within public hospitals that allow for communication, data sharing, and access to shared resources, including Local Area Networks (LANs), Wide Area Networks (WANs), and internet connectivity.	dapted from Talba (2024); Laudon & Laudon (2020)

Source: Researchers' Compilation (2025)

4. RESULTS AND DISCUSSIONS

This part presents and analysed data collected from the questionnaire instrument to test the hypotheses.

4.1 Normality Test

Table 3 **Normality Test**

	N Statistic	Mean Statistic	Std. Deviation Statistic	Skewness Statistic	Skewness Std. Error	Kurtosis Statistic	Kurtosis Std. Error
Hardware Technology	209	18.8804	5.84413	-.612	.168	-.953	.335
Software Technology	209	22.5167	3.35281	-2.627	.168	9.019	.335
Database Technology	209	14.4737	5.15067	.179	.168	-.656	.335
Network Technology	209	18.9091	4.85723	-.914	.168	.120	.335
Employee Performance	209	22.6651	2.48510	-1.422	.168	2.042	.335
Valid N (listwise)	209						

Source: Authors' Computaton using SPSS Version 27

The results in Table 3 present the normality test for all study variables based on skewness and kurtosis values. According to the guidelines by Hair et al. (2010), skewness values should fall within the range of -2 to +2, and kurtosis within -7 to +7 to be considered acceptable for normal distribution. Based on this criterion, Hardware Technology, Database Technology, Network Technology, and Employee Performance all have skewness and kurtosis values within the acceptable range, indicating approximate normality.

Collinearity Test

Table 4 **Collinearity Statistics**

		Tolerance	VIF
1	(Constant)		
	Hardware Technology	.886	1.129
	Software Technology	.894	1.119
	Database Technology	.941	1.063
	Network Technology	.974	1.027

a. Dependent Variable: Employee Performance

Source: Authors' Computaton using SPSS Version 27

Table 4 presents collinearity statistics for the predictor variables—Hardware Technology, Software Technology, Database Technology, and Network Technology—in relation to the dependent variable, Employee Performance. The Tolerance values for all four predictors range from 0.886 to 0.974, indicating that a high proportion of each variable's variance is not explained by the others. This reflects a low risk of multicollinearity. Similarly, the Variance Inflation Factor (VIF) values range from 1.027 to 1.129, all of which are very close to 1. Since VIF values below 5 (or more conservatively, below 10) are generally considered acceptable, these results confirm

that no significant multicollinearity exists among the independent variables in the regression model.

Model Fit

Table 5 shows how the model fit the data for the regression analysis conducted in the study.

Table 5 Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.480[a]	.230	.215	2.20185	1.903

a. Predictors: (Constant), Network Technology, Hardware Technology, Database Technology, Software Technology

b. Dependent Variable: Employee Performance

Source: Authors' Computaton using SPSS Version 27

Table 5 provides a summary of the regression model's performance in predicting Employee Performance based on the independent variables: Hardware Technology, Software Technology, Database Technology, and Network Technology, including the constant term. The correlation coefficient (R) is 0.480, signifying a moderate positive linear relationship between the proxies and Employee Performance. The R Square = 0.230, implying that 23.0% of the variance in employee performance is explained by the four technological factors used in the research. The Adjusted R^2, to avoid overestimation, is 0.215. The Durbin-Watson statistic is 1.903, suggesting that autocorrelation is not an issue in the study data.

4.2 ANOVA

Table 6 is the outcome of ANOVA test.

Table 6 ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	295.530	4	73.882	15.239	.000[b]
	Residual	989.025	204	4.848		
	Total	1284.555	208			

Dependent Variable: Employee Performance

Predictors: (Constant), Network Technology, Hardware Technology, Database Technology, Software Technology

Source: Authors' Computaton using SPSS Version 27

Table 6 presents the ANOVA results for the regression model predicting Employee Performance using the predictors: Hardware Technology, Software Technology, Database Technology, and Network Technology. The F-statistic is 15.239, which represents the ratio of the variance explained by the regression model to the variance unexplained (residual). This value tests the null hypothesis that all regression coefficients are equal to zero, implying that the model has no predictive capability. The associated p-value is .000, which is less than 0.05, indicating that the overall regression model is statistically significant. This means that, collectively, the technological factors significantly predict employee performance. The model explains a significant amount of

variance in the dependent variable, confirming that at least one of the predictors has a meaningful contribution to explaining employee performance.

4.3 Regresson Results

Table 7 **Coefficients[a]**

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	20.803	1.221		17.043	.000
	Hardware Technology	-.120	.028	-.281	-4.307	.000
	Software Technology	.018	.048	.024	.369	.712
	Database Technology	.133	.031	.276	4.354	.000
	Network Technology	.095	.032	.185	2.977	.003

a. Dependent Variable: Employee Performance
Source: Authors' Computaton using SPSS Version 27

Table 7 shows regression coefficients. Hardware Technology exhibited a statistically significant negative effect on employee performance. The unstandardized coefficient was -0.120, with a corresponding t-value of -4.307 and a p-value of 0.000. This indicates that for every one-unit increase in the observed presence or implementation of hardware technology, employee performance is predicted to decrease by 0.120 units. This inverse relationship led to the rejection of the null hypothesis concerning hardware technology.

In contrast, Software Technology showed no statistically significant influence on employee performance. The unstandardized coefficient was a small positive at 0.018, with a t-value of 0.369 and a p-value of 0.712. Given that the p-value is greater than the conventional significance level (e.g., 0.05), the relationship between software technology and employee performance was deemed statistically insignificant. Consequently, the null hypothesis for software technology was retained.

For Database Technology, the analysis revealed a positive significant on employee performance. The unstandardized coefficient was 0.133, accompanied by a t-value of 4.354 and a p-value of 0.000. This positive coefficient suggests that an increase in the use or improvement of database technology is associated with an increase in employee performance. This statistically significant finding led to the rejection of the null hypothesis.

Finally, Network Technology also demonstrated a statistically significant positive impact on employee performance. The unstandardized coefficient was 0.095, with a t-value of 2.977 and a p-value of 0.003. This positive and statistically significant result indicates that improvements in network infrastructure are associated with enhanced employee performance, leading to the rejection of the null hypothesis concerning network technology.

4.4 Discussion of Findings

The findings from this study present a nuanced picture of how different facets of digital technology influence employee performance in public hospitals in Niger State, Nigeria, and offer interesting contrasts and similarities with existing literature.

The negative and significant effect of Hardware Technology on employee performance is a particularly striking and counter-intuitive finding. While Talba (2024) also found a significant effect of hardware, it was in a positive direction. This divergence suggests that in the specific context of public hospitals in Niger State, hardware infrastructure might be acting as a barrier rather than an enabler of performance. This could be attributed to several local problems prevalent in Nigerian public hospitals, such as outdated or obsolete equipment that is prone to breakdowns, frequent power outages that render devices unusable, or a lack of proper maintenance and technical support. Inadequate or incompatible hardware may lead to frustration, increased downtime, and a reduction in efficiency for hospital staff, ultimately hindering their ability to perform tasks effectively.

Conversely, the insignificant impact of Software Technology on employee performance is also noteworthy. This contrasts with the positive effects often reported in broader digital transformation studies and also with Talba's (2024) findings. The lack of a meaningful influence could stem from a variety of factors specific to these public hospitals. Possible explanations include underutilization of available software due to complex interfaces, insufficient training for staff on how to effectively use the software, a misalignment between the software's capabilities and the actual workflow needs of the hospital, or even issues with software bugs and frequent crashes. If staff cannot efficiently or consistently use the software tools, or if the software does not genuinely support their tasks, its presence will have minimal bearing on their performance.

The positive and significant effect of Database Technology on employee performance aligns well with expectations and similar findings in the literature, including Talba (2024). This outcome underscores the critical importance of organized, accessible, and reliable data storage and retrieval systems in a healthcare setting. When hospital staff can quickly and accurately access patient records, medical histories, medication inventories, and other vital information, their efficiency in diagnosis, treatment, and administrative tasks improves significantly. This streamlines decision-making processes, reduces errors, and enhances overall job effectiveness, demonstrating that well-implemented database systems are a clear asset to performance.

Finally, the positive and significant impact of Network Technology on employee performance is also consistent with global trends and the findings of Talba (2024). In the context of public hospitals, robust and reliable network infrastructure is paramount. It facilitates seamless communication among departments, enables quick access to electronic health records across different units, supports telemedicine and remote consultations, and allows for efficient sharing of critical information. Improved connectivity enhances coordination, reduces delays, and empowers staff with timely access to information, all of which directly contribute to better job output and overall efficiency in a busy healthcare environment. This finding highlights networks as a foundational component for leveraging other digital assets.

4.5 Theoretical and Practical Implications of Findings

The findings from this study offer significant contributions to the theoretical understanding of the Technology-Organization-Environment (TOE) framework, particularly within the context of public healthcare in developing economies. The most prominent theoretical implication stems from the mixed effects observed across the digital technology dimensions. While the positive impacts of database and network technologies align with expectations, the negative influence of hardware and the insignificance of software challenge a simplistic view that all technology automatically enhances performance. This suggests that within the TOE's "technological context," the quality, usability, and appropriateness of specific technological components are crucial, not just their mere presence. It also emphasizes that the relationship between technology and performance is not monolithic but highly dependent on the nature and state of the specific technology implemented. Furthermore, these unexpected outcomes underscore the vital, often mediating, role of the Organizational Context within the TOE framework, implying that simply introducing technology is insufficient; the organizational capacity to effectively deploy, maintain, train staff on, and integrate these technologies is paramount. This study enriches the TOE framework by providing empirical evidence from a developing country, demonstrating how specific local environmental and organizational constraints can lead to divergent outcomes compared to more resourced settings.

Practically, these findings provide crucial, actionable insights for public hospital management, policymakers, and healthcare professionals in Niger State and similar regions. The negative impact of hardware technology highlights an urgent need to prioritize the quality, modernity, and rigorous maintenance of physical digital equipment, rather than just its acquisition. This means dedicating budgets for upgrades, implementing proactive maintenance schedules, and ensuring robust technical support to minimize downtime. Similarly, the insignificant effect of software technology calls for a critical re-evaluation of current software systems and, more importantly, the strategies for their implementation and user training. Hospitals should ensure software is user-friendly, aligns with workflows, and that staff receive comprehensive, ongoing training. Conversely, the strong positive impacts of database and network technologies underscore them as critical areas for continued investment and optimization. Public hospitals must prioritize developing and maintaining robust, accessible, and secure databases for efficient information management and invest in reliable, high-speed network infrastructure to facilitate seamless communication and access to shared resources. Ultimately, these results advocate for a holistic, integrated digital transformation strategy that addresses the specific infrastructural, human capital, and organizational challenges prevalent in public healthcare settings in Nigeria, ensuring that technology truly serves as an enabler for improved employee performance and, consequently, better patient care.

5. CONCLUSION AND RECOMMENDATIONS

Based on the findings of the research conducted in public hospitals in Niger State, Nigeria, it can be concluded that among the four dimensions of information and communication technology (ICT) examined - hardware technology, software technology, database technology, and network technology - three (hardware, database, and network technologies) have significant effects on employee performance. While hardware technology surprisingly showed a negative impact, suggesting possible implementation or operational issues, both database and network technologies positively influenced performance, highlighting their critical roles in enhancing efficiency and

service delivery. Software technology, however, was found to have no significant effect, indicating potential gaps in utilization or relevance. These results underscore the need for strategic investment and staff capacity-building in ICT infrastructure, particularly in optimizing hardware use and maximizing the benefits of database and network technologies to improve overall employee performance in public healthcare institutions.

Based on the study's findings, hospital administrators are advised to prioritize the proper selection, deployment, and maintenance of hardware technology, ensuring it aligns with the specific needs of public hospitals in Niger State. The negative effect of hardware technology on performance suggests inefficiencies or underutilization that must be urgently addressed through targeted training and regular system audits. ICT managers and technical staff should also focus on enhancing the functionality and accessibility of database and network technologies, as these were found to significantly improve employee performance. Regular upgrades, cybersecurity measures, and user-friendly platforms should be prioritized to maintain reliability and boost productivity.

5.1 Suggestion for Further Study

Future research could explore the critical role of workforce digital literacy and ongoing training programs in public hospitals, investigating how sustained investments in human capital development ensure the long-term sustainability and maximize the positive impact of digital technology on employee performance.

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