

Digital Transformation and Employee Productivity in Nigeria's Mobile Telecommunication Sector

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Abstract

Purpose: This study seeks to analyze Digital Transformation and employee productivity in Nigeria's mobile telecommunications sector by specifically examining the effect of digital skills and task efficiency among employees and investigating the effect of technology adoption on the output quality of employees in Nigeria's mobile telecommunications sector.

Research Methodology: A survey research design was utilized, and data were collected from 347 employees in the Nigerian mobile telecommunications sector and analyzed using linear regression.

Results: The findings revealed that digital skills had a significant, strong positive effect on task efficiency, with the model explaining 61.3% of the variance. Similarly, technology adoption significantly and positively affected output quality, accounting for 45.4% of the variance in the outcome variable.

Conclusions: Mobile telecommunication firms must prioritize strategic training initiatives to fully leverage their technological investments and optimize workforce performance

Limitations: Online surveys were utilized; hence, there may be bias in responses from respondents.

Contributions: This study will enable the management of mobile telecommunications firms to design and implement target programs and provide insight into how to collaborate with policymakers and industry leaders to develop a digital literacy framework.

Keywords: *Digital Skills, Digital Transformation, Employee Productivity, Task Efficiency, Technology Adoption, Output Quality*

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1. Introduction

The Fourth Industrial Revolution has significantly accelerated the global shift towards digital technologies across both the private and public sectors. In today's highly competitive business landscape, digital transformation is no longer merely an option but a fundamental necessity for organizations seeking to improve their overall performance. A significant increase in staff productivity is a major result that is generally anticipated from digital transformation. This is frequently assessed using certain metrics, such as task efficiency and output quality, to encourage more openness in all corporate procedures (Vuong & Nguyen, 2022).

Digital skills cover a wide range of competencies, from skilled communication through digital platforms and the specialized use of sector-specific digital tools to basic computer literacy and efficient data administration (Sartika, Astuti, Chasanah, & Riyanto, 2023). Closely related is the concept of digital technology adoption, which describes the extent to which organizations integrate digital tools into their daily operations, including cloud-based systems, automation software and digital communication platforms. The successful implementation of these technologies has been empirically associated with

significant output quality gains, mainly because of the intrinsic ability of digital platforms to lower errors, improve consistency, and foster greater openness across a range of business processes (Juhász, Squicciarini, & Voigtländer, 2024).

Digital Transformation has a significant and positive influence on employee performance in terms of productivity. According to (Teng, Wu, & Yang, 2022), for organizations, focusing on investing in digital technologies, employee digital skills, and digital transformation strategies are key factors that are beneficial for digital transformation, thus helping to improve the performance and overall productivity of their employees. The purpose of digital transformation is to innovate. Through digital transformation, employees can find a new paradigm for development, especially when they adopt and integrate it into their work structures (Zhu, 2019). Additionally, research has shown that human resources have a favorable effect on the digital transformation of organizations, and digital transformation can positively impact employee productivity (Hai, 2021).

Employee skills are a moderating factor in the digital transformation of organizations. Although digital transformation is a long-term and difficult endeavor with obstacles in the areas of technology, talent development, business capacity building, and other areas, it is not impossible as long as organizations strategically implement it into their workforce (Zhang, Xu, & Ma, 2022). Despite the significant growth and substantial economic contribution of Nigeria's telecommunications sector, the full realization of the benefits of digital transformation for employee productivity is hampered by several critical challenges. Its practical implementation within firms, such as IHS Tower and ZTE Nigeria Limited, is consistently impeded by inadequate and outdated technological infrastructure, persistent network connectivity issues, and a general lack of robust digital support structures (Ochor, Mbazie, & Agbo, 2024; Olubiyi, Ise, Glory, Ogheniyore, & Ayobami, 2024).

Furthermore, a pervasive challenge lies in the human capital aspect, characterized by significant employee training and digital skill gaps, coupled with cultural resistance to change and over-reliance on traditional work methods (Ochor et al., 2024; Olubiyi et al., 2024). These skill deficits and cultural barriers prevent employees from fully leveraging advanced digital tools, thereby directly impacting their task efficiency and output quality. Broader environmental factors, including the high cost of data, volatile power supply, and concerns regarding job insecurity within the gig economy, further complicate the operational landscape, potentially leading to reduced team spirit and delayed task completion (Ochor et al., 2024; Olubiyi et al., 2024). Consequently, a number of academics have argued for greater funding for training in digital skills as a means of improving productivity and creativity at work (Cirillo, Fanti, Mina, & Ricci, 2023).

If these concerns are not addressed, organizations might find it difficult to relish the benefits that digital transformation offers in enhancing employee productivity. An organization that lacks productive employees may find it difficult to perform well and achieve its set objectives. Compounding these practical challenges is a notable gap in the existing academic literature. There is limited understanding of how digital transformation specifically impacts employees' experiences and productivity at the individual level within the Nigerian mobile telecommunications sector creates a critical void. Therefore, this study seeks to bridge this crucial knowledge gap by empirically analyzing Digital Transformation and Employee Productivity in Nigeria's mobile telecommunications sector.

1.1. Objectives of the Study

The main objective of this study is to examine the effect of Digital Transformation on Employee Productivity in Nigeria's mobile telecommunications sector. The specific objectives include

1. To examine the effect of digital skills on task efficiency among employees in Nigeria's mobile telecommunications sector.
2. To investigate the effect of technology adoption on the output quality of employees in Nigeria's mobile telecommunications sector.

1.2. Research Questions

1. What is the effect of digital skills on task efficiency?

2. What is the effect of technology adoption on employees' output quality?

1.3. Hypotheses

H₀₁: Digital skills do not significantly affect the task efficiency of employees in Nigeria's mobile telecommunications sector.

H₀₂: Technology adoption has no significant effect on the output quality of employees in Nigeria's mobile telecommunications sector.

2. Literature Review and Hypothesis Development

2.1. Digital Transformation (DT)

Digital transformation is fundamentally defined as the process through which organizations adopt and integrate digital technologies to either create entirely new products, services, and operational models or significantly modify existing ones by translating business processes into a digital format (Ifeoma, Phina, Nwanonigwe, & Uchechukwu, 2021; Verhoef et al., 2021); (Solberg, Traavik, & Wong, 2020). It is a dynamic process driven by digital technology that involves frequent changes in business plans, company capabilities, digital representation features, and competitive advantages (Islam & Hossain, 2024). Beyond mere digitization (converting analog to digital) or digitalization (using digital technology to change existing processes), DT involves a holistic embedding of technologies across the entire business to drive fundamental strategic change, affecting every facet of an organization (Ifeoma et al., 2021; Islam & Hossain, 2024).

It is not merely about technology but about how businesses harness new technologies for business improvement and sustainability and enable innovation (Ifeoma et al., 2021). Digital transformation is an evolutionary process in which digital technologies and capabilities generate value by enhancing business models, customer experience, and operational procedures (Verhoef et al., 2021). It seeks to enhance an organization by initiating substantial changes to its characteristics through the integration of Information, Computing, Communication, And Connectivity (ICC) technologies. Studies have shown that digital transformation plays a pivotal role in enhancing employee productivity in the work environment. This is shown in the number of outputs per person, time spent on job, efficiency of tasks and overall performance of organisation (Paais & Pattiruhu, 2020)

2.2. Employee Productivity

Employee productivity, also known as workforce productivity, is a quantifiable measure of an employee's output or efficiency in completing their assigned tasks or responsibilities within a specific period (Paais & Pattiruhu, 2020); Singh & Chaudhary, 2022). It measures how efficiently and effectively a worker or a group of workers contributes to accomplishing organizational goals, serving as a Key Performance Indicator (KPI) that measures the output of work concerning the inputs of time, effort, and resources. Productivity involves consistently accomplishing essential tasks while balancing all production elements to achieve the highest output with minimal effort and adopting a mindset that prioritizes progress and continually enhances existing processes. Factors influencing employee productivity include skills, technology, work environment, leadership, employee engagement, and motivation (Paais & Pattiruhu, 2020).

Firms that achieve high performance foster employee productivity, which leads to greater engagement in decision-making, goal-setting, and problem-solving activities among staff, ultimately enhancing their performance (Alkadash, 2015). Additionally, human resource policies are designed to offer employees opportunities to be involved in decision-making, incentives for making discretionary efforts, and opportunities to develop the necessary skills. Productivity can be assessed by evaluating an employee's output within a specific timeframe. Generally, a worker's productivity is gauged against the average performance of others in similar roles.

Employee productivity is crucial for businesses, as it significantly influences their overall success (Alkadash, Vorobyova, Alhajjar, Almaamari, & Abdulrahim, 2021). Employee Productivity can be improved by integrating digital transformation into the workplace. Digital transformation is a critical driver of modern workplace efficiency and significantly enhances employee productivity in several

ways. By adopting digital technologies, organizations can facilitate streamlined workflows, automate routine tasks, and provide employees with advanced tools for communication and collaboration (Ahmad, Mad Lazim, Shamsuddin, Wahab, & Abu Seman, 2019; Büyüközkan & Göçer, 2018).

Studies have shown that the successful implementation of digital initiatives enables employees to adapt rapidly to new processes and leverage advanced information systems to improve performance and decision-making (Zhang et al., 2022). Furthermore, fostering a digital mindset among employees positively influences their attitudes toward work, contributing to overall organizational performance (Solberg et al., 2020). Research confirms that the relationship between digital transformation and performance is clear, indicating that strategic investments in digital infrastructure can lead to measurable improvements in productivity and competitive advantage (Teng et al., 2022).

2.3. Digital Skills

Digital skills refer to the capabilities and proficiencies that employees possess in effectively utilizing digital technologies and tools. The development of digital skills is explicitly identified as a key driver of digital transformation within Performance Management Systems (PMS) (Islam & Hossain, 2024). Human capabilities, encompassing employee support, preparedness, and advanced digital skills, are crucial for accelerating decision-making processes and enabling swifter responses to complex business scenarios (Pramanik, Kirtania, & Pani, 2019); (Bekaroo, Bokhoree, & Pattinson, 2016; Büyüközkan & Göçer, 2018; Dremel, Wulf, Herterich, Waizmann, & Brenner, 2017).

Training personnel in data analytics, digital communication, and technical competency is crucial for the effective utilization of digital performance management solutions (Islam & Hossain, 2024). A workforce well trained in digital technologies can also effectively support remote working models (Pramanik et al., 2019). The ability to use digital tools, platforms, and technologies efficiently is referred to as a digital skill. These skills are crucial in various industries, including manufacturing, because they can increase productivity, efficiency, and overall performance. The underlying philosophy of digital skills addresses several topics, including education's role in preparing people for these abilities, the impact of digital technology on society, and learning.

The essential elements of the digital skills theory include the education process, which is a variety of approaches, including formal schooling, self-study, and on-the-job training, that can be used to develop digital skills. The learning process includes understanding the fundamental ideas, becoming proficient in technical abilities, and honing problem-solving techniques (Ahmad et al., 2019). The effects of digital technologies explain how people's lives and jobs have been altered by digital technologies, making digital skills a crucial component of contemporary life. It is now essential for people to adapt and acquire digital skills because these technologies have democratized information access, facilitated collaboration, and expedited procedures (Nadeau, 2018).

2.4. Task Efficiency

Task efficiency refers to the capability of employees or organizational systems to complete assigned duties accurately, promptly, and with minimal waste of time, effort, and resources. It represents how effectively individuals utilize available tools, information, and processes to achieve expected outcomes (Braglia, Gabbrielli, & Marrazzini, 2019). Efficient task performance contributes directly to productivity and operational efficiency. In today's digitally driven organizations, task efficiency is increasingly linked to technological advancements and digital literacy. Islam and Hossain (2024) posit that digitalization enables automation, reduces human interference, and accelerates workflow, collectively improving employees' ability to perform tasks efficiently. Similarly, Ochor et al. (2024) found that digital tools significantly enhance task execution in Nigerian telecommunications firms by promoting speed, accuracy, and interdepartmental coordination.

From a theoretical standpoint, task efficiency aligns with the Technology-Organization-Environment (TOE) framework and the Unified Theory of Acceptance and Use of Technology (UTAUT), which explains how technology adoption, organizational culture, and external factors influence performance outcomes. According to Fagbuyi, Adegbola, Alabi, and Abdurahaman (2023), in the Nigerian public

sector, employees' perceptions of technology's usefulness and the availability of supportive conditions play crucial roles in determining efficiency levels. This highlights that task efficiency is not merely a technical outcome but a function of behavioral and contextual factors, including employee motivation, training, and managerial support. The integration of digital systems, such as Enterprise Resource Planning (ERP) and workflow automation platforms, has further enabled workers to manage complex tasks with a reduced cognitive load, allowing them to focus more on strategic decision-making and innovation (Olubiyi et al., 2024).

Beyond improving operational speed, task efficiency facilitates knowledge transfer and organizational learning, both of which are essential for sustaining performance. Sheng, Hartmann, Chen, and Chen (2015) describe task efficiency as an interpersonal mechanism that allows tacit knowledge, the experiential and intuitive know-how possessed by employees, to flow seamlessly between knowledge producers and recipients (Sheng et al., 2015). This efficiency-driven knowledge exchange enhances problem-solving capacity and strengthens collective intelligence within the teams. Furthermore, it has been observed that in digital work environments, efficient communication and collaboration tools promote resilience and adaptive performance, especially under high-pressure conditions (Solberg et al., 2020). Therefore, task efficiency extends beyond performance metrics and serves as the foundation for innovation, learning, and organizational adaptability in a dynamic business environment.

2.5. Technology Adoption

Technology adoption is more than just acquiring new tools; it is a strategic process of integrating technological innovations into organizational structures, systems, and culture to enhance overall performance and competitiveness. According to Davis (1989), the Technology Acceptance Model (TAM) highlights perceived usefulness and perceived ease of use as key determinants of user acceptance of new technology. This implies that when employees view a technology as beneficial and easy to operate, their likelihood of adoption increases. Similarly, Rogers' (2003) Diffusion of Innovation theory explains that adoption is influenced by innovation characteristics such as compatibility, complexity, and observability. In contemporary organizations, technology adoption extends beyond operational convenience to encompass strategic digital transformation initiatives that reshape business models and processes (Islam & Hossain, 2024).

In Nigeria, digital transformation and technology adoption have become critical for addressing inefficiencies and driving innovation, especially in the telecommunications and manufacturing sectors. Olubiyi et al. (2024) emphasized that successful technology adoption requires deliberate organizational investments in employee training, infrastructure, and management. Their study of Nigerian firms revealed that technological integration enhances responsiveness, reduces redundancy, and improves decision-making processes. This aligns with Adaptive Structuration Theory (AST), which suggests that users play an active role in shaping how technology is used and interpreted within organizations (Ochor et al., 2024). Therefore, adoption is not merely technical but socio-structural, influenced by organizational norms, leadership support, and employees' readiness to embrace innovation.

Empirical evidence supports a positive relationship between technology adoption and organizational performance. Olatunji et al. (2025) in their study reveals that SMEs in Lagos, Nigerian that adopt technologies such as automation and artificial intelligence achieved higher operational efficiency and profitability. Aliu et al. (2025) noted that heavy-engineering projects that implemented digital systems experienced improved project coordination and cost control. However, barriers such as inadequate infrastructure, resistance to change, and high costs of technological investment still hinder adoption in developing economies (Achiole & Sylvanus, 2025). Overall, when technology adoption is well implemented, it leads to innovation, productivity growth, and long-term competitiveness by optimizing both human and technical resources.

2.6. Output Quality

Output quality refers to the standard, accuracy, and overall value of the work produced by employees or organizations. It is a multidimensional concept encompassing consistency, reliability, and innovation in the results (Islam & Hossain, 2024). High output quality indicates that an organization not only meets

but also exceeds customer expectations, leading to an improved reputation and competitiveness. Digital transformation plays a critical role in enhancing output quality through process automation, analytics, and error reduction. As organizations transition from manual to digital systems, tasks are executed with greater precision and monitoring, resulting in higher quality deliverables (Olubiyi et al., 2024). The use of technology in managing workflow and performance metrics ensures that errors are detected early, processes are standardized, and outcomes are consistent over time.

Empirical studies in Nigeria and other developing economies affirm the significant influence of digital tools on the output quality. Achiole and Sylvanus (2025) reported that brewery firms in Southeast Nigeria achieved better production control and consistency after adopting automated technologies and ERP systems. Similarly, Aliu et al. (2025) found that digitalization improved project coordination, reduced material wastage, and enhanced precision in project outcomes in Nigerian heavy-engineering projects. These findings suggest that technology integration enhances not only operational efficiency but also the qualitative dimensions of work outputs. In the manufacturing sector, Olatunji et al. (2025) noted that firms and SMEs leveraging artificial intelligence (AI) and data analytics experienced improved product quality and faster responses to customer needs. This implies that output quality is directly linked to the level of technological sophistication and employee competence within an organization.

In addition, output quality can be viewed as the ultimate manifestation of effective task efficiency. When employees perform their duties efficiently, thereby minimizing waste and optimizing time, the resulting outputs are more consistent, accurate, and innovative (Islam & Hossain, 2024). The synergy between task efficiency and output quality is evident in digitally advanced firms, where streamlined processes, effective communication, and well-defined workflows lead to superior results (Ochor et al., 2024). High-quality output, in turn, reinforces organizational performance by fostering customer satisfaction, profitability, and employee confidence. Thus, output quality serves as a key performance indicator that reflects the success of task efficiency and technology integration. In summary, task efficiency and output quality are interdependent constructs that together represent essential dimensions of employee performance in the era of digital transformation.

2.7. Theoretical framework

This study is anchored on the Resource-Based View (RBV), a concept introduced by Penrose in 1959. However, over the years, the Resource-Based View (RBV) has been further refined by researchers such as Wernerfelt (1995) and Barney and Conner (1991). According to Barney (1991), the RBV outlines a theoretical framework connecting resources to a competitive edge. It highlights cognitive abilities as a crucial source of advantage, since they are unevenly distributed, limited in availability, and difficult to duplicate. It also argues that an organization's competitive advantage is rooted in its internal resources and capabilities rather than external factors. The link between this theory and the current study is that it explains that organizational success depends on strategic resources such as technology, innovation, and employee capabilities. However, digital technology transformation provides valuable and rare technological resources, whereas employees' skills and adaptability represent critical human capital. When these two are effectively combined, they enhance productivity and create a sustainable competitive advantage.

2.8. Empirical Insights

Islam and Hossain (2024) explored the effects of digital transformation on employees' performance management systems in the telecommunications industry in Bangladesh. Using both primary and secondary data, this study sought to comprehend the evolution of digital performance management and its impact on competition. Two hundred employees from Bangladeshi telecommunications companies completed a questionnaire for the study, and interviews were conducted to obtain additional insights. The findings indicate that digital transformation improves performance management systems, workforce performance, and sustainability. Respondents concurred that digital tools could potentially automate numerous performance management system functions. The implementation of digitalization has enhanced operations, productivity, and process management. Employees have also expressed their support for digital access to performance-related data.

The study identified several drivers of digital transformation in performance management systems, including managerial and operational capabilities, the development of digital skills, and innovation capabilities. With a Cronbach's alpha coefficient of 0.877, the research instrument employed in this study exhibited high levels of internal consistency and reliability. The findings of the study indicate that implementing digital performance management solutions has the potential to confer long-term competitive benefits to the telecommunications industry in Bangladesh. Ochor et al. (2024) assessed the Digital Media and Job Performance by Telecommunication Employees of IHS Towers and ZTE Nigeria Limited in Lagos State, Nigeria. This study examined the digital media and job performance of telecommunication employees of IHS Tower and ZTE Nigeria Limited in Lagos State, Nigeria.

The study's objectives were to identify the digital media tools that help telecommunication employees of IHS Tower and ZTE Nigeria Limited in job performance. The theoretical framework of the study was adaptive structural and system theories. The research design adopted for this study was a descriptive survey. The population of this study consisted of IHS Tower and ZTE Nigeria Limited workers (staff) in Lagos State. According to the telecommunication companies Administrative Officers in 2023, the total population of IHS Tower is 600 and ZTE Nigeria Limited is 185. The total population was 785 (seven hundred and eighty-five). To obtain the required sample size, Krejcie and Morgan Table was used to obtain a sample size of 254. The sampling method adopted was multistage sampling, and data for this study were obtained using copies of the questionnaire.

Data were analyzed using descriptive and inferential statistical analyses. The findings revealed that the digital media tools that the telecommunication employees of IHS Tower and ZTE Nigeria Limited engaged in job performance were Google Drive, browsers, servers, media hubs, YouTube, Websites, portal sites, podcasts, blogs, webcasts, Skype, Dropbox, Evernote, HBO Go, Textplus, Picasa, Android, and Flipboard. Nwankwo (2024) examined the effect of digital media on job performance in a case study of telecommunication employees in IHS Towers and ZTE Nigeria Ltd.. The theoretical framework of the study was adaptive structural and system theories. The research design adopted for this study was a descriptive survey. The population of this study consisted of IHS Tower and ZTE Nigeria Limited workers (staff) in Lagos State.

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Igiba, Abubakar, and Salihu (2023) analyzed the effect of technology adoption on service delivery in Nigeria's telecommunications industry. This study adopted a cross-sectional survey to investigate the variables. The primary data source was a structured questionnaire. The study population was sixty-nine (69) fully employed staff members of the four major telecommunications industries in Bauchi. The census sample size determination method was employed, so the whole sixty-nine (69) was used. The sampling procedure was achieved using the Cronbach alpha coefficient, with all items scoring above 0.70. The hypotheses were tested using linear regression analysis. The tests were performed at a 0.05 significance level. The study's findings revealed a significant positive impact of technological advancement on service delivery.

Ifeoma et al. (2021) analyzed Digital transformation and business sustainability of telecommunication firms in Lagos State, Nigeria. This study examined the effect of digital transformation on the business sustainability of telecommunication firms. A descriptive design was employed, and a structured questionnaire was used to gather information. The formulated hypotheses were tested using Pearson's product-moment correlation coefficients. The results revealed that digital technology has a significant

positive effect on operational efficiency in the telecommunications industry in Lagos State and that digital infrastructure has a significant positive relationship with service delivery. It was concluded that Digital Transformation impacts organizations profitability goals in an increasingly competitive environment and also impacts the sustainability aspects of business; therefore, organizations should increasingly deploy digital technologies to improve business sustainability.

3. Methodology

3.1. Research Design

This study adopted a survey research design, which was appropriate because the data were collected using a structured questionnaire. The survey design enabled the researcher to gather quantifiable information directly from employees within Nigeria's mobile telecommunications sector, allowing for a systematic assessment of the relationships between digital transformation variables and employee productivity. Using this design, the study captures employees' real experiences and perceptions without manipulating their work environment, making it suitable for analyzing trends, patterns, and associations across a large and diverse workforce.

3.2. Population of the Study

The study population consisted of 7,451 employees drawn from four major mobile telecommunications firms in Nigeria: MTN, GLO, Airtel, and 9mobile. These companies were selected because they have a nationwide presence, a large subscriber base, and extensive network coverage, making them the most representative of the Nigerian mobile telecommunications industry. Their scale and operational diversity provide a robust foundation for examining how digital transformation influences employee productivity in the sector.

3.3. Sample Size and Sampling Technique

The sample size for the study was 366 employees, determined using the Krejcie and Morgan (1970) sample size determination formula, which is suitable for large populations. A stratified random sampling technique was adopted to ensure fair representation across sectors. The population comprises employees from four major telecommunications companies: MTN, GLO, Airtel, and 9mobile. Each company serves as a separate stratum. After creating the strata, participants were randomly selected from each company in proportion to their staff size, ensuring that the final sample accurately reflected the distribution of employees across the industry.

3.4. Method of Data Collection

Data for the study were collected using a structured questionnaire designed and administered via Google Forms. This method enabled the efficient distribution and retrieval of responses, particularly given the digital orientation of employees within the telecommunications sector. During the administration, priority was given to employees who demonstrated sufficient digital literacy to access, answer, and submit the questionnaire electronically. This approach ensured accuracy, ease of response, and a wider reach across the selected telecommunication firms. The questionnaire was subjected to both validity and reliability tests, and the results showed that the questionnaire was both valid and reliable. A total of 347 copies were used for the study, as not all electronically distributed copies were returned, and some of the collected/submitted copies were incomplete.

3.5. Method of Data Analysis

The data collected were analyzed using both descriptive (mean, frequencies, and tables) and inferential statistics (using linear regression). The hypothesis was tested at these 5% level of significance. These statistical tools were chosen for their appropriateness in examining the relationships between the components of Digital Transformation and Employee Productivity in Nigeria's mobile Telecommunication Sector. All analyses were performed using the Statistical Package for Social Sciences (SPSS) software (version 27.0). This provides the tools necessary to generate accurate and interpretable results for the study.

4. Result and Discussion

4.1. Data Presentation and Analysis

Out of the 366 questionnaires shared, 347 were retrieved.

4.1.1. Decision Rule

The decision in the analysis section was determined by the average of the respondents' responses. Strongly Agreed (5 points), Agreed (4 points), Disagreed (3 points), Strongly Disagreed (2 points) and Undecided (1 point). The average of the responses is: Therefore, a mean score below 3.0 was considered rejected, and a mean score of 3.0 and above was considered accepted.

Research Question 1: What is the effect of digital skills on task efficiency?

Table 1. Respondent responses on the effect of digital skills on task efficiency

S/N	Items	N	Mean	Standard Deviation	Remark
Digital Skills					
1	I am proficient in using digital tools and software required for my job.	347	4.31	0.811	Accepted
2	I can quickly learn and adapt to new digital technologies introduced at the workplace.	347	4.23	0.834	Accepted
3	My digital skills enable me to analyze information and data efficiently.	347	4.08	0.899	Accepted
4	I am skilled in using digital communication tools for collaboration.	347	4.37	0.778	Accepted
5	The company provides adequate training to improve digital skills.	347	2.87	1.189	Rejected
Task Efficiency					
6	My digital skills allow me to complete work assignments more quickly.	347	4.29	0.803	Accepted
7	My digital capabilities enable me to manage a higher workload and multiple tasks effectively.	347	4.14	0.876	Accepted
8	Utilizing digital tools helps reduce errors and improve the accuracy of my work.	347	4.19	0.854	Accepted
9	I spend less time on routine tasks because of my ability to use digital shortcuts.	347	4.21	0.881	Accepted
10	Overall, my proficiency in digital technology significantly enhances my work efficiency.	347	4.33	0.791	Accepted
	Grand Mean	347	4.11	0.872	Accepted

The analysis in the table 1 above provides insights into the effect of digital skills on task efficiency. The result shows a grand mean of 4.11, which is above the 3.0 benchmark, indicating an overall acceptance that digital skills positively affect the task efficiency. Specifically, Item 1 (M=4.31, SD=0.811), Item 2 (M=4.23, SD=0.834), Item 3 (M=4.08, SD=0.899), Item 4 (M=4.37, SD=0.778), Item 6 (M=4.29, SD=0.803), Item 7 (M=4.14, SD=0.876), Item 8 (M=4.19, SD=0.854), Item 9 (M=4.21, SD=0.881), and Item 10 (M=4.33, SD=0.791) were all accepted. However, a significant finding is the rejection of Item 5, which stated that the company provides adequate training to improve digital skills (M=2.87, SD=1.189), as its mean score fell below the 3.0 threshold. This suggests that while employees are digitally proficient and see the benefits, they perceive company-provided training as being inadequate.

Research Question 2: What is the effect of technology adoption on employees' output quality?

Table 2. Respondent responses on the effect of technology adoption on output quality

S/N	Items	N	Mean	Standard Deviation	Remark
Technology Adoption					
11	My company actively invests in and provides access to the latest technology.	347	3.89	0.941	Accepted
12	The management encourages and supports the use of new technological tools.	347	3.97	0.913	Accepted
13	New technologies have been effectively integrated into daily work processes.	347	3.63	1.011	Accepted
14	We receive sufficient training to effectively use newly adopted technologies.	347	2.91	1.201	Rejected
15	The technological resources provided by the company were reliable and well maintained.	347	3.77	0.998	Accepted
Output Quality					
16	Using modern technology in my job helps me produce a higher standard of work.	347	4.18	0.864	Accepted
17	The technologies available to me contribute to reducing errors in my final output.	347	4.22	0.839	Accepted
18	Technology adoption has led to more innovative solutions and ideas.	347	4.09	0.893	Accepted
19	I am better able to meet quality expectations because of the available technology.	347	4.16	0.871	Accepted
20	The overall quality of my work output has improved as a direct result of adopting new technology.	347	4.24	0.827	Accepted
	Grand Mean	347	3.81	0.936	Accepted

The data presented in the Table 2, with a grand mean of 3.81, show a general agreement that technology adoption positively affects the quality of employee output. The majority of the items were accepted, including Item 11 (M=3.89, SD=0.941), Item 12 (M=3.97, SD=0.913), Item 13 (M=3.63, SD=1.011), Item 15 (M=3.77, SD=0.998), Item 16 (M=4.18, SD=0.864), Item 17 (M=4.22, SD=0.839), Item 18 (M=4.09, SD=0.893), Item 19 (M=4.16, SD=0.871), and Item 20 (M=4.24, SD=0.827). Similar to the findings for the first research question, Item 14 regarding the sufficiency of training for new technologies was rejected (M=2.91, SD=1.201), with its mean score falling just below the 3.0 acceptance criterion. This highlights a potential gap between technology provision and user enablement through training programs.

4.1.2 Hypothesis Testing

The hypotheses of this study were tested using linear regression analysis. The results are presented in the tables below:

Hypothesis 1: Digital skills have no significant effect on the task efficiency of employees in Nigeria's mobile telecommunications sector.

Table 3. Regression output for hypothesis 1

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.783a	.613	.612	.49813

a. Predictors: (Constant), digital skills

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	135.839	1	135.839	547.190	.000b
Residual	85.641	345	.248		
Total	221.480	346			

a. Dependent Variable: Task Efficiency

b. Predictors: (Constant), Digital Skills

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
(Constant)	.413	.158		2.614	.009
Digital Skills	.819	.035	.783	23.392	.000

a. Dependent Variable: Task Efficiency

Hypothesis 2: Technology adoption has no significant effect on the output quality of employees in Nigeria's mobile telecommunications sector.

Table 4. Regression output for hypothesis 2

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.674a	.454	.452	.58109

a. Dependent Variable: Output Quality

b. Predictors: (Constant), Technology Adoption

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
(Constant)	.987	.182		5.423	.000
Technology Adoption	.711	.042	.674	16.955	.000

a. Dependent Variable: Output Quality

The regression analysis presented in the table 3 and 4 was conducted to test the study's hypotheses. For the first hypothesis, the results showed that digital skills had a significant and positive effect on task efficiency, with an R-squared value of **.613**, indicating that **61.3%** of the variance in task efficiency could be explained by digital skills ($F(1, 345) = 547.19, p < .001$). The regression coefficient ($\beta = .819, p < .001$) confirmed this strong positive relationship. Therefore, the null hypothesis is rejected in this study. For the second hypothesis, technology adoption also had a significant positive effect on output quality ($R^2 = .454, F(1, 345) = 287.46, p < .001$), explaining 45.4% of the variance in output quality. The regression coefficient ($\beta = .711, p < .001$) further supports this finding. Consequently, the second null hypothesis was also rejected.

4.2. Discussion of Findings

This study established a significant positive relationship between employees' digital skills and their task efficiency. This outcome is likely attributable to the fact that employees proficient in digital tools can navigate complex workflows more rapidly, automate routine duties, and collaborate more effectively, culminating in faster and more accurate completion of responsibilities. This finding strongly supports the Resource-Based View (RBV), which posits that unique internal capabilities, such as advanced digital skills, constitute valuable and rare resources that provide firms with sustainable competitive advantages. By possessing a digitally adept workforce, telecommunication firms essentially develop a critical human capital asset that is difficult for competitors to imitate.

The results of this study are consistent with those of previous empirical studies. For instance, Ochor et al. (2024) revealed that digital media tools significantly enhance employee efficiency in Nigerian telecommunications companies. Likewise, the findings resonate with those of Islam and Hossain (2024), who concluded that digital tools improve overall productivity and streamline process management in the Bangladeshi telecom sector. Furthermore, this conclusion aligns with Martins, Gilson, and Maynard (2022), who observed that mastering and habitual use of digital tools led to an increase in employees' job productivity. The consistency across these studies underscores the universal importance of digital skill development as a direct driver of individual and organizational efficiency. Furthermore, the study confirmed that technology adoption has a significant positive effect on employee output quality. The probable reason for this finding is that the successful integration of modern digital technologies into daily operations minimizes human error, standardizes procedures, and provides access to superior analytical tools, thereby elevating the overall quality and consistency of the work produced.

This aligns perfectly with Adaptive Structuration Theory (AST), which suggests that the benefits of technology are not derived from its mere presence but from how employees actively interact with, adapt, and appropriate these tools into their work practices. When employees effectively integrate technology to suit their tasks, as AST predicts, a direct improvement in the quality of their output is realized. This result is well supported by the existing literature. Ifeoma et al. (2021) also found a significant positive effect of digital technology on operational efficiency and service delivery in Nigerian telecommunication firms. Similarly, Souza and Pereira (2021) observed that digital adoption led to significant enhancements in profitability and return on investment, which are macro-level indicators of high-quality operational outputs. This is further corroborated by Olubiyi et al. (2024), who linked the adoption of digital payment channels to improved net profits, reflecting successful operational outcomes.

4.3. Summary of findings

- The study found that digital skills significantly and positively predicted task efficiency ($R^2 = .613$, $F(1, 345) = 547.19$, $p < .001$), with a strong positive coefficient ($\beta = .819$). This implies that investing in the enhancement of employees' digital capabilities is a direct and impactful strategy for improving operational speed and accuracy.
- Technology adoption also had a significant positive effect on employee output quality ($R^2 = .454$, $F(1, 345) = 287.46$, $p < .001$), as indicated by the positive regression coefficient ($\beta = .711$). This implies that organizational investment in modern, well-integrated technological tools is crucial for elevating work standards and fostering innovation.

5. Conclusions

5.1. Conclusion

This study critically examines Digital Transformation and employee productivity in Nigeria's mobile telecommunications sector by specifically examining the effect of digital skills and task efficiency among employees and investigating the effect of technology adoption on the output quality of employees in Nigeria's mobile telecommunications sector. The findings revealed that digital skills had a significant, strong positive effect on task efficiency, and technology adoption had a significant positive effect on output quality, accounting for 45.4% of the variance in the outcome variable. While the positive relationships are strong, this study simultaneously highlights a critical gap regarding the perceived inadequacy of corporate training programs. This suggests that the full potential of digital transformation is currently constrained not by a lack of technology but by insufficient investment in human capital development to support it.

5.2. Research Limitations

The use of an online survey could cause respondent bias, inaccurate answers due to misunderstanding, the lack of an interviewer to clarify questions or gauge non-verbal cues, and a limitation to closed-ended questions that can restrict the depth of data.

5.3. Suggestions and Directions for Future Research

Based on the findings, it is recommended that the management of mobile telecommunications firms design and implement continuous, targeted training programs that focus on both foundational and advanced digital skills. This will help bridge the identified skill gap and enable employees to fully leverage the technologies provided, thereby maximizing their efficiency and output quality. For future research, a qualitative or mixed-methods approach could be employed to explore the underlying reasons for the perceived inadequacy of training programs within telecommunications firms. Additionally, further studies should investigate the potential negative impacts of digital transformation on employees, such as increased job stress and information overload, to provide a more balanced understanding of its effects on the workforce.

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