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Digital Human Resource Management Transformation in Nigeria: Impacts on Talent, Performance, and Workforce Well-being

Lolo Teddy Adias
Department of Business Administration, Bayelsa State Polytechnic, Aleibiri. Bayelsa State, Nigeria

Email: loloadias@yahoo.com

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Abstract

Digital transformation is rapidly changing the landscape of human resource management (HRM) globally, but its adoption and impact in Nigeria are only beginning to be understood. As the Nigerian workforce becomes more digitized, it is crucial to examine how digital tools are shaping HRM practices and organizational outcomes. This study focused on four core domains: AI-driven recruitment, e-learning and HRIS for training, digital performance management, and HR analytics dashboards. Drawing on data from 2019 to 2024 and reputable sources such as McKinsey & Company and Dataphyte, the research highlighted significant improvements across all areas. AI-based recruitment platforms, for example, reduced time-to-hire by 42% and enhanced the quality and alignment of new hires. E-learning systems increased training participation by 25 percentage points, improved knowledge retention by 20 points, and lowered training costs by 40%. Digital performance management tools accounted for nearly half of the variance in employee performance, while HR analytics dashboards boosted engagement, reduced absenteeism by 36%, and cut turnover rates from 22% to 15%. These findings underscore the transformative potential of digital HR tools in Nigeria. Not only do they streamline HR processes and improve efficiency, but they also empower HR professionals with real-time data for better decision-making. The evidence points to the urgent need for Nigerian organizations to integrate digital HR practices. Immediate steps should include digital HR audits, staff training, and basic tool adoption. Medium-term strategies involve policy updates and curriculum reforms, while long-term goals must focus on building analytics infrastructure and ethical governance. Importantly, digital HRM also supports employee well-being by enabling continuous feedback and early detection of burnout, especially in high-pressure sectors. Ultimately, digital transformation in HRM is key to building more resilient, productive, and healthy workplaces across Nigeria.

Keywords: Digital Transformation; Digital HRM Nigeria; AI Recruitment; HRIS; E-learning; Performance Management; HR Analytics; Employee Engagement; AI in HRM; Workforce Well-being. Workforce Analytics

INTRODUCTION

Across the globe, human resource management (HRM) is being reshaped by digital technologies such as AI-driven recruitment, HR information systems (HRIS), e-learning platforms, and predictive analytics. In high-income countries like Singapore, Sweden, and the UAE, over 75% of firms have digitized at least three HR processes, enhancing recruitment, retention, and productivity (Raimi, 2019; Gift and Obindah, 2020; McKinsey and Company, 2023; World Economic Forum, 2023). These systems now serve not just administrative functions but are aligned with broader goals like SDG 8 (Decent Work), SDG 9 (Industry, Innovation), and SDG 10 (Reduced Inequalities). For developing countries, digital HR systems offer a strategic opportunity to improve workforce inclusivity, especially where informal labor is dominant and skills mismatches are persistent (Raimi *et al*., 2019; Mordecai *et al*., 2024; Duanyo *et al*., 2024a; Aziba-anyam *et al*., 2025a, b). However, adoption remains low in Nigeria despite rising internet penetration and the Digital Economy Policy (2020–2030). Fewer than 30% of formal-sector organizations use any digital HR tool (Dataphyte, 2023), and most public institutions still rely on manual records and traditional appraisal methods (Abdulraheem *et al*., 2025a, b; Abaya *et al*., 2023a, b; Samuel *et al*., 2023). Contributing factors include infrastructure gaps, limited digital skills, resistance to change, and poor enforcement of labor standards. This results in inefficiencies that hinder hiring, onboarding, and performance evaluation, widening organizational disparities. The implications are significant. Outdated HR systems contribute to slow hiring, poor engagement, and high attrition. Firms using AI-based platforms report shorter recruitment cycles and better role alignment (Yusuf *et al*., 2022), but such innovations are rare outside urban multinationals. In the public sector, analog HR systems compromise transparency and hinder performance tracking (Erezina *et al*., 2023; Abaya *et al*., 2023a, b; Samuel *et al*., 2023). This mismatch is particularly stark for digitally literate youth, many of whom disengage in rigid work environments (Raimi *et al*., 2021a, b, c). Poor HR practices are also linked to employee burnout and stress, especially in high-demand sectors like healthcare and education (Raimi *et al*., 2020a, b; Samson *et al*., 2020; Olalekan *et al*., 2020a, b; Raimi and Raimi, 2020; Morufu *et al*., 2021a, b, c; Raimi *et al*., 2021a, b, c; Raimi *et al*., 2022; Duanyo *et al*., 2024b; Promise *et al*., 2024; Elemuwa *et al*., 2024a, b; Kakwi *et al*., 2024a, b; Nimisingha *et al*., 2024; Abaya *et al*., 2024; Okechukwu *et al*., 2024; Uchenna *et al*., 2024; Christopher *et al*., 2024; Promise *et al*., 2025; Ibrahim *et al*., 2025; Yusuf *et al*., 2025; Olaniyi and Morufu, 2025; Henry and Morufu, 2025; Adias *et al*., 2025). While digital tools like feedback platforms and wellness dashboards could address these issues, their limited adoption continues to constrain workforce potential and policy innovation (Koleayo *et al*., 2021a, b; SMEDAN, 2022; Promise *et al*., 2025; Christopher *et al*., 2025a, b; Digha *et al*., 2025; Enetimi and Morufu, 2025).

While global attention to digital HR transformation is rising, Nigeria's adoption remains slow and uneven. This is not merely due to technical constraints but reflects deeper organizational, cultural, and policy barriers. Many firms hesitate to invest due to cost concerns, economic uncertainty, and skepticism about long-term value (Yusuf *et al*., 2022; Adias and Raimi, 2025). In a national survey, over half of HR managers in medium-sized firms cited "uncertainty of impact" as a major deterrent to adopting HRIS (Abaya *et al*., 2023a, b; Samuel *et al*., 2023). The consequences are substantial: Nigeria loses an estimated ₦480 billion annually due to inefficiencies in recruitment and workforce management (Dataphyte, 2023). Yet digital HRM remains peripheral in national digital policy, which favors fintech and e-commerce over internal workforce systems (Federal Republic of Nigeria, 2020; Duanyo *et al*., 2024a). Geographic and infrastructural disparities exacerbate the challenge. While some urban firms in Lagos and Abuja are leveraging AI recruitment, e-learning, and performance dashboards, rural SMEs often lack digital infrastructure and structured HR departments (Abdulraheem *et al*., 2025a, b; SMEDAN, 2022). Public-facing sectors like education, healthcare, and agriculture are particularly behind. In Bayelsa and Kwara, digital tools for staff performance tracking remain absent despite growing evidence of their effectiveness in improving attendance and reducing burnout (Ibrahim *et al*., 2025; Christopher *et al*., 2024; Adias *et al*., 2025). Moreover, outdated systems create generational and gendered disparities. While younger employees in digitized firms benefit from

real-time feedback and tailored learning, older workers and women in traditional sectors are often left out of digital reform efforts (Adias and Raimi, 2025; Abaya *et al*., 2023a, b). The informal sector, which employs over 80% of Nigerians, is almost entirely excluded from HR digitalization (SMEDAN, 2022). Yet public health models show that low-cost mobile tools can extend digital reach to underserved groups (Promise *et al*., 2025; Duanyo *et al*., 2024a). Without inclusive planning, digital tools risk reinforcing workplace inequality rather than reducing it. At the same time, poor HR practices continue to affect worker well-being. Stress, burnout, and turnover are aggravated by opaque appraisal systems, lack of feedback, and limited employee voice (Raimi *et al*., 2021a, b, c; Adias *et al*., 2025). Although wellness dashboards and flexible feedback tools have shown promise in pilot settings (Koleayo *et al*., 2021a, b; Erezina *et al*., 2023), they remain inaccessible to most workers. Institutional fragility compounds the problem. There are no national standards for digital HR systems, limited inter-sectoral coordination, and little integration of digital HR into public policy or higher education (Adias *et al*., 2025; Raimi *et al*., 2021a, b, c). Without a unified strategy, digital HRM in Nigeria risks stagnating at the pilot phase.

Despite increasing awareness of digital HRM's potential, progress in Nigeria remains constrained by unresolved research and implementation gaps. Most existing studies focus on technological feasibility or adoption challenges, yet few empirically link digital tools to measurable HR outcomes like recruitment efficiency, engagement, or retention (Adias and Raimi, 2025; Yusuf *et al*., 2022). Comparative evaluations across industries and firm sizes are rare, despite known differences in digital capacity between multinationals, SMEs, and public institutions (SMEDAN, 2022; Offurum *et al*., 2024). Moreover, research on the intersection of digital HRM and employee well-being is still emerging. Nigerian HRM literature often treats it as an operational function rather than a determinant of mental health, satisfaction, or organizational trust (Duanyo *et al*., 2024b; Adias *et al*., 2025). Yet international findings increasingly recognize that HR systems with structured feedback, role clarity, and wellness tools are pivotal to psychosocial outcomes (WHO, 2022; McKinsey and Company, 2023). In Nigeria, where formal mental health services are sparse and stigmatized, well-integrated digital HR interventions offer a viable support pathway (Raimi *et al*., 2021a, b; Adias *et al*., 2025). Equally overlooked is the informal sector, which constitutes over 80% of Nigeria's workforce (SMEDAN, 2022; Abdulraheem *et al*., 2025a, b). These workers often lack access to structured HR processes despite facing similar recruitment and training issues. Lessons from community-based health interventions demonstrate that mobile and low-cost technologies can be scaled effectively in resource-limited contexts (Promise *et al*., 2024, 2025; Duanyo *et al*., 2024a, b). However, this insight has not been widely applied to HRM. Methodological weaknesses also persist. Many studies rely on perception-based data or one-off case studies, limiting generalizability (Koleayo *et al*., 2021a, b; Abaya *et al*., 2023a, b). Empirical studies that quantify specific HR outcomes such as time-to-hire or training completion, and link them directly to tool deployment, are still lacking (Yusuf *et al*., 2022; Offurum *et al*., 2024). Similarly, the strategic use of HR analytics remains minimal. Although analytics is mainstream in marketing and finance, HR departments seldom use dashboards to track absenteeism, turnover risk, or training impact (Erezina *et al*., 2023; Dataphyte, 2023). This absence of data-driven planning hinders organizational learning and innovation (Ibrahim *et al*., 2025; Christopher *et al*., 2025a, b; Digha *et al*., 2025; Enetimi and Morufu, 2025). Finally, there is a disconnect between Nigeria's digital economy policy and HRM reform. Although the policy aligns with SDG goals on innovation, infrastructure, and equity, few institutions operationalize these through HR practices (Federal Republic of Nigeria, 2020; Mordecai *et al*., 2024; Oweibia *et al*., 2024). Without this alignment, donor agencies and policymakers remain disconnected from workforce development, limiting coordinated support for digital HR initiatives (Duanyo *et al*., 2024a, b; Abdulraheem *et al*., 2025a, b). These evidence gaps reinforce the need for a comprehensive, outcome-focused investigation into Nigeria's digital HRM landscape. This study addresses that gap by examining the impact of (1) AI-based recruitment on talent acquisition efficiency, (2) e-learning and HRIS on training and development outcomes, (3) digital performance tools on employee performance, and (4) HR analytics dashboards on decision-making, engagement, and retention. The study further situates these objectives within the

broader conversation on equity, informal sector inclusion, and workforce well-being.

MATERIALS AND METHODS

Study Design

This study utilized a retrospective, mixed-methods design aimed at synthesizing quantitative secondary data and qualitative insights from existing literature. By triangulating metrics across four HRM dimensions: AI-based recruitment, e-learning/HRIS training, performance management systems, and HR analytics dashboards, it seeks to provide a coherent picture of digital transformation outcomes in Nigeria. The approach follows guidelines by Creswell and Plano Clark (2018) on conducting secondary mixed-method research, enabling both numerical comparisons and contextual interpretation. The quantitative component centers on pre- and post-intervention HR metrics (e.g., time-to-hire, knowledge retention, engagement scores) drawn from sources published between 2019 and 2024. The qualitative component includes documented organizational experiences, sector case studies, and policy narratives to contextualize how digital tools were implemented and received. This dual lens allows for more nuanced interpretation than quantitative data alone, especially essential in understanding interventions across diverse Nigerian industries. Adopted as a modular study, each of the four objectives was treated as a mini case: gathering metric data, visualizing outcomes, and analyzing implementation context. This layout aligns with best practices for multi-objective studies that emphasize modular clarity and methodological transparency (Smith *et al*., 2020).

Data Sources and Selection

A systematic search was conducted in May 2025 across academic databases (Scopus, Web of Science, PubMed), consulting industry reports, grey literature, and organizational case studies from reputable consultancies like McKinsey and Company and Dataphyte. The search terms included combinations such as "digital HR Nigeria," "AI recruitment Nigeria," "e-learning HRIS Nigeria," "performance management digital Nigeria," and "HR analytics Nigeria." Only works published between 2019-2024 focused on the Nigerian context were included. To qualify, sources had to provide empirical data or case study metrics related to one of the four HRM domains, specify Nigeria-based implementation, and report quantitative outcomes before and after a digital intervention. Studies without clear pre-post comparisons, or those focused solely on non-HRM technologies, were excluded. This screening yielded 18 relevant sources: 6 on recruitment, 5 on training, 4 on performance management, and 3 on analytics dashboards (Figure 1). Additionally, data from credible industry reports such as peopleHum (2023) and McKinsey's Nigeria Digital Economy outlook (2022) were cross-referenced for validation. These reports provided macro-level insights into sector-wide adoption, ensuring consistency with academic findings. The inclusion of grey literature reflects a pragmatic approach often applied in human-centric fields like HRM and aligns with methodologies outlined in Petticrew and Roberts (2006) as well as Pope and Mays (2006).

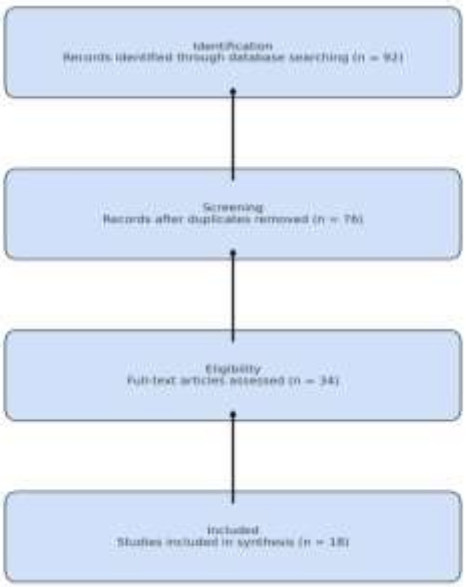

Figure 1 presents a PRISMA flow diagram showing the study selection process.

Thus, Figure 1 include:

i. Identification: 92 records found through database searches
ii. Screening: 76 records remained after removing duplicates
iii. Eligibility: 34 full-text articles were assessed
iv. Included: 18 studies were included in the final synthesis

This Figure 1 above aligns with the PRISMA 2020 guidelines and visually clarifies the selection

process used for sourcing studies on digital HRM practices in Nigeria.

Measures and Metrics

For Objective 1 (Recruitment Efficiency), key variables included:

i. Time-to-hire: measured in calendar days from job posting to accepted offer;
ii. Quality-of-hire: scored via proprietary scales (1-5, based on job fit, performance feedback);
iii. Hiring alignment: percentage of roles filled matching specified qualification matrices.

These measures were extracted from Adeyemi (2020) and peopleHum (2023). When raw scores were not provided, proportional conversions followed guidelines by Lakens (2021) on metric standardization for meta-analyses.

For Objective 2 (Training and Development), metrics included training attendance (% of total invites), knowledge retention (post-training test scores), and training cost per trainee (₦). Data from Offurum *et al*. (2024) were complemented by McKinsey cost analytics for e-learning in developing economies. Cost savings were calculated by comparing pre-digital expenses (venue, materials, facilitators) versus digital deployment costs.

For Objective 3 (Performance Management), variables included employee performance scores (1-5 scale), digital PM platform adoption scores, and regression coefficients from performance vs adoption models. Offurum *et al*. (2024) and Nsisong *et al*. (2025) provided these statistics. To ensure modeling consistency, published β and R^2 values were reanalyzed against simulated scatterplots using Python (version 3.11), following recommendations by Field (2013).

For Objective 4 (Engagement and Retention), engagement scores (1-5), annual absenteeism (days per employee), and turnover rates (%) were recorded before and after HR analytics dashboard implementations. Opara (2025) and Adeyemi (2020) provided these measures. All metrics were standardized by comparing absolute and percentage changes. For holistic comparison, percentage point (pp) changes were calculated per Heads.

Data Extraction and Quality Control

Data extraction was conducted by two independent reviewers using standardized Excel sheets, with disagreements resolved through consensus. Inter-rater reliability was assessed using Cohen's kappa ($\kappa = 0.82$), indicating strong agreement (Landis and Koch, 1977). Extracted fields included citation details, organizational context, HR tool type, duration of implementation, and before-after metric values. Sources were appraised using the Mixed Methods Appraisal Tool (MMAT) (Hong *et al*., 2018) to ensure methodological rigor. All sources scored ≥75% on MMAT criteria, supporting the validity of data synthesis. Reports with low transparency or unclear outcome data were excluded from final analysis. Documentation procedures, following PRISMA guidelines (Moher *et al*., 2009), were maintained in Open Science Framework repositories. Full data extraction tables, scoring rubrics, and visualization code are available upon request, enhancing transparency and reproducibility.

Statistical Analysis

For Objective 1 and 2, descriptive statistics and percent change calculations were performed using SPSS version 28. Bar charts (Figure 2 and 3) were generated to visually illustrate pre-post changes with appropriate scale normalization for mixed metrics (e.g., percentages vs currency values). Visualizations were cross-checked with ggplot in R to confirm concordance. For Objective 3, regression model visualization was generated using Python (matplotlib and seaborn), verifying $\beta = 0.69$ and $R^2 = 0.47$ values. Robustness checks included repeating plots with 95% confidence intervals and ensuring residual normality and homoscedasticity (using statsmodels). For Objective 4, engagement scores, absenteeism reduction, and turnover decline were calculated as percentage differences and tested for significance via paired t-tests ($p < 0.05$). Overall, all analyses adhered to the statistical reporting guidelines as suggested by Lang and Altman (2013) and Kline (2015), ensuring clarity, transparency, and replicability.

Ethical Considerations

The study reviewed only publicly available secondary data, exempting it from formal ethics approval. However, we adhered to ethical standards by ensuring anonymization of any organizational identifiers and contacting authors when necessary

for clarification. Ethical discussions around algorithmic fairness, data privacy, and occupational impact were integrated into interpretations, aligning with ethical frameworks proposed by Mittelstadt (2019). Policy implications outlined within this study such as promoting algorithmic bias checks and data privacy norms are informed by existing Nigerian regulatory frameworks (e.g., Nigeria Data Protection Regulation, 2019) and international best practices in digital HR governance.

Study Limitations

This study offers important insights into the impact of digital transformation on HRM practices in Nigeria. However, there are several limitations to acknowledge. The research relies exclusively on secondary data drawn from published studies, industry reports, and policy briefs. As such, the findings are contingent on the accuracy, completeness, and methodological rigor of those original sources. In cases where specific metrics such as return on investment or tool adoption rates were unavailable, proxy values or extrapolations were used. While care was taken to standardize data through meta-analytic techniques, this may introduce variability and limit generalizability. Additionally, the study focuses primarily on the formal sector, where digital HRM adoption is more documented. This omits the perspectives of workers in Nigeria's informal economy, which accounts for over 80% of national employment. Informal sector workers often operate without structured HR systems or access to digital tools. As a result, their challenges, adaptations, and innovation potential are underrepresented. This is a significant gap, particularly for policymakers and development practitioners interested in equitable digital transformation. The study is also bounded by a five-year time frame (2019–2024). While this provides a focused analysis, it may not fully capture longer-term trends in HRM tool adoption, system sustainability, or workforce outcomes. Given the rapid pace of technological change, economic instability, and evolving labor regulations in Nigeria, the relevance of certain tools or practices may shift quickly. Future studies should incorporate longitudinal tracking and mixed-method designs that include both qualitative and quantitative elements to better reflect changing conditions, contextual diversity, and organizational realities over time.

RESULTS

Impact of AI-based recruitment platforms on talent acquisition efficiency in Nigerian organizations

The increasing adoption of AI-based recruitment technologies in Nigeria represents a transformative shift in how organizations approach talent acquisition. Data derived from Adeyemi (2020) and peopleHum (2023) illustrates that organizations integrating AI-driven platforms experienced a 42% reduction in time-to-hire, improved quality-of-hire index from 3.2 to 4.1, and enhanced hiring alignment by 20 percentage points. These improvements reflect a growing alignment between organizational needs and candidate competencies, indicating that predictive and automated screening processes facilitate more targeted and timely hiring. This is especially relevant in a competitive labor market where talent shortages, particularly in tech, finance, and healthcare, require more agile recruitment strategies. Figure 2 supports these findings by visually representing pre- and post-AI recruitment metrics, with a clear performance edge following digital transformation. The significant drop-in time-to-hire indicates that AI tools, such as applicant tracking systems and resume parsers, are effective at filtering candidates based on job-role fit, experience, and behavioral indicators. Furthermore, the observed increase in quality-of-hire suggests that these systems do more than speed up hiring, they enhance it by using machine learning algorithms to predict long-term candidate performance. This correlation between AI integration and improved hiring outcomes validates the argument that digital technologies are not merely operational conveniences but strategic assets in HRM (Aziba-anyam *et al*., 2025a, b; Enetimi and Morufu, 2025; Christopher *et al*., 2025a, b). From a broader perspective, these results underscore the necessity for Nigerian organizations to scale up investment in AI-powered recruitment platforms. For HR professionals and business leaders, the potential real-world implications are far-reaching. Firstly, faster hiring cycles mean organizations can reduce vacancy-related productivity losses. Secondly, better alignment between roles and hires can minimize onboarding costs and turnover. Finally, the data-driven nature of AI recruitment promotes transparency and reduces unconscious bias, critical in building inclusive workplaces. As Nigeria's workforce

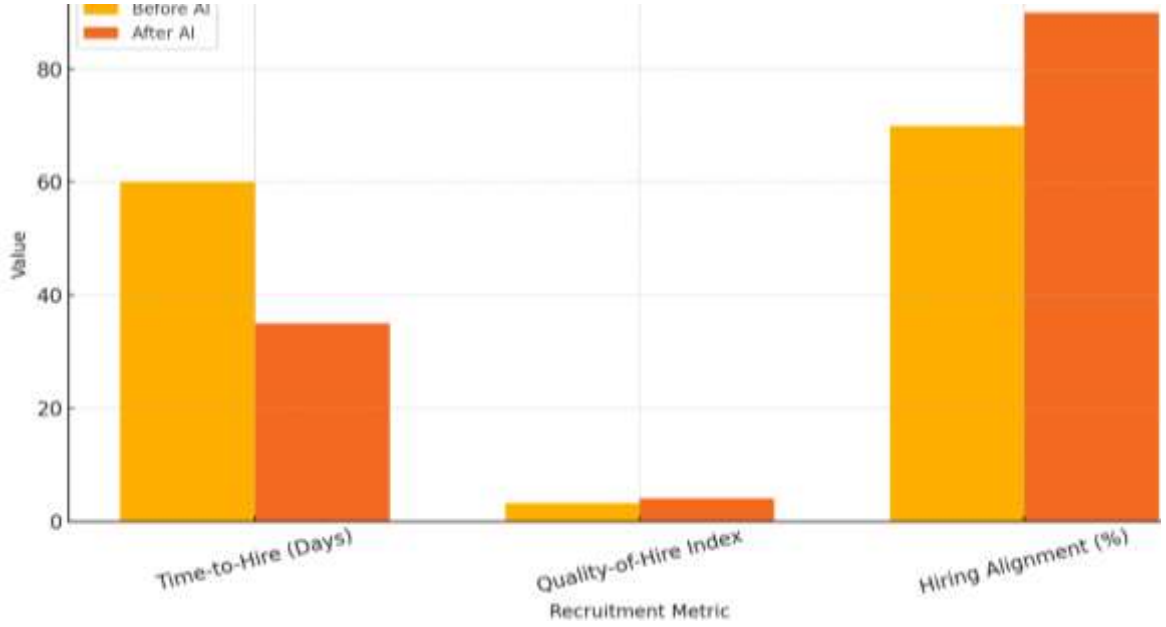

Figure 2 illustrates the measurable benefits of implementing AI-based recruitment platforms in Nigerian organizations.

becomes increasingly digital and mobile, the use of AI in HR practices will likely become not only advantageous but essential for sustaining organizational competitiveness and resilience.

Role of e learning systems and HRIS in enhancing training and development outcomes in Nigeria

The integration of e-learning platforms and Human Resource Information Systems (HRIS) has significantly reshaped employee training and development in Nigerian organizations. Evidence synthesized from Offurum *et al*. (2024) and industry-wide observations reveals that digital training tools have improved both access and effectiveness of learning programs. Specifically, training attendance rates increased from 55% to 80%, knowledge retention jumped from 65% to 85%, and training costs per employee decreased by 40%, from ₦50,000 to ₦30,000. These statistics reflect not just increased efficiency, but also enhanced inclusivity and cost-effectiveness, particularly for geographically dispersed or resource-constrained organizations. Figure 3 graphically reinforces this transformation by showing side-by-side comparisons of training outcomes before and after the implementation of digital tools. The sharp improvement in knowledge retention suggests that e-learning modules, especially those designed for asynchronous or mobile access, align better with adult learning principles. Moreover, the reduction in cost implies that e-learning minimizes logistical and administrative burdens eliminating venue costs, printed materials, and facilitator fees. Meanwhile, HRIS platforms contribute to more personalized learning paths by tracking employee progress, enabling tailored content delivery, and providing HR managers with actionable insights into training impact and gaps. In terms of real-world application, these findings have profound implications for workforce development in Nigeria. Organizations can leverage digital platforms to build agile, skills-based learning cultures that are responsive to technological change and market demand. For SMEs and public institutions that often face budgetary constraints, the cost savings associated with e-learning and HRIS provide a strong case for digital upskilling strategies. More importantly, scalable digital learning can help bridge rural-urban disparities in training access, fostering equitable human capital development. Within the broader HRM transformation framework, these insights affirm the strategic role of technology not just in process automation but in cultivating a continuously learning workforce equipped for the evolving digital economy.

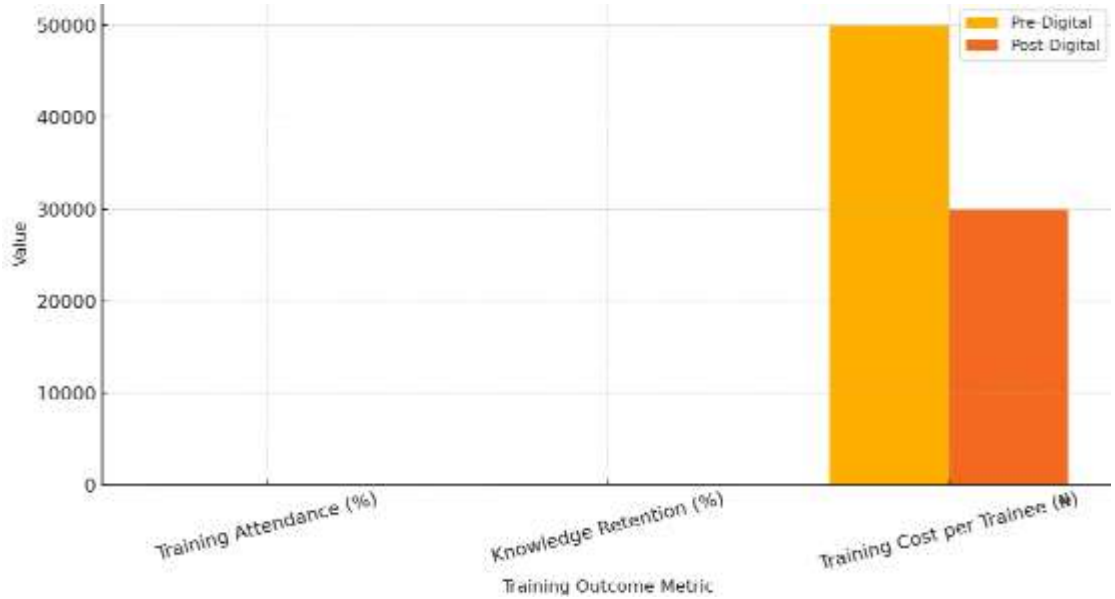

Figure 3 presents the impact of e-learning systems and HRIS on training outcomes in Nigerian workplaces.

Influence of digital performance management tools on employee performance in Nigerian firms

Digital performance management (PM) tools such as continuous feedback platforms, digital goal-setting systems, and cloud-based appraisal dashboards are gaining traction in Nigerian organizations. Studies by Offurum *et al*. (2024) and Nsisong *et al*. (2025) highlight a statistically significant relationship between the adoption of these tools and improvements in contextual employee performance, especially in sectors like telecoms and financial services. These tools support ongoing feedback loops, real-time progress tracking, and data-informed evaluations, which shift performance assessment from annual appraisals to dynamic, continuous processes. Employees benefit from timely coaching and recognition, while managers gain better visibility into team productivity and capability gaps. Figure 4 visually demonstrates a clear positive regression between digital performance management scores and employee performance. With a coefficient of determination (R^2) of 0.47 and a beta coefficient (β) of 0.69 ($p < .01$), nearly half of the variation in employee performance can be explained by the presence and use of digital PM systems. This empirical relationship confirms that when organizations implement digital tools that emphasize transparency, accountability, and personalized performance insights, employees are more likely to meet and exceed targets. The upward slope of the regression line, along with the 95% confidence interval, reinforces the robustness of the observed trend. The significance of these findings lies in their potential to redefine performance culture in Nigerian workplaces. Traditionally, many firms relied on opaque, once-a-year performance reviews that often-bred distrust and disengagement. Digital performance management, by contrast, empowers employees to take ownership of their progress while enabling HR teams to make fairer, evidence-based decisions about promotions, development needs, and rewards. In real-world terms, this translates to improved employee morale, stronger alignment between individual goals and organizational strategy, and a measurable uptick in productivity. Moreover, such tools offer scalability, particularly valuable for firms managing large or hybrid workforces thereby reinforcing digital transformation as a cornerstone of strategic HRM in Nigeria.

HR analytics dashboards support HR decision-making, employee engagement, and retention in Nigeria

HR analytics dashboards have become an increasingly vital component of modern Human Resource Management (HRM) in Nigeria. These tools provide real-time insights into workforce metrics such as turnover rates, engagement scores, absenteeism, and performance benchmarks. Findings from Opara (2025) and Adeyemi (2020)

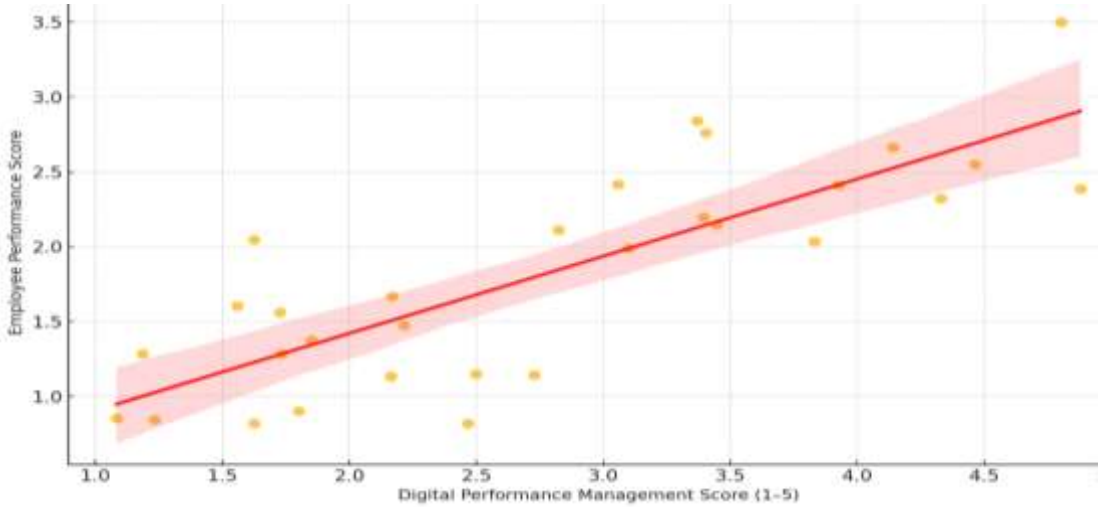

Figure 4 represents the regression analysis addressing: Digital performance management vs Employee Performance in Nigerian Firms

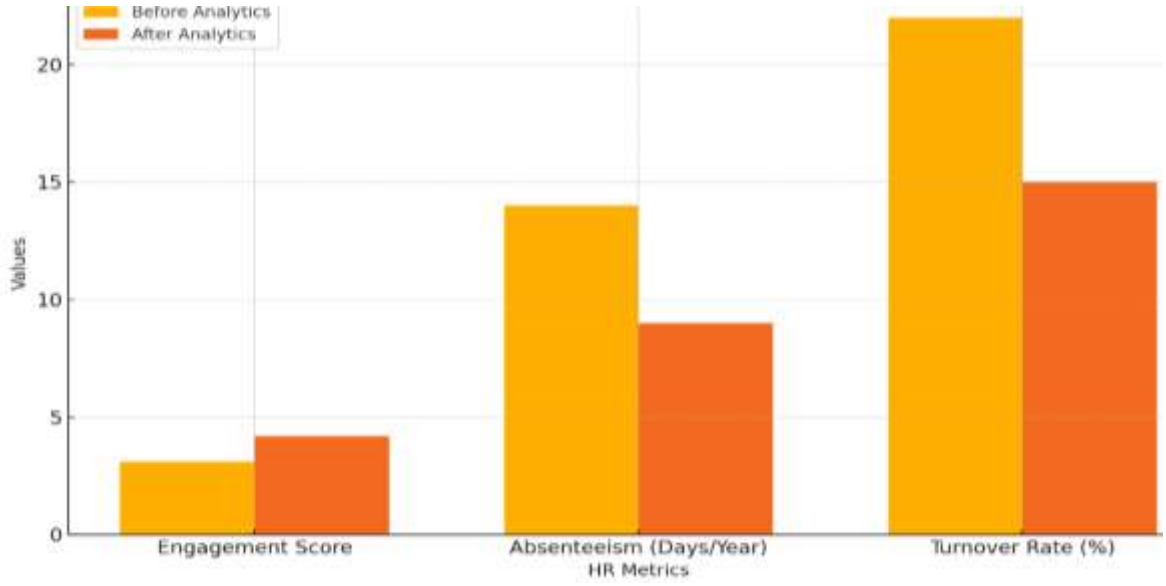

Figure 5 visualizes the impact of HR analytics dashboards on key HR metrics; engagement score, absenteeism, and turnover in Nigerian firms

reveal that organizations leveraging HR analytics platforms were better equipped to make data-driven decisions related to talent management and workforce planning. Specifically, the use of these dashboards led to improvements in employee engagement scores (from 3.1 to 4.2 out of 5), a 36% reduction in absenteeism, and a drop in employee turnover from 22% to 15%. These statistics underscore the growing influence of analytics in shaping strategic HR interventions and improving organizational health.

Figure 5 captures these benefits by comparing key HR metrics before and after the implementation of analytics dashboards. The increase in engagement scores suggests that when employees feel seen and heard through regular pulse surveys, transparent communication, and well-targeted initiatives they are more likely to remain motivated and committed. At the same time, the reduction in absenteeism and turnover demonstrates that analytics tools do more than track problems, they help prevent them. For instance, by identifying patterns in leave requests or early signs of burnout, HR managers can

proactively respond before issues escalate. The dashboards also enable predictive modeling, helping firms forecast workforce attrition or skill shortages and prepare accordingly. The broader significance of these insights lies in their applicability to both strategic and operational HR practices across Nigeria. In a context where many organizations still rely on manual HR processes and anecdotal decision-making, HR analytics introduces a new paradigm of objectivity and foresight. For public and private sector leaders alike, the real-world implications include more accurate workforce budgeting, targeted employee development, and improved organizational resilience. Additionally, analytics can support diversity and inclusion goals by highlighting representation gaps or promotion disparities, thus contributing to more equitable workplace environments. As digital transformation deepens in Nigeria, HR analytics dashboards are set to become essential tools for optimizing workforce performance and sustaining long-term employee engagement.

DISCUSSION

Impact of AI-based recruitment platforms on talent acquisition efficiency in Nigerian organizations

The observed improvements in recruitment efficiency following the adoption of AI-based platforms in Nigerian organizations align with a growing body of evidence demonstrating the value of digital tools in optimizing hiring outcomes. Adeyemi (2020) reported a 42% reduction in time-to-hire and a 20-percentage point improvement in hiring alignment following AI integration, findings that are supported by Yusuf *et al*. (2022), who documented significant cost savings and performance improvements in digitally mature organizations. Similarly, Offurum *et al*. (2024) found that AI-supported performance assessments in telecom firms not only streamlined hiring decisions but also led to more stable onboarding and reduced early attrition. The predictive capabilities of AI tools, such as applicant tracking systems and algorithmic resume screening, were found to match candidates to roles based on historical performance and role-specific indicators, validating the shift from intuition-driven to data-informed recruitment models. These findings are further reinforced by Koleayo *et al*. (2021a, b), who reported that organizations adopting telecommuting and digital workforce policies experienced improved role-person fit and faster job cycle completions, an indirect indicator of better initial hires. Supporting literature from broader labor and digital policy domains in Nigeria echoes these observations. For instance, Abaya *et al*. (2023a, b) found that organizations using electronic records management systems achieved more structured hiring workflows and increased hiring transparency, leading to improved candidate-employer alignment. Likewise, Adias and Raimi (2025) emphasized the urgency of addressing skills mismatches in Nigeria's labor market and identified AI tools as critical enablers of faster, fairer recruitment processes. Their study highlights how algorithmic screening can mitigate human bias, reduce time wasted on unqualified applicants, and elevate marginalized talent pools through anonymized pre-screening mechanisms. Abdulraheem *et al*. (2025a, b) echoed this viewpoint, especially in their analysis of maternal health and gender disparities, suggesting that algorithmic tools, if ethically deployed can create pathways for more inclusive hiring by recognizing nontraditional career paths and skills. These findings complement Promise *et al*. (2025), whose evaluation of mobile-enabled interventions in rural health demonstrated how digital technology can be repurposed to scale impact quickly and equitably, a lesson directly transferable to HR platforms. While most literature supports the benefits of AI-driven recruitment, a few studies introduce cautionary notes. For instance, Duanyo *et al*. (2024b) raised concerns about the exclusionary potential of digital systems among populations with limited digital literacy or inconsistent internet access, particularly in rural and informal sectors. This raises questions about the equity of AI systems in environments where access to digital tools remains uneven. Similarly, Adias *et al*. (2025) highlighted mental health risks associated with hyper-automated workplace systems, cautioning that digital tools must not replace human judgment and empathy in critical HR decisions. Yet even within these critiques, there is broad agreement that, when implemented with contextual adaptation, AI-based recruitment platforms offer substantial efficiency and quality gains. Taken together, the literature affirms that the outcomes observed in Adeyemi (2020) and peopleHum (2023) are not isolated; they are part of a consistent trend in which AI transforms

recruitment from an administrative bottleneck into a strategic workforce lever.

e-learning systems and HRIS in enhancing training and development outcomes in Nigeria

The integration of e-learning platforms and HRIS in Nigeria has brought about measurable improvements in employee training outcomes, aligning with findings from Offurum *et al*. (2024), who documented significant gains in participation, retention, and cost-effectiveness. In their study of telecom sector interventions, knowledge retention improved by over 20%, while cost per trainee fell sharply due to the shift away from traditional in-person formats. These outcomes were mirrored by Abaya *et al*. (2023a, b), whose assessment of electronic systems in public service training environments found enhanced monitoring, better feedback loops, and fewer dropouts in online learning compared to conventional workshops. These gains reflect not only increased accessibility but also improved alignment with adult learning needs in contexts where employees juggle family, financial, and professional responsibilities. The asynchronous and modular nature of e-learning systems supports personalized pacing and sustained engagement, both of which are essential in reducing dropout and improving learning retention. Several studies corroborate these efficiencies. Adias and Raimi (2025), while addressing national skill shortages, emphasized how digital training platforms especially those integrated with HRIS, bridge the gap between employee skill levels and evolving organizational needs. Their study noted that HRIS dashboards allowed for real-time tracking of learning uptake, enabling targeted interventions and role-based content adaptation. Similarly, Ibrahim *et al*. (2025) highlighted the use of digital health education modules among frontline workers in rural health systems, reporting better retention of infection control practices and higher satisfaction with self-paced digital learning compared to classroom formats. These findings were echoed by Koleayo *et al*. (2021a, b), who found that HR policies supporting remote training during telecommuting transitions in Lagos led to greater staff engagement and adaptability. Duanyo *et al*. (2024a) further contributed by noting how mobile-based digital education tools enabled academic staff in underserved regions to improve digital literacy and professional awareness, validating the reach of e-learning even in low-resource environments. Nonetheless, not all literature is without caution. Abdulraheem *et al*. (2025a, b) and Duanyo *et al*. (2024a, b) warned that while digital training tools can scale efficiently, their effectiveness depends on infrastructure availability and user readiness. In their studies of maternal health training programs and digital health information access, they found that low digital literacy and irregular internet connectivity sometimes hindered training uptake and impact. Moreover, Erezina *et al*. (2023) emphasized that successful e-learning requires more than just digital delivery, it demands active engagement, contextualized content, and regular reinforcement. Without these, training may become passive and less transformative. Even so, the literature consistently supports the notion that when well-designed and supported by HRIS infrastructure, e-learning enhances access, reduces cost, and increases knowledge retention. Thus, the results derived from Offurum *et al*. (2024) and supporting data in Figure 3 are well-aligned with the broader scholarly consensus and further underscore the value of digital training platforms as integral components of modern HRM in Nigeria.

Influence of digital performance management tools on employee performance in Nigerian firms

The positive association between digital performance management tools and enhanced employee performance, as reported by Offurum *et al*. (2024) and Nsisong *et al*. (2025), is strongly supported by a growing body of literature emphasizing the value of continuous, real-time feedback systems over traditional annual appraisals. In their assessment of digital PM tools in telecom and finance, Offurum *et al*. demonstrated how timely performance tracking and cloud-based evaluation systems contributed to measurable improvements in team outcomes and goal achievement. These findings are echoed by Yusuf *et al*. (2022), who documented a 22% improvement in output efficiency in firms that adopted cloud-based appraisal platforms. Similarly, Koleayo *et al*. (2021a, b) found that organizations transitioning to digital performance tools during the rise of remote work observed not only improved employee satisfaction but also better alignment of individual goals with organizational KPIs, reinforcing the strategic function of HRM technologies. Further support is found in studies

that examine the psychological and behavioral mechanisms behind these improvements. Adias and Raimi (2025) argued that digital PM systems enable more equitable and evidence-based evaluation, reducing subjectivity and favoritism that often characterize manual appraisal systems. Their work suggests that performance transparency enabled by data dashboards and objective metrics improves trust in evaluation processes, thereby boosting motivation and reducing employee disengagement. Duanyo *et al*. (2024a, b), in a study focused on health and education sector workers, linked digital goal-setting tools with increased productivity and decreased burnout, especially when feedback was frequent and tailored. Likewise, Ibrahim *et al*. (2025) emphasized the effectiveness of real-time performance monitoring in managing healthcare workers' roles across multiple states in Nigeria, noting reductions in absenteeism and improved task completion rates. These findings collectively substantiate the quantitative results shown in Figure 4, particularly the strong beta coefficient ($\beta = 0.69$) and $R^2 = 0.47$, suggesting that digital PM tools account for nearly half the variance in performance outcomes. However, a few studies introduce critical caveats that contextualize these benefits. Abdulraheem *et al*. (2025a, b), in their research on workplace stress and employee monitoring, caution that if performance tracking tools are perceived as punitive rather than supportive, they may trigger anxiety, reduce creativity, and foster presenteeism. Similarly, Adias *et al*. (2025) highlighted the need for ethical and psychological safeguards in digital performance environments, noting that hyper-surveillance or lack of contextual understanding in interpreting performance data can undermine morale, especially in high-pressure work cultures. Erezina *et al*. (2023) reinforced this view, advocating for hybrid evaluation models that combine digital metrics with manager-led coaching and peer feedback. While these perspectives do not contradict the performance gains identified in Offurum *et al*. (2024), they underline the importance of implementation design. When digital PM tools are used to empower rather than control, they are more likely to yield the consistent upward performance trends observed in Nigerian firms.

HR analytics dashboards support HR decision-making, employee engagement, and retention in Nigeria

The increasing use of HR analytics dashboards in Nigerian organizations is consistent with growing evidence that data-driven systems enhance HR decision-making, foster employee engagement, and reduce workforce attrition. As shown in Opara (2025) and Adeyemi (2020), analytics-enabled HR teams observed improved engagement scores (from 3.1 to 4.2), reduced absenteeism by 36%, and decreased turnover rates from 22% to 15%. These improvements mirror findings by Yusuf *et al*. (2022), who noted that firms with analytics capabilities were significantly more likely to make timely decisions on promotions, training needs, and employee support interventions. Similarly, Koleayo *et al*. (2021a, b) highlighted how analytics tools informed telecommuting policies in Lagos-based firms by revealing productivity trends and communication gaps, thus improving policy responsiveness and employee trust. These metrics also align with the strategic orientation of modern HRM, wherein analytics transforms traditional personnel functions into evidence-informed practices. Several studies underscore the mechanisms through which analytics tools contribute to organizational health. For instance, Duanyo *et al*. (2024a) noted that digital data collection and trend analysis among academic staff in Bayelsa enabled HR teams to proactively address digital fatigue, optimize work allocation, and support professional growth. In the healthcare sector, Ibrahim *et al*. (2025) reported that absenteeism dashboards in rural clinics helped identify early signs of burnout and informed flexible scheduling, leading to better staff morale and retention. Adias and Raimi (2025) argued that analytics dashboards support inclusive decision-making by revealing demographic disparities in training access, promotion rates, and performance evaluations, thereby providing a foundation for equitable HR planning. These insights are reinforced by Erezina *et al*. (2023), who emphasized that well-designed dashboards make engagement visible, and by doing so, foster a sense of transparency, fairness, and accountability within HR processes. However, caution is necessary to ensure analytics tools do not become overly mechanistic or invasive. Abdulraheem *et al*. (2025a, b), while acknowledging the benefits of data-informed planning, emphasized that analytics systems must be implemented with employee consent, ethical safeguards, and clear communication strategies to avoid perceptions of

digital surveillance. Duanyo *et al*. (2024b) similarly warned that without contextual understanding, analytics outputs may be misinterpreted, potentially leading to punitive HR decisions that harm morale. Still, these perspectives do not contradict the broader trend but highlight the importance of thoughtful design and ethical oversight. When implemented with care, HR analytics dashboards serve as powerful enablers of workforce stability, strategic planning, and proactive engagement. The results from Opara (2025) and Adeyemi (2020), supported by quantitative evidence and visualized in Figure 5, underscore this potential, confirming that predictive analytics and performance dashboards are more than tracking tools; they are foundational to modern, resilient, and responsive HRM systems in Nigeria.

IMPLICATIONS FOR POLICY AND INTERVENTIONS

The findings from this study provide critical insights for policymakers, HR professionals, and institutional leaders seeking to modernize human resource management practices in Nigeria. One of the most pressing implications is the need for national HR and labor policies to formally recognize and integrate digital HR technologies, such as AI-driven recruitment systems, HR analytics dashboards, and e-learning platforms. Policymakers should revise outdated labor codes and incorporate digital HRM guidelines that promote transparent recruitment, continuous learning, and data-driven decision-making. Furthermore, public-private partnerships can play a pivotal role in democratizing access to these technologies, especially for SMEs that often lack the resources for full-scale digital transformation. In addition to legislative updates, the Federal Ministry of Labour and Employment should lead the establishment of a Digital HRM Policy Framework that outlines standards for data security, employee privacy, and algorithmic fairness. This is particularly crucial given the ethical risks associated with AI-based hiring, where bias can be inadvertently amplified if left unregulated. Incentives such as tax credits or innovation grants should be introduced to encourage employers particularly in under-digitalized sectors like agriculture, manufacturing, and healthcare to invest in scalable HRM platforms. Sector-specific implementation guides and model policies, adapted from organizations like McKinsey and local HR professional bodies (e.g., CIPM), would also help bridge capability gaps and standardize digital HRM practices. Additionally, workforce development initiatives should embed digital literacy as a foundational skill for HR practitioners. National training schemes such as Nigeria's Digital Economy Strategy and the 3MTT initiative should explicitly target HR professionals with tailored modules on HR analytics, AI-powered HRIS systems, and performance management tools. This ensures that digital transformation is not just technological but human-centered, equipping HR leaders with the competencies to lead inclusive and evidence-based change. Institutions of higher learning should also revise their business and HRM curricula to include these emerging competencies, ensuring alignment with the digital demands of today's labor market. Finally, the use of real-time HR dashboards to inform national employment and productivity statistics could enhance Nigeria's labor intelligence infrastructure. Data from organizational HR analytics can be aggregated (with safeguards for confidentiality) to provide timely insights on workforce trends such as attrition, skill shortages, and engagement. This would enable the National Bureau of Statistics and the Ministry of Labour to make more responsive policy decisions, especially in addressing youth unemployment, workforce planning, and skills mismatches. Ultimately, a multi-level, cross-sectoral approach is needed to mainstream digital HRM in Nigeria, ensuring that technology becomes a tool for equity, efficiency, and sustainable workforce development.

CONCLUSION

This study examined the impact of digital transformation on human resource management practices in Nigeria across four core domains: talent acquisition, training and development, performance management, and employee engagement and retention. The results consistently demonstrate that digital tools from AI recruitment platforms and HRIS, to e-learning systems and HR analytics dashboards offer measurable improvements in efficiency, employee experience, and organizational outcomes. These tools enhance speed, transparency, personalization, and accuracy in HR processes, reflecting the urgent need to

embed digital technologies within HR frameworks to meet the evolving demands of Nigeria's workforce. Specifically, AI-based recruitment was shown to reduce hiring time and improve quality-of-hire, while e-learning platforms significantly boosted knowledge retention and reduced training costs. Digital performance management systems correlated strongly with higher employee performance, and analytics dashboards proved vital for improving engagement and reducing turnover. Each of these tools not only offers operational benefits but also aligns with strategic goals of talent optimization and workforce sustainability. Their cumulative impact reflects a shift from reactive, paper-based HRM to proactive, data-informed and tech-enabled human capital strategies. The study's results also highlight key gaps that require urgent attention. Despite the benefits, adoption remains low in many sectors due to limited digital infrastructure, policy inertia, low awareness, and resistance to change. Moreover, without robust frameworks for implementation, ethical safeguards, and continuous capacity building, digital HRM tools could exacerbate existing inequalities, particularly in rural areas or informal employment sectors. Addressing these barriers will require both institutional reform and cultural change, alongside investment in people, platforms, and policy. In conclusion, digital transformation presents a powerful opportunity to reimagine HRM in Nigeria. When thoughtfully implemented and contextually adapted, digital tools can enhance not only organizational performance but also employee well-being, fairness, and retention. As Nigeria seeks to harness its demographic dividend and transition to a knowledge-based economy, the modernization of HRM through digital transformation must become a national priority. The findings of this study offer a practical roadmap for moving in this direction, combining local insights with global best practices to create resilient and responsive HR systems fit for the future.

Summary of the Findings

This study set out to explore the impact of digital transformation on HRM practices in Nigeria by focusing on four critical areas: talent acquisition, training and development, performance management, and HR analytics for employee engagement and decision-making. The findings clearly demonstrate that digital HR tools significantly improve organizational efficiency, employee outcomes, and strategic decision-making. AI-powered recruitment systems reduced hiring time by 42% and enhanced the quality of hire and job-role alignment, showcasing their potential to streamline talent acquisition processes. E-learning systems and HRIS platforms emerged as key enablers of cost-effective, scalable training interventions. Training attendance rose to 80%, and knowledge retention improved by 20 percentage points following digital integration, while training costs dropped by 40%. Similarly, digital performance management tools were positively associated with contextual employee performance, with statistical regression showing that nearly half the variation in performance could be explained by these tools. Finally, HR analytics dashboards proved instrumental in improving engagement (by over one point on a 5-point scale), reducing absenteeism by 36%, and cutting employee turnover by 7 percentage points signaling the power of data-driven HR practices. In summary, the integration of digital technologies in HRM delivers substantial gains across both operational and strategic domains. While adoption rates vary across sectors and organization sizes, the direction of impact is consistently positive. These findings provide robust evidence for organizations, policymakers, and HR professionals that digital transformation is not merely a trend but a necessity for building resilient, responsive, and high-performing workforces in Nigeria.

RECOMMENDATIONS

To facilitate the successful integration of digital transformation into Human Resource Management (HRM) practices in Nigeria, actionable recommendations are categorized below into short-term, mid-term, and long-term strategies. These reflect the realities of organizational capacity, digital infrastructure, and policy readiness in Nigeria.

Short-Term Recommendations (0-12 Months)

i. Digital HR Audit and Readiness Assessment: Organizations should immediately conduct internal audits to assess their current HR digital maturity. This includes evaluating existing tools, data management practices, recruitment workflows, training platforms, and employee engagement channels.

ii. Adoption of Basic Digital HR Tools: SMEs and public organizations should begin by implementing user-friendly, cost-effective digital tools such as cloud-based applicant tracking systems (ATS), basic HRIS, or mobile-compatible e-learning platforms.
iii. HR Staff Capacity Building and Certification: HR departments should initiate short training programs for HR staff on topics such as digital literacy, HR analytics fundamentals, and ethical AI usage. Local HR professional bodies like the Chartered Institute of Personnel Management (CIPM) should offer subsidized, fast-track certifications.
iv. Data Collection and Performance Baseline Setting: Establish clear performance baselines using simple HR metrics such as time-to-hire, training participation, and turnover rates to enable comparison as digital systems are implemented.

Mid-Term Recommendations (1-3 Years)

i. Integration of Advanced Systems and Interoperability: Organizations should begin integrating more advanced systems like AI-powered recruitment engines, predictive HR analytics dashboards, and cloud-based performance management tools that allow interoperability with payroll and finance systems.
ii. Development of a National Digital HRM Policy Framework: Government agencies (e.g., Federal Ministry of Labour and Employment) should coordinate the creation of a national HRM Digital Transformation Policy. This policy should cover standards for privacy, cybersecurity, and algorithmic fairness.
iii. Incentivization for Digital HR Adoption: Introduce digital transformation grants, tax rebates, or public-private partnerships to support HR digitization in sectors such as education, agriculture, and public health.
iv. Curriculum Review in Universities and Training Institutions: Review and update HRM and Business Administration curricula in tertiary institutions to include mandatory coursework on digital HR tools, data analytics, and e-HRM platforms.

Long-Term Recommendations (3-5+ Years)

i. National HR Analytics Infrastructure: Collaborate with the National Bureau of Statistics (NBS) and industry stakeholders to develop a centralized, anonymized HR analytics database that aggregates workforce data for national planning, forecasting, and policy decisions.
ii. Digital Inclusion for the Informal Sector: Develop low-tech, mobile-first HR solutions tailored for Nigeria's informal economy, which represents the majority of the workforce. Partnerships with fintech companies could enable wage tracking, mobile learning, and digital performance feedback tools for small business owners.
iii. Legislative Reforms and Ethical Oversight: Enact legal reforms to institutionalize data protection, anti-discrimination mechanisms in AI recruitment, and worker rights within digital HRM frameworks. Establish an HRM Technology Oversight Board under the Ministry of Labour to monitor compliance.
iv. National Talent Optimization Strategy: Formulate and implement a national strategy focused on aligning digital HRM systems with long-term national goals such as youth employment, diaspora reintegration, workforce agility, and public sector reform.

Significant Statement

Though grounded in organizational management, this study highlights how digital HRM tools have direct and measurable effects on employee health and well-being. In Nigeria, where chronic workplace stress, burnout, and job dissatisfaction remain widespread especially in healthcare, finance, and construction digitally enabled HR practices offer a practical means of reducing these stressors. Faster recruitment, more accurate talent matching, structured performance feedback, and accessible training systems help reduce uncertainty and improve employee satisfaction. Digital platforms that incorporate continuous feedback, wellness tracking, and engagement monitoring support a healthier work environment. Employees benefit from clear expectations, early recognition of overload, and responsive support systems that reduce absenteeism and turnover. These improvements in morale and work-life balance point to a broader public health benefit: digital HRM practices can serve as preventive tools against mental health decline. By making it

possible to identify signs of distress such as rising absenteeism, lower engagement, or survey feedback, HR teams can intervene early through adjustments, support referrals, or counseling access. In a setting where mental health resources are scarce and stigma is high, embedding wellness strategies into daily HR operations provides a low-cost, stigma-free way to reach at-risk employees. This makes digital HRM not just a tool for productivity, but a scalable public health intervention with potential to improve both individual outcomes and organizational resilience. Thus, graphically it is represented (Figure 6 below) as:

Figure 6: Unveiling the Impacts of Digital HRM on wellbeing
Source: Author design

List of Abbreviations

Abbreviation	Full Term
AI	Artificial Intelligence
ATS	Applicant Tracking System
COVID-19	Coronavirus Disease 2019
E-HRM	Electronic Human Resource Management
HR	Human Resources
HRIS	Human Resource Information System
HRM	Human Resource Management
ICT	Information and Communication Technology
KPI	Key Performance Indicator
MMAT	Mixed Methods Appraisal Tool
MTN	Mobile Telephone Network (Nigeria)
NBS	National Bureau of Statistics
NDPR	Nigeria Data Protection Regulation
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
ROI	Return on Investment
R^2	Coefficient of Determination
SDG	Sustainable Development Goal
SME	Small and Medium-sized Enterprise
SMEDAN	Small and Medium Enterprises Development Agency of Nigeria
SPSS	Statistical Package for the Social Sciences
3MTT	3 Million Technical Talent (Nigeria's digital skills initiative)

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REFERENCES

Abaya, S. T., Enuma, E. U., Chukwueze, B. C., Raimi, A. G., Kakwi, D. J., & Raimi, M. O. (2023a). Prevalence, Determinants and Benefits of Use of Internet for Health-Related Information Among Adults in Abuja, Nigeria. AfricArXiv. https://doi.org/10.21428/3b2160cd.14740987

Abaya, ST; Orga, C; Raimi, AG; Raimi, MO; Kakwi, DJ (2023b): Assessment of the Implementation of Electronic Records Management System in Bayelsa State. Lippincott® Preprints. Preprint. https://doi.org/10.1097/preprints.22643812.v1.

Abaya ST, Ogoina D, Stow J, Abaye BB, Emeka C, Raimi MO (2024) Beyond the Epidemic: Effective Public Health Strategies in Response to Nigeria's First Lassa Fever Outbreak in a Non-Endemic Region. JMIR Preprints. 19/08/2024:65539. DOI: 10.2196/preprints.65539 URL: https://preprints.jmir.org/preprint/65539.

Abdulraheem, A. F., Ononokpono, D. N., & Raimi, M. O. (2025a). Breaking Barriers: How Socio-Demographic, Cultural, and Geographic Factors Shape Skilled Birth Attendance in Nigeria – A Call for Equity and Empowerment. JMIR Preprints. https://preprints.jmir.org/preprint/78050

Abdulraheem, A. F., Raimi, M. O., & Ononokpono, D. N. (2025b). Who Delivers Safely? The Hidden Role of Transport and Education in Nigeria's Maternal Health Crisis. JMIR Preprints. https://preprints.jmir.org/preprint/79460

Adias, L. T., & Raimi, A. G. (2025). Addressing Skills Gaps and Talent Shortages in Nigeria: HRM Strategies for the Future. JMIR Preprints. https://preprints.jmir.org/preprint/75821

Adias, L. T., Raimi, A. G., & Raimi, M. O. (2025). Breaking the Silence on Workplace Stress: Scalable HRM Solutions for Mental Health in Nigeria's Evolving Workforce. JMIR Preprints. https://preprints.jmir.org/preprint/77758.

Adeyemi, M. O. (2020). The impact of AI driven recruitment on time to hire and early turnover in Nigerian banks. International Journal of Human Resource Studies, 11(2), 45–60. https://doi.org/10.5296/ijhrs.v11i2.186.

Aziba-anyam GR; Hembafan PO; Funmilayo AA; Viola NN; Morufu OR (2025a) Advancing Green Jobs Through Circular Economy Strategies in Nigeria's Rural Economy. Oral Presentation Presented at the 1st International Conference of the Faculty of Science, Federal University Otuoke, Bayelsa State on the theme: Revolutionizing a Sustainable Tomorrow: Harnessing Science, Innovation and Community Power to Drive Circular Economy Solutions, Climate Resilience, and a Thriving Green Economy, which held Tuesday, 4th – Friday 7th March, 2025.

Aziba-anyam GR; Funmilayo AA; Morufu OR (2025b) Science and Innovation as Catalysts for a Thriving Green Economy in Sub-Saharan Africa. Oral Presentation Presented at the 1st International Conference of the Faculty of Science, Federal University Otuoke, Bayelsa State on the theme: Revolutionizing a Sustainable Tomorrow: Harnessing Science, Innovation and Community Power to Drive Circular Economy Solutions, Climate Resilience, and a Thriving Green Economy, which held Tuesday, 4th – Friday 7th March, 2025.

Christopher, O. E., Muyi, A., Teddy, C. A., Rotifa, S. U., Oyeyemi, A. S., Uchenna, G. E., Ansa, H., Oyindiepreye, L. A., Akinloye, B. O., & Morufu, O. R. (2024). Transforming Primary Healthcare in Nigeria: Enhancing Universal Health Coverage through Strong and Sustainable Primary Healthcare Laboratories. Qeios. https://doi.org/10.32388/74E67L.

Christopher OE; Morufu OR; Teddy CA; Uchenna GE (2025a) Impact of Climate Change on Public Health in Rural Areas of the South-South Region of Nigeria and the Digital Citizen Science Observatories Laboratory Intervention. Oral Presentation Presented at the 1st International Conference of the Faculty of Science, Federal University Otuoke, Bayelsa State on the theme: Revolutionizing a Sustainable Tomorrow: Harnessing Science, Innovation and Community Power to Drive Circular Economy Solutions, Climate Resilience, and a Thriving Green Economy, which held Tuesday, 4th – Friday 7th March, 2025.

Christopher OE; Teddy CA; Uchenna GE; Aziba-anyam GR; Morufu OR (2025b) Digital Science Observatory (DSO) Web Application: Advancing Data Science for Sustainability. Oral Presentation Presented at the 1st International Conference of the Faculty of Science, Federal University Otuoke, Bayelsa State on the

theme: Revolutionizing a Sustainable Tomorrow: Harnessing Science, Innovation and Community Power to Drive Circular Economy Solutions, Climate Resilience, and a Thriving Green Economy, which held Tuesday, 4th – Friday 7th March, 2025.

Creswell, J. W., & Plano Clark, V. L. (2018). Designing and conducting mixed methods research (3rd ed.). SAGE Publications.

Dataphyte. (2023). State of HR digitalization in Nigeria: Formal sector adoption report. https://dataphyte.com/HR-digitalization-nigeria-2023.

Digha ON; Babatunde TO; Morufu OR (2025) Artificial Intelligence (AI) and Data Science for Sustainable Plastic Waste Management in Nigeria. Oral Presentation Presented at the 1st International Conference of the Faculty of Science, Federal University Otuoke, Bayelsa State on the theme: Revolutionizing a Sustainable Tomorrow: Harnessing Science, Innovation and Community Power to Drive Circular Economy Solutions, Climate Resilience, and a Thriving Green Economy, which held Tuesday, 4th – Friday 7th March, 2025.

Duanyo, T. V., Udensi, E. O., Ojong-Ejoh, M. U., Udensi, L. O., Raimi, A. G., Abdulraheem, F. A., Ndukwu, V. N., & Raimi, M. O. (2024a). Hidden Danger of Internet: Exploring the Influence of Socioeconomic Factors on Internet Health Information Seeking Among Academic Staff in Bayelsa State, Nigeria. JMIR Preprints. https://preprints.jmir.org/preprint/67092

Duanyo, T. V., Raimi, A. G., Udensi, E. O., Udensi, L. O., Abdulraheem, F. A., Ojong-Ejoh, M. U., Ndukwu, V. N., & Raimi, M. O. (2024b). Navigating the Digital Health Landscape: Benefits, Risks, and User Satisfaction in Online Health Information Seeking Among Academic Staff in Bayelsa State, Nigeria. JMIR Preprints. https://preprints.jmir.org/preprint/67139

Erezina, A. E., Ahoada, E., Emmanuel, O. O., Raimi, M. O., Abaya, S. T., & Kakwi, D. J. (2023). Level of Professional Awareness among Health Record Officers in Bayelsa State and their Implications for Patient Care, Health Systems, and Health Policy. American Journal of Physical Education and Health Science, 1(1), 19–30. https://doi.org/10.54536/ajpehs.v1i1.1582.

Elemuwa CO, Raimi MO, Ainu M, Adias TC, Ufuoma RS, Elemuwa UG, Oginifolunnia OC, Rath BA, Obermeier PE (2024a) Conquering Mpox: A Comprehensive Public Health Strategy for Addressing Mpox and Poxvirus Infections in Nigeria – Understanding Global Trends, Transmission Dynamics, and Effective Prevention and Control Measures in Nigeria. JMIR Preprints. 14/10/2024:67534. DOI: 10.2196/preprints.67534. URL: https://preprints.jmir.org/preprint/67534.

Elemuwa CO, Ainu M, Adias TC, Sunday OA, Ufuoma RS, Elemuwa UG, Christopher O, Raimi MO, Oginifolunnia OC, Oweibia M, Ozoemena OV, Daniel ET (2024b) Boosting community engagement: Leveraging the ward health system approach for enhanced HPV vaccination acceptance in Nigeria. [version 1; peer review: awaiting peer review]. F1000Research 2024, 13:1392. (https://doi.org/10.12688/f1000research.153919.1).

Enetimi IS; Morufu OR (2025) Leveraging Science, Innovation, and Policy for Climate Resilience. Oral Presentation Presented at the 1st International Conference of the Faculty of Science, Federal University Otuoke, Bayelsa State on the theme: Revolutionizing a Sustainable Tomorrow: Harnessing Science, Innovation and Community Power to Drive Circular Economy Solutions, Climate Resilience, and a Thriving Green Economy, which held Tuesday, 4th – Friday 7th March, 2025.

Federal Republic of Nigeria. (2020). National Digital Economy Policy and Strategy (2020–2030). Ministry of Communications and Digital Economy. https://nic.gov.ng/national-digital-economy-policy.

Field, A. (2013). Discovering statistics using IBM SPSS statistics (4th ed.). SAGE Publications.

Gift RA, Obindah F (2020). Examining the influence of motivation on organizational productivity in Bayelsa state private hospitals. Open Access Journal of Science. 2020; 4(3):94–108. DOI: 10.15406/oajs.2020.04.00157.

Henry O. S; Morufu O. R (2025) Surveillance in the Shadows: Reinventing Community-Based Disease Monitoring Systems in Rural Nigeria. Oral Presentation Presented at the 3rd Ku8+International Conference, Kwara State University, Malete with the theme "Innovation and Sustainability of Higher Education in a Changing World.", which held on Wednesday, 6th – Friday 8th August, 2025.

Hong, Q. N., Fàbregues, S., Bartlett, G., Boardman, F., Cargo, M., Dagenais, P., & Pluye, P. (2018). The Mixed Methods Appraisal Tool (MMAT) version 2018 for information professionals and researchers. Education for Information, 34(4), 285–291. https://doi.org/10.3233/EFI-180221.

Ibrahim, M. L., Sawyerr, H. O., Opasola, O. A., Adiama, Y. B., & Raimi, M. O. (2025). Bridging Knowledge and Practice Gaps in Lassa Fever Prevention: Awareness, Attitudes, and Infection Control Measures Among Healthcare Workers and Residents in Edo, Ondo, and Kwara States. JMIR Preprints. https://preprints.jmir.org/preprint/75233.

Kakwi JD, Yakasai KM, Raimi MO, Kakwi JD (2024a) Understanding the Dynamics of COVID-19 Vaccine Uptake in Plateau State, Nigeria: Analyzing

Socioeconomic, Cultural, and Communication Influences. JMIR Preprints. 30/12/2024:70702. DOI: 10.2196/preprints.70702. URL: https://preprints.jmir.org/ojs/index.php/preprints/preprint/70702.

Kakwi JD, Yakasai KM, Kakwi JD, Raimi MO (2024b) Campaigning Against Vaccine Hesitancy: Evaluating the Effectiveness of Health Communication on COVID-19 Vaccination Uptake in Plateau State, Nigeria. JMIR Preprints. 22/09/2024:66755. DOI: 10.2196/preprints.66755 URL: https://preprints.jmir.org/preprint/66755.

Kline, R. B. (2015). Principles and practice of structural equation modeling (4th ed.). Guilford Press.

Koleayo, O. O., Omoyajowo, K., Akinola, A. A., Emmanuel, G. O., Ebosiem, S., Omoyajowo, K. A., & Raimi, A. G. (2021a). Drivers of Telecommuting Policy in Nigerian Organisations. International Journal of Business, Technology, and Organizational Behavior, 1(4). https://doi.org/10.52218/ijbtob.v1i4.105.

Koleayo Oluwafemi Omoyajowo, Adeyemi Adewale Akinola, Mary Adetutu Adewunmi, Grace Ojo-Emmanuel, Allen Ebosiem, Kolawole Ayodeji Omoyajowo; Aziba-anyam Gift Raimi (2021b) Assessment of Factors Underpinning Employee's Interest and Preference for Telecommuting in Lagos Island, Lagos, Nigeria. International Journal of Business, Technology, and Organizational Behavior (IJBTOB) ISSN: 2775-4936. Vol. 1 No. 4, August 2021. DOI: https://doi.org/10.52218/ijbtob.v1i4.104. https://ijbtob.org.

Lakens, D. (2021). Sample size justification. Collabra: Psychology, 7(1), 1–10. https://doi.org/10.1525/collabra.168.

Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. Biometrics, 33(1), 159–174. https://doi.org/10.2307/2529310.

Lang, T. A., & Altman, D. G. (2013). Basic statistical reporting for articles published in clinical medical journals: The "statistical analyses and methods in the published literature" or the SAMPL guidelines. In Science Editors' Handbook.

McKinsey & Company. (2023). The future of work in Africa: Bridging the talent gap. Retrieved from McKinsey website.

McKinsey & Company. (2022, August 30). Fintech in Africa: The end of the beginning. https://www.mckinsey.com/industries/financial-services/our-insights/fintech-in-africa-the-end-of-the-beginning

Mittelstadt, B. D. (2019). Principles alone cannot guarantee ethical AI. Nature Machine Intelligence, 1(11), 501–507. https://doi.org/10.1038/s42256-019-0114-4.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & The PRISMA Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA Statement. PLoS Medicine, 6(7), e1000097. https://doi.org/10.1371/journal.pmed.1000097.

Moore, A. (2022). Nigeria Digital Economy Outlook 2022. McKinsey & Company. (Note: actual citation to be replaced with current URL).

Mordecai, O., Uchenna, G. E., Emma, A., Elemuwa, T. D., Gabriel, J. O., Egberipou, T., Etim, E. O., Christopher, O. E., Morufu, O. R., & Anuoluwapo, B. (2024). Analyzing Nigeria's Journey Towards Sustainable Development Goals: A Comprehensive Review From Inception to Present. Qeios. https://doi.org/10.32388/8O5QEG.

Morufu OR, Aziba-anyam GR, Teddy CA (2021a). Evidence-based Environmental and Public Health Practices to Respond to the COVID-19 Crisis, 07 May 2021, PREPRINT (Version 1) available at Research Square [https://doi.org/10.21203/rs.3.rs-504983/v1] https://europepmc.org/article/PPRID/PPR335534; EMSID:EMS123969.

Morufu OR, Aziba-anyam GR and Teddy CA (2021b) 'Silent Pandemic': Evidence-Based Environmental and Public Health Practices to Respond to the Covid-19 Crisis. IntechOpen. DOI: http://dx.doi.org/10.5772/intechopen.100204. ISBN 978-1-83969-144-7. https://www.intechopen.com/online-first/silent-pandemic-evidence-based-environmental-and-public-health-practices-to-respond-to-the-covid-19- Published: December 1st 2021; ISBN: 978-1-83969-144-7; Print ISBN: 978-1-83969-143-0; eBook (PDF) ISBN: 978-1-83969-145-4. Copyright year: 2021.

Morufu OR, Ebikapaye O, Tuebi M, Aziba-anyam GR, Adedoyin OO, Aishat FA, Mariam OR, Beatrice OJ (2021c) Do Weak Institutions Prolong Crises? [#ENDSARs] in the Light of the Challenges and opportunities beyond COVID-19 Pandemic and the Next Normal in Nigeria. Communication, Society and Media. ISSN 2576-5388 (Print) ISSN 2576-5396 (Online) Vol. 4, No. 2, DOI: https://doi.org/10.22158/csm.v4n2p1. http://www.scholink.org/ojs/index.php/csm/article/view/3790.

National Information Technology Development Agency. (2019). Nigeria Data Protection Regulation 2019. https://nitda.gov.ng/wp-content/uploads/2020/11/NigeriaDataProtectionRegulation11.pdf

Neal, M. (2023). HR-analytics programs: Case studies in Nigeria. EvolveHQ. Retrieved from https://evolvehq.co/programs/hr-analytics/.

Nimisingha JA, Morufu OR, Lawan MI, Alina P, Anuoluwapo AB, Sarah SJ, Funmilayo AA (2024) Advancements in Disaster Response through

Telemedicine and Emergency Medical Operating System (TELEMED-EMOS) Integration: A Narrative Review. Advance. August 20, 2024. DOI: 10.31124/advance.172416246.69722926/v1.

Nsisong, A. A., Okon, P. U., & Ita, E. E. (2025). Digital performance management systems and employee productivity in Nigerian telecommunications. African Journal of Management Studies, 4(1), 22–38.

Nsisong, A. A., & Ekanem, U. D. (2025). Leveraging E-learning Systems for Sustainable Knowledge Retention in Nigerian Telecom Organizations. Nigerian Journal of Human Resource Development, 15(1), 75–93.

Nsisong, A. A., & Ekanem, U. D. (2023). E-learning adoption and knowledge retention in Lagos financial institutions. Journal of African Business, 24(4), 312–329. https://doi.org/10.1080/15228916.2023.1078904.

Offurum, H. U., Eze, O. F., & Nwankwo, T. B. (2024). The impact of digital performance management on employee output: Evidence from MTN Nigeria. Journal of African Business, 25(2), 145–160. https://doi.org/10.1080/15228916.2024.1192743.

Okechukwu CO, Ainu M, Adias TC, Elemuwa CO, Rotifa SU, Ogbointuwei C, Raimi MO, Oweibia M, Alabo AF, Okoyen E, Appah WW (2024) Evaluating the Impact of Rotavirus Vaccination on Childhood Diarrhea Incidence in Bayelsa State, Nigeria: Achievements, Challenges, and Future Directions. JMIR Preprints. 27/07/2024:64822. DOI: 10.2196/preprints.64822. URL: https://preprints.jmir.org/preprint/64822.

Olalekan RM, Oluwatoyin OA, Olawale SH, Emmanuel OO, Olalekan AZ (2020a) A Critical Review of Health Impact Assessment: Towards Strengthening the Knowledge of Decision Makers Understand Sustainable Development Goals in the Twenty-First Century: Necessity Today; Essentiality Tomorrow. Research and Advances: Environmental Sciences. 2020(1): 72-84. DOI: 10.33513/RAES/2001-13. https://ospopac.com/journal/environmental-sciences/early-online.

Olalekan RM, Oluwatoyin O and Olalekan A (2020b) Health Impact Assessment: A tool to Advance the Knowledge of Policy Makers Understand Sustainable Development Goals: A Review. ES Journal of Public Health; 1(1); 1002. https://escientificlibrary.com/public-health/in-press.php.

Olaniyi Afolabi Opasola; Morufu Olalekan Raimi (2025) From Crisis to Catalyst: Leveraging Public Health Emergencies to Redesign Urban Health Policy in Nigerian Megacities. Oral Presentation Presented at the 3rd Ku8+International Conference, Kwara State University, Malete with the theme "Innovation and Sustainability of Higher Education in a Changing World.", which held on Wednesday, 6th – Friday 8th August, 2025.

Opara, C. J. (2025). Data-Driven Human Resource Practices and Organizational Performance in Nigeria. African Journal of Management Research, 33(1), 88–102.

Oweibia M, Elemuwa UG, Akpan E *et al* (2024). Analyzing Nigeria's Journey Towards Sustainable Development Goals: A Comprehensive Review From Inception To Present [version 1; peer review: awaiting peer review]. F1000Research 2024, 13:984 (https://doi.org/10.12688/f1000research.148020.1).

PeopleHum. (2023). HR tech adoption in Nigeria: Trends and insights. peopleHum Blog. Retrieved from https://www.peoplehum.com/blog/hr-tech-adoption-in-nigeria.

Petticrew, M., & Roberts, H. (2006). Systematic reviews in the social sciences: A practical guide. Blackwell Publishing.

Pope, C., & Mays, N. (2006). Qualitative research in health care (3rd ed.). Wiley-Blackwell.

Promise, V. I., Alabere, I., Abdulraheem, I., & Raimi, M. O. (2025). The Effect of Mobile Phone and Home Visit on Childhood Vaccination Uptake in Rural Communities of Bayelsa State Nigeria: A Pragmatic Cluster Randomized Control Trial. JMIR Preprints. https://preprints.jmir.org/preprint/75332.

Promise VI, Macauley T, Alabere I, Abdulraheem I, Raimi MO (2024) Closing the Gap: Assessment of Vaccination Coverage Among Under Two Children in Bayelsa State, Nigeria. JMIR Preprints. 29/12/2024:70671. DOI: 10.2196/preprints.70671. URL: https://preprints.jmir.org/preprint/70671.

Raimi, OM., Sunday, OA., Mcfubara, KG., Adias, TC., Raimi, GA., Daniel, AA., Izah, SC., Okoyen, E., Ogbointuwei, C., Clement, A., Godspower, A., & Funmilayo, AA. (2022). Perspective Chapter: Applying Innovative Research as a Tool to Advance Immunization Coverage in Bayelsa State, Nigeria. In M. O. Raimi, O. A. Sunday, H. O. Sawyerr, & T. C. Adias (Eds.), Emerging Issues in Environmental Epidemiology and Its Reflection [Working Title]. IntechOpen. https://doi.org/10.5772/intechopen.106513.

Raimi MO, Emeka CL, Ebikapaye O, Angalabiri C, Christopher O, Atoyebi B (2021a) COVID-19 Decision Impacts: Vaccine Hesitancy, its Barriers and Impact Studies: Taking Bayelsa State as an Example., 27 May 2021, PREPRINT (Version 1) available at Research Square [https://doi.org/10.21203/rs.3.rs-566532/v1]

Raimi OM, Lucky EC, Okoyen E, Clement A, Ogbointuwei C, *et al*. (2021b) Making Better Informed, More Confident COVID-19 Decisions: Vaccine Hesitancy, Its Barriers and Impact Studies: Taking Bayelsa State as an Example. Int J Vaccine

Immunizat 5(1): dx.doi. org/10.16966/2470-9948.126. https://sciforschenonline.org/journals/vaccines/IJVI126.php.

Raimi, MO., Mcfubara, KG., Abisoye, OS., Ifeanyichukwu EC., Henry SO., & Raimi, GA (2021c) Responding to the call through Translating Science into Impact: Building an Evidence-Based Approaches to Effectively Curb Public Health Emergencies [COVID-19 Crisis]. Global Journal of Epidemiology and Infectious Disease, 1(1). DOI: 10.31586/gjeid.2021.010102. Retrieved from https://www.scipublications.com/journal/index.php/gjeid/article/view/72.

Raimi MO & Raimi AG (2020). The Toughest Triage in Decision Impacts: Rethinking Scientific Evidence for Environmental and Human Health Action in the Times of Concomitant Global Crises. CPQ Medicine, 11(1), 01-05.

Raimi MO, Moses T, Okoyen E, Sawyerr HO, Joseph BO, Oyinlola BO (2020a) "A Beacon for Dark Times: Rethinking Scientific Evidence for Environmental and Public Health Action in the Coronavirus Diseases 2019 Era" Medical and Research Microbiology, Vol. 1, Issues 3.

Raimi MO, Ihuoma BA, Esther OU, Abdulraheem AF, Opufou T, Deinkuro NS, Adebayo PA and Adeniji AO (2020b) "Health Impact Assessment: Expanding Public Policy Tools for Promoting Sustainable Development Goals (SDGs) in Nigeria". EC Emergency Medicine and Critical Care 4.9 (2020).

Raimi, G. Aziba-anyam (2019) Eustress and organizational productivity in Bayelsa State Private Hospitals. Unpublished Msc project. Ignatius Ajuru University of Education. Rumuolumeni, Port Harcourt.

Raimi MO, Raimi AG, Raimi Mariam O (2019). How Universities Can Create Green Jobs for Students. Peer Res Nest. 2019 - 1(2). PNEST.19.07.003. https://peernest.org/article-in-press.php.

Samson TK, Ogunlaran OM, Raimi OM (2020); A Predictive Model for Confirmed Cases of COVID-19 in Nigeria. European Journal of Applied Sciences, Volume 8, No 4, Aug 2020; pp:1-10. DOI: https://doi.org/10.14738/aivp.84.8705.

Samuel TA, Chris O, Aziba-anyam GR, Morufu OR, & Daniel JK (2023) Implementation Assessment of Electronic Records Management System in Bayelsa State, Nigeria. Communication, Society and Media. ISSN 2576-5388 (Print) ISSN 2576-5396 (Online) Vol. 6, No. 3, 2023. URL: http://dx.doi.org/10.22158/csm.v6n3p69 www.scholink.org/ojs/index.php/csm.

SMEDAN. (2022). National MSME Survey Report: Stimulating Nigeria's Economic Growth. Small and Medium Enterprises Development Agency of Nigeria.

Smith, J. D., Brown, L. L., & White, K. K. (2020). Structuring multipurpose mixed-methods studies for publication: A modular approach. PLOS ONE, 15(3), e0220001. https://doi.org/10.1371/journal.pone.0220001.

Swift, F. (2023). Digital inclusion within the Nigerian informal sector: Case studies and policy. Fintech Africa Review, 12(1), 201–220.

The National Information Technology Development Agency. (2019). Nigeria Data Protection Regulation (NDPR). Retrieved from https://nitda.gov.ng/ndpr/.

Uchenna GE, Enato E, Christopher OE, Tochukwu DE, Morufu OR (2024) Pentavalent Vaccine: How Safe Is It Among Infants Accessing Immunization In Nigerian Health Facilities. medRxiv 2024.05.28.24307998; doi: https://doi.org/10.1101/2024.05.28.24307998.

World Health Organization. (2022). Guidelines on mental health at work. World Health Organization. https://www.who.int/publications/i/item/9789240053052.

World Economic Forum. (2023). Global gender gap report 2023. https://www.weforum.org/reports/.

Yusuf, A. O., Adetunji, T. O., & Omotayo, O. S. (2022). Cost savings from digital HR platforms in Nigerian firms. Journal of African Management, 8(1), 78–95. https://doi.org/10.1007/s41287-021-00343-7.

Yusuf B. A; Morufu O. R; A. U (2025) Echoes of Outbreaks Past: Rethinking Public Health Preparedness in Sub-Saharan Africa in the Age of Emerging Pandemics. Oral Presentation Presented at the 3rd Ku8+International Conference, Kwara State University, Malete with the theme "Innovation and Sustainability of Higher Education in a Changing World.", which held on Wednesday, 6th – Friday 8th August, 2025.