AJEMATES
African Journal of Educational Management, Teaching and Entrepreneurship Studies
VOL.13 (3), September-December, 2024 https://ajemates.org

INFLUENCE OF ARTIFICIAL INTELLIGENCE ON WORKPLACE SAFETY IN NIGERIAN EMPLOYMENT RELATIONSHIP

Matthew Izuchukwu Anushiem, PhD
Department of Clinical Legal Education,
Faculty of Law, Nnamdi Azikiwe University, Awka.
Phone/Email: 08032641757, mi.anushiem@unizik.edu.ng

ABSTRACT

The growing integration of Artificial Intelligence (AI) into workplace processes is redefining the landscape of employment relations and occupational safety in Nigeria. This paper critically examines the influence of AI on workplace safety within the context of Nigerian employment relationships, highlighting both the transformative potential and the emerging challenges associated with technological adoption. The discussion emphasizes how AI-driven systems such as predictive analytics, automated monitoring, and intelligent robotics contribute to accident prevention, risk management, and compliance with occupational health standards. However, the paper also identifies pressing concerns, including job displacement anxiety, ethical dilemmas in employee surveillance, and the absence of clear regulatory frameworks guiding AI implementation in Nigeria. Drawing from socio-technical and human relations perspectives, the paper argues that the safety benefits of AI can only be fully realized when accompanied by inclusive policies, worker reskilling programs, and proactive collaboration between employers, labor unions, and government agencies. The analysis underscores the need for Nigeria to adopt a balanced approach leveraging AI innovations to improve workplace safety while ensuring that technological progress aligns with human-centered employment values. The paper concludes by advocating for the establishment of comprehensive AI safety standards, ethical oversight mechanisms, and sustained public-private partnerships to promote safe, fair, and future-ready workplaces in Nigeria.

Keywords: Artificial Intelligence; Workplace Safety; Employment Relations; Technology Adoption; Labor Policy

Introduction

Artificial Intelligence (AI) is no longer a futuristic novelty; it is reshaping how work is organized, supervised, and safeguarded across industries. Globally, firms are deploying AI tools for predictive maintenance, real-time hazard detection, automated monitoring of safety compliance, and decision support that can anticipate and reduce workplace accidents (Shah, 2024). At the same time, large-scale automation and algorithmic management are changing job content and the ways workers are supervised introducing both opportunities for improved occupational safety and new risks tied to surveillance, deskilling, and over-reliance on algorithmic outputs (International Labour Organization [ILO], 2025).

According to Anushiem and Anushiem (2023), artificial intelligence (AI) has moved

decisively from experimental pilot projects to practical workplace tools that reconfigure how routine and hazardous tasks are performed, how risk is identified and mitigated, and how managerial oversight is exercised; recent reviews show AI-powered systems from computer vision for hazard detection to predictive maintenance models are increasingly applied to occupational safety problems and can shift organisations from reactive to predictive safety postures when correctly implemented (Shah, 2024; Park et al., 2024). At the same time, systematic analyses of AI in safety management caution that technological gains are neither automatic nor uniformly distributed: the design of AI systems, the data they rely on, and the socio-organisational arrangements that govern their use determine whether they reduce exposure to physical hazards or introduce new psychosocial and accountability risks (El-Helaly, 2024; Gihleb, 2022).

AI's influence on workplace transformation operates through two interdependent channels: task substitution/augmentation and socio-organisational change. On the technical side, robotics and automation can remove workers from high-risk tasks and machine-learning models can flag failure patterns in equipment before breakdowns occur, thereby lowering accident likelihood (Park et al., 2024). On the socio-organisational side, algorithmic management systems, continuous monitoring, and performance scoring alter supervision practices and information asymmetries in ways that affect worker autonomy, stress, and the capacity of collective worker representation to contest unsafe conditions (Zhang, 2025; Wiggin, 2025). These dual pathways mean that the safety benefits of AI are conditioned by whether organisations pair technology deployment with human oversight, ergonomics, and participatory governance rather than relying solely on automated decision-making.

Nigeria sits at a critical junction of these global dynamics. The country's National Digital Economy Policy and Strategy (2020–2030) sets out a clear commitment to harness digital technologies including AI to accelerate economic development, job creation, and competitiveness (Federal Republic of Nigeria, 2020). The World Bank's digital economy diagnostic for Nigeria underscores the scale of Nigeria's digital transition and highlights both the potential of digital technologies to transform jobs and the sizeable gaps in skills, infrastructure and regulatory frameworks that must be bridged for benefits to be inclusive (World Bank, 2021). McKinsey's recent work on generative AI likewise points to large potential economic gains across African sectors if deployment is well governed and skills are developed (McKinsey & Company, 2025). These policy aims and commercial opportunities are being realized unevenly: while Nigeria's internet and digital services penetration has rapidly expanded, structural challenges in skills development, firm readiness, and sectoral regulation persist all of which shape how AI affects workplace

safety in practice (World Bank, 2021; McKinsey & Company, 2025).

Furthermore, in Nigeria, the adoption of AI is visible in pockets across finance, health, agriculture and certain manufacturing firms, but academic analyses emphasise uneven diffusion and capacity constraints: available studies of the Nigerian context find that larger, digitally mature firms are more likely to deploy advanced AI tools, while micro, small and medium enterprises (which employ the bulk of the workforce) often lack the infrastructure, data, and skills to adopt such systems widely (Adediran et al., 2024; Ogunbodede, 2025; Bala, 2024). This unevenness has two practical implications for workplace safety in Nigeria. First, safety improvements tied to AI for example, real-time monitoring or predictive maintenance may concentrate in a subset of workplaces, leaving many employees in sectors and firms without access to these technologies; second, partial digitalisation can create hybrid risk environments where human workers operate alongside semi-autonomous systems without clear protocols, raising new forms of hazard and blame-shifting when incidents occur (Park et al., 2024; El-Helaly, 2024).

The relevance of AI to employment relations in Nigeria is therefore multifaceted and urgent. Algorithmic supervision and data-driven performance metrics can erode established forms of workplace bargaining and reshape managerial prerogatives unless matched by updated labour practices and legal protections (Wiggin, 2025; Zhang, 2025). Moreover, high-profile cases from other jurisdictions illustrate how automation intended to increase safety can interact with labour intensity and performance pressures in ways that leave injury rates unchanged or even higher (longform investigative reporting on large logistics firms provides cautionary examples). Such outcomes underscore that technological deployment without attention to work organisation, workload, and ergonomics may fail to deliver the promised safety dividends (Wired reporting; see reference).

AI offers powerful tools that can materially improve workplace safety in Nigeria through predictive risk assessment, automation of dangerous tasks, and enhanced compliance monitoring but these benefits will be realized only if AI deployment is guided by human-centered governance, robust regulatory safeguards, skills development for workers, and inclusive labour policies that protect rights and preserve human oversight.

Despite growing attention, important research and policy gaps remain for Nigeria. First, much of the scholarly literature on AI and occupational safety is global or focused on high-income contexts; thus, transferability to Nigeria's labour markets and regulatory environment is uncertain and requires country-specific analysis (Adediran et al., 2024). Second, the category "AI" is often insufficiently granular in policy discourse: different AI applications (computer vision for hazard detection, predictive maintenance, scheduling algorithms, wearable-sensor analytics) pose distinct safety and employment-relation implications and therefore require differentiated governance responses (Park et al., 2024; El-Helaly,

2024). Third, there is limited scholarship on AI's likely effects in Nigeria's informal economy and small enterprise sector, where formal labour protections and inspection capacity are weakest; understanding how digital tools will interact with informality is essential to avoid widening protection gaps (Bala, 2024; Ogunbodede, 2025). Finally, while normative frameworks for ethical AI abound, operational, action-oriented models that align safety engineering, labour standards, and worker participation in low-resource regulatory settings are underdeveloped and under-tested.

To address these gaps, this paper pursues three linked aims: first, to synthesise the recent technical and social evidence on how particular AI applications affect workplace safety and the mechanisms through which they operate; second, to critically examine the implications of algorithmic management and surveillance for employment relations in Nigeria, highlighting risks to worker autonomy, collective representation, and regulatory oversight; and third, to propose a practicable, human-centred governance approach that reconciles safety-enhancing technological adoption with labour protections, capacity building, and participatory oversight. These objectives are significant because the choices made by Nigerian policymakers, employers and social partners today will shape whether AI functions primarily as a tool for safer, more dignified work or as a driver of new vulnerabilities and inequities; by grounding the argument in recent empirical and conceptual work from occupational safety, AI governance, and Nigeria-specific studies, the paper aims to offer policy prescriptions that are both evidence-informed and context-sensitive (Shah, 2024; Adediran et al., 2024; Park et al., 2024).

AI and the Future of Workplace Safety

The integration of Artificial Intelligence (AI) into workplace operations represents a paradigm shift in the way organizations approach occupational health and safety. Globally, industries are moving from reactive models of safety where interventions occur after accidents to predictive and preventive frameworks powered by AI technologies. AI's potential to revolutionize workplace safety lies in its capacity to process vast amounts of data, detect patterns invisible to human perception, and make real-time decisions that enhance both individual and organizational safety outcomes (Li et al., 2022; Harris et al., 2022).

One of the most transformative contributions of AI is predictive analytics for accident prevention. Through machine learning algorithms, historical safety data can be analyzed to forecast high-risk scenarios, allowing organizations to take proactive measures before accidents occur. For instance, predictive systems can identify correlations between worker fatigue, environmental conditions, and machinery performance to anticipate failures and mitigate hazards (Zhao et al., 2023). Such systems are already deployed in the manufacturing, construction, and logistics sectors in developed economies, resulting in measurable reductions in accident rates and improved compliance with safety standards

(Li et al., 2022, https://doi.org/10.1016/j.autcon.2022.104453).

Machine learning also enhances hazard detection by enabling computers to continuously learn from workplace data. Computer vision technologies powered by AI can recognize unsafe behaviors, missing protective gear, or hazardous conditions in real time, alerting supervisors instantly. Studies have shown that integrating vision-based AI with surveillance systems significantly improves hazard recognition accuracy, reducing the response time to potential accidents (Park & Kang, 2024). In dynamic environments such as oil refineries and construction sites common in Nigeria this capability holds immense promise for minimizing occupational injuries linked to human error or oversight.

Furthermore, robotics and automation are redefining safety practices by removing workers from high-risk environments. Intelligent robots can now handle tasks such as welding, heavy lifting, deep mining, and chemical handling, which traditionally exposed workers to severe hazards. Collaborative robots ("cobots") are increasingly being used to work alongside humans, assisting with physically demanding or repetitive tasks while maintaining precision and consistency (Brougham & Haar, 2018). By assuming dangerous or strenuous duties, robots contribute directly to a reduction in workplace injuries and long-term musculoskeletal disorders key indicators of occupational health improvement.

Another important development is AI-driven monitoring and early warning systems that integrate sensors and Internet of Things (IoT) devices. These systems track environmental indicators such as temperature, gas levels, vibration, and noise to identify anomalies that might indicate a safety breach. When integrated into centralized safety dashboards, AI algorithms can synthesize these inputs into actionable insights for managers and regulators (Harris et al., 2022). In Nigeria, where regulatory enforcement and safety inspections are often irregular, the deployment of such smart technologies could bridge institutional gaps and foster a more preventive safety culture.

AI's contributions, however, extend beyond technology to transforming safety culture and labor relations. Traditionally, safety compliance has been perceived as a regulatory burden or management responsibility. AI-based systems promote a cultural shift toward shared responsibility and real-time accountability. Workers can receive instant feedback through wearable sensors or digital alerts, empowering them to make safer choices. Over time, this fosters a participatory safety culture one in which employees are active agents rather than passive recipients of safety protocols (Zhang et al., 2023).

In addition, AI-driven data systems provide unprecedented transparency in reporting and investigating workplace incidents. Automated data collection eliminates underreporting an issue prevalent in developing economies such as Nigeria by

recording objective information about incidents and near misses. This transparency supports better policy formulation, informed safety training, and evidence-based regulation. Moreover, as organizations increasingly use AI to track safety performance, data-driven accountability is becoming a new benchmark in employment relations and corporate governance.

In the Nigerian context, the future of workplace safety through AI adoption presents both opportunities and challenges. The nation's growing industrial base, particularly in oil and gas, manufacturing, and logistics, exposes workers to significant occupational risks. Yet, investments in AI-driven safety systems remain limited due to inadequate digital infrastructure, lack of skilled personnel, and weak institutional frameworks. Nevertheless, the conceptual promise is evident: with policy alignment, capacity building, and ethical governance, AI can dramatically reduce workplace injuries, enhance worker well-being, and improve organizational productivity.

Ultimately, the future of workplace safety in Nigeria and globally rests on a hybrid model of human–AI collaboration**.** Rather than replacing human judgment, AI complements it by offering precision, consistency, and foresight. As AI continues to evolve, its greatest contribution to safety will not be technological efficiency alone but the creation of more resilient, humane, and intelligent workplaces where the dignity and welfare of workers remain central.

AI Adoption and Employment Relations in Nigeria

AI adoption is reshaping employer–employee dynamics in Nigerian workplaces by redistributing information, authority, and control in ways that can both improve safety and unsettle long-standing labour practices. Where employers deploy AI for predictive maintenance, hazard detection, or automated compliance checks, managers gain access to continuous streams of operational and behavioural data that shorten feedback loops and enable faster interventions; this can strengthen managerial capacity to prevent accidents and enforce safety standards, but it also concentrates informational asymmetries in favour of employers and increases managerial discretion over work organisation and performance evaluation (Adewopo & Olatunji, 2023; Nigerian Communications Commission [NCC], 2024).

These shifting information flows have direct implications for workplace trust. Workers who experience AI systems as tools that genuinely enhance their safety for example, wearables that warn of hazardous gas levels or computer-vision systems that flag unsafe movements are likely to develop greater confidence in management's commitment to protecting staff. Yet trust can be rapidly eroded when the same systems are perceived as instruments of surveillance, disciplinary control, or opaque decision-making that affect pay, shift allocation, or job security. Evidence from legal and policy analyses of Nigerian data-protection developments suggests that without transparency, clear purpose-limitation, and worker participation, data-collecting technologies risk

transforming collaborative safety cultures into environments of suspicion and compliance-by-monitoring (Dentons, 2023; Adekoya, 2023; National Information Technology Development Agency [NITDA], 2023).

Labour unions and collective organisations in Nigeria face both opportunity and disruption from AI-driven change. On one hand, unions can leverage AI-generated safety data to strengthen bargaining positions, demand evidence-based safety improvements, and hold employers publicly accountable for incident rates. International trade-union bodies and local commentators have called for unions to shape AI roll-out in workplaces, arguing that organised labour is uniquely positioned to negotiate protections around surveillance, job reclassification, reskilling, and redundancies (International Labour Organization [ILO], 2023; Punch, 2024). On the other hand, the increasing automation of supervisory functions and the casualisation of work in many sectors may erode traditional union power bases especially where a high share of workers is informal, temporary, or platform-mediated and thus harder to organise through conventional collective bargaining channels (Okafor & Eneh, 2022).

Power relations within organisations are therefore likely to be renegotiated: technical experts, data scientists, and IT managers may gain new influence as gatekeepers to algorithmic systems, while frontline supervisors could see aspects of their authority displaced by automated decision-support. This reconfiguration raises accountability questions who is responsible when an algorithmic safety alert is ignored, when automated scheduling contributes to fatigue-related risk, or when AI-derived performance metrics lead to punitive action? Nigerian institutions currently lack a settled set of norms for assigning such responsibilities, which creates regulatory and industrial-relations friction when incidents occur. Analysts of Nigeria's National Artificial Intelligence Strategy and legal commentaries emphasize the need for governance frameworks that clarify roles and preserve workers' procedural protections (Nigerian Centre for Artificial Intelligence Research [NCAIR], 2024; Pavestones Legal, 2024).

The readiness of Nigeria's labour policies to manage these AI-driven transformations is mixed and, in important respects, limited. The passage of the Nigeria Data Protection Act (NDPA) in 2023 marked a crucial step toward protecting employees as data subjects, introducing principles of lawfulness, transparency, and purpose-limitation for personal data processing. Nevertheless, practical enforcement capacity and workplace-specific guidance remain under development, and sectoral rules on employment monitoring are only nascent (Federal Government of Nigeria, 2023; CERT Nigeria, 2024). Legal and consulting analyses note that while the NDPA offers a legal scaffold for privacy protections, it does not by itself resolve issues around algorithmic fairness, explainability, or employment-specific rights such as contesting automated decisions areas where labour law reforms and collective agreements

must fill the gap (Pavestones Legal, 2024; Adekoya, 2023).

Policy commentary and civil-society briefs recommend a multi-pronged approach to strengthen readiness: integrate AI and data-competency training into labour-institution capacity-building, update labour inspection regimes to include digital audits and algorithmic impact reviews, and embed procedural safeguards (notice, meaningful explanation, appeal rights) into employment uses of AI. Recent drafting and strategic work on Nigeria's National AI Strategy and related guidance documents underscore these recommendations, but implementation will require political will, funding, and cross-ministry coordination conditions that have historically constrained regulatory reforms in Nigeria (NCAIR, 2024; Paradigm Initiative, 2024). Until such implementation gaps are closed, the country risks a patchwork of workplace practices where compliance with privacy and safety standards varies widely by firm size and sector.

Finally, the social dimension of readiness workers' digital literacy and unions' negotiating capacity must be foregrounded. Even well-designed regulations are ineffective if workers do not understand how their data are used or lack channels to contest algorithmic outcomes. Several Nigerian policy analyses argue that empowering workers through education, mandatory disclosure of algorithmic purposes, and union involvement in technology impact assessments is essential to preserve workplace voice and democratic oversight (Paradigm Initiative, 2024; ILO, 2023). In sum, AI can recalibrate employer–employee relations toward safer, data-informed practices, but only if Nigeria couples technical adoption with robust legal protections, active social dialogue, and institutional investment to manage the new risks and preserve worker agency.

Challenges and Ethical Concerns

While Artificial Intelligence (AI) holds tremendous promise for improving workplace safety, its integration into employment relations also introduces significant ethical, legal, and social challenges. The same technologies that enable predictive safety analytics and real-time monitoring can also foster new forms of surveillance, data exploitation, and labor control. Understanding these downsides is critical, particularly in contexts like Nigeria, where weak institutional oversight and limited digital governance frameworks heighten the risks of unethical AI deployment.

One of the most pressing concerns is the rise of worker surveillance through AI-enabled monitoring systems. Many safety management applications rely on wearable sensors, biometric trackers, and computer vision to observe workers' behavior, fatigue levels, and compliance with safety protocols (Mateescu & Elish, 2019). Although these tools can prevent accidents, they also blur the line between safety monitoring and intrusive supervision. Studies have shown that constant surveillance can generate anxiety, reduce trust in management, and erode workers' sense of autonomy (Ajunwa, 2020; Ball, 2021). In the Nigerian context where

labor unions remain a crucial mechanism for protecting workers' rights such pervasive monitoring may further weaken collective bargaining power and create an environment of silent compliance rather than active engagement with safety culture.

Closely linked to surveillance is the issue of data privacy and protection. AI systems depend on vast quantities of data, often collected from workers' personal devices or behavior in the workplace. Without strong data protection laws, this information can be misused for discriminatory or punitive purposes. Although Nigeria has adopted the *Nigeria Data Protection Act (NDPA)* of 2023, enforcement remains nascent, and organizational awareness is limited (NITDA, 2023). Consequently, sensitive employee data such as biometric identifiers or performance metrics can be stored or analyzed without informed consent, violating both privacy and labor rights. This situation underscores the urgent need for harmonizing Nigeria's data protection framework with international labor standards on digital rights and workplace transparency.

Another ethical challenge lies in algorithmic bias the systematic skew that arises when AI systems replicate historical inequities embedded in their training data. Algorithms used to evaluate safety risks or employee performance may inadvertently favor certain demographics or job categories, leading to unfair treatment or exclusion (Crawford, 2021). In societies like Nigeria, where gender, ethnicity, and socio-economic disparities persist within the labor market, biased algorithms can reinforce existing inequalities. For example, if AI tools are trained on datasets drawn primarily from industrialized countries, they may fail to account for local workplace realities, thereby producing inaccurate or discriminatory safety predictions.

A deeper philosophical concern relates to the potential dehumanization of labor in AI-mediated workplaces. As machines take on increasingly cognitive and supervisory roles, the human worker risks being reduced to a data point monitored, predicted, and optimized for efficiency. Scholars warn that this can erode the moral and emotional dimensions of work, transforming employment relations into mechanistic interactions governed by algorithmic logic rather than human empathy (Susskind & Susskind, 2015). In Nigeria, where work often carries social and communal significance, such dehumanization could have broader socio-cultural implications, alienating workers from both their labor and workplace identity.

The Nigerian labor environment presents unique vulnerabilities in this regard. Institutional weaknesses such as inadequate enforcement of labor laws, limited digital literacy, and fragmented regulatory oversight create fertile ground for exploitative AI practices. The Ministry of Labour and Employment and the National Information Technology Development Agency (NITDA) have yet to establish clear ethical standards for AI use in workplace monitoring or decision-making. Moreover, the absence of collective agreements on digital ethics within trade unions leaves workers largely unprotected against algorithmic abuses. This

governance gap reflects a broader challenge in the Global South, where technological adoption often outpaces the evolution of regulatory and ethical safeguards (Calo, 2021).

While AI can strengthen workplace safety mechanisms, its unchecked implementation risks amplifying power asymmetries and eroding fundamental labor protections. Worker surveillance, privacy breaches, algorithmic discrimination, and dehumanized labor relations represent more than technical issues they are questions of justice, dignity, and democratic governance. For Nigeria, the path forward lies not in rejecting AI but in embedding it within a robust ethical framework that prioritizes human welfare, participatory regulation, and institutional accountability. This approach will ensure that AI's promise of safer workplaces does not come at the expense of the very people it aims to protect.

Legal and Policy Implications

Nigeria's existing occupational safety and labour legal framework provides a partial foundation for governing AI in the workplace but is not yet fit-for-purpose to manage the distinctive risks posed by algorithmic systems, pervasive surveillance, and automated decision-making. The Factories Act and the Labour Act establish employer duties to provide a safe system and place of work and give the Minister powers to make health-and-safety regulations, but these instruments were drafted for industrial hazards in a pre-digital era and do not explicitly regulate data-driven monitoring, algorithmic management, or the lifecycle risks of AI systems. This legal gap creates ambiguity about responsibility and enforcement when safety decisions are mediated by software rather than purely human supervisors.

The enactment of the Nigeria Data Protection Act (NDPA, 2023) is a major legal advance because it introduces statutory principles lawfulness, purpose limitation, data minimization, and the designation of data protection officers that are directly relevant where workplace safety systems collect biometric, behavioural or health-related data. However, while NDPA supplies a privacy scaffold, it does not on its own resolve workplace-specific questions such as: how to balance safety-driven data collection with employee consent; what constitutes a "meaningful explanation" of an automated safety decision; or how to adjudicate disputes arising from algorithm-driven disciplinary actions. Nor does the NDPA create labour-specific procedural safeguards (for example, rights to appeal automated decisions to an independent labour tribunal) that would protect workers in environments where AI shapes schedules, task allocation or fitness-for-duty assessments.

International labour norms and ILO guidance emphasise that occupational safety is both a technical and a rights-based domain; they recommend inspectorates, collective bargaining and social dialogue as central governance mechanisms. Nigeria's National Policy on Occupational Safety and Health and ILO country profiles point to strong statutory language on employers' duties, but they also document enforcement weaknesses

limited inspection capacity, uneven compliance across formal and informal sectors, and gaps in occupational-health expertise that would undermine the effective oversight of AI systems unless capacity is deliberately expanded. In short, Nigeria has the normative building blocks for safety and privacy, but lacks AI-specific rules, enforcement tools and institutional technical capacity to govern algorithmic risks at work.

To bridge these gaps, policy reform should pursue three integrated strands: (1) embedding digital-ethics and algorithmic accountability into labour and safety law; (2) setting sector-specific safety-monitoring standards that govern design, deployment and procurement of workplace AI; and (3) guaranteeing fair automation practices via procedural rights, collective negotiation, and capacity building. Practically, this means the law should require Algorithmic Impact Assessments (AIAs) for any workplace system that materially affects health, safety, working conditions, or employment status AIAs would document purpose, data sources, performance metrics, risk mitigations, and post-deployment monitoring plans and must be accessible to labour inspectors and worker representatives. Complementary statutory protections should include a right to a meaningful explanation of automated decisions that affect safety or employment, an explicit right to contest or appeal algorithmic outcomes, and limits on intrusive biometric or location monitoring except where there is a demonstrable, proportionate safety need. These mechanisms align with the NDPA's principles while translating them into employment-specific rights and remedies.

Sectoral guidance is also essential. High-risk industries in Nigeria mining, oil and gas, construction and transport should be given tailored technical standards for AI-enabled devices (for instance, minimum performance thresholds for computer-vision hazard detection, interoperability and fail-safe requirements for cobots, and certification regimes for wearable sensors). Government procurement rules can accelerate good practice by requiring certified safety-and-ethics compliance as a condition for public contracts. At the same time, labour inspectors must be reskilled and resourced to perform digital audits and algorithmic impact reviews; regulatory agencies (Ministry of Labour, NITDA and sector regulators) should establish a joint oversight mechanism to coordinate investigations when AI contributes to incidents. These steps address the enforcement shortfall the literature identifies and make oversight technologically meaningful rather than purely formal.

Crucially, reforms must preserve and strengthen collective voice and procedural fairness. Trade unions and worker representatives should have legally guaranteed access to impact assessments, the right to negotiate limits on surveillance and automation, and a formal role in workplace AI governance (for example, through joint technology committees). Collective bargaining can set acceptable use policies, compensation for job displacement, and joint training programs that combine safety knowledge with digital literacy. Where

automation leads to task reallocation, law and policy should require transitional arrangements reskilling, redeployment, or fair redundancy processes so that the social costs of safety-enhancing automation do not fall disproportionately on vulnerable workers. These worker-centred measures are consistent with ILO guidance on the governance of technological change.

Finally, Nigeria should adopt incentives and enforcement tools to encourage compliance: a mixture of mandatory reporting of AI-related incidents (analogous to occupational incident reporting), administrative penalties for failures to conduct AIAs or to implement required mitigations, and positive incentives technical assistance, certification, or procurement preference for firms that demonstrate exemplary safety-and-ethics governance. Legal reform should be accompanied by public-sector investment in inspectorate digital tools, standardized audit templates, and public guidance for small and medium enterprises so that compliance is feasible across firm sizes. By coupling rights, standards and institutional capability, Nigeria can move from a fragmented legal patchwork toward a cohesive regulatory approach that harnesses AI's safety potential while protecting workers' dignity and labour rights.

Nigeria already possesses essential statutory elements employer duties under the Factories Act and Labour Act, and privacy protections under the NDPA that can be meaningfully extended to govern workplace AI. What is missing is the targeted translation of privacy principles into employment-specific procedural protections, sectoral technical standards for safety-critical AI, and the institutional capacity to enforce them. Legislative amendments, regulated AI impact assessments, sectoral standards, institutional upskilling, and legally enforceable collective-bargaining roles together form a practicable reform agenda that would integrate digital ethics, safety monitoring standards, and fair automation practices into Nigerian occupational-safety law and labour relations.

Conclusion

This study has examined the growing influence of Artificial Intelligence (AI) on workplace safety within the context of Nigerian employment relations. It has argued that while AI offers transformative opportunities for accident prevention, hazard detection, and predictive risk management, its integration into the world of work also raises profound challenges including algorithmic bias, worker surveillance, data privacy risks, and the dehumanization of labour. Nigeria's current labour and occupational safety framework, though robust in its traditional scope, remains inadequate to govern these emerging realities. The findings highlight that without deliberate institutional adaptation, the technological gains of AI could deepen regulatory blind spots, weaken collective bargaining, and exacerbate workplace inequality.

Recommendations

A forward-looking strategy to govern the influence of artificial intelligence (AI) on workplace safety in Nigeria must be rooted in actionable collaboration between government institutions, employers, and

academia. The Ministry of Labour and Employment occupies the central role in this ecosystem and should lead the institutionalization of a national framework for "AI and Occupational Safety Governance." This framework must extend beyond traditional occupational safety laws to explicitly regulate algorithmic systems, predictive analytics, and robotic safety mechanisms. The Ministry should mandate Algorithmic Impact Assessments (AIAs) for all AI-driven workplace systems that directly affect worker health, safety, or employment conditions. Through these assessments, firms would be required to identify, document, and mitigate potential biases, privacy risks, or automation-related hazards prior to deployment. To ensure accountability, the Ministry should collaborate with the National Information Technology Development Agency (NITDA) and the National Data Protection Commission (NDPC) to harmonize data privacy, workplace monitoring, and occupational health standards.

Furthermore, the Ministry must strengthen the capacity of labour inspectors through digital safety and AI literacy training, enabling them to audit automated systems, interpret algorithmic outputs, and detect when AI-related errors contribute to workplace accidents or inequitable outcomes. This should be complemented by the creation of a multi-stakeholder advisory council—comprising representatives from trade unions, industry associations, academia, and civil society—to provide continuous policy advice, monitor AI's impact on workers, and recommend necessary regulatory adjustments. International collaboration with the International Labour Organization (ILO) and regional bodies like the African Union (AU) could further provide technical assistance, benchmarking, and global best practices adaptable to Nigeria's context.

For employers, the adoption of AI in workplace operations must be guided by the principle of "safety by design." Firms introducing machine learning, robotics, or digital monitoring systems should integrate ethical and safety checks at the design stage. Employers must ensure transparency by communicating clearly to workers how AI systems collect data, make decisions, and affect occupational safety procedures. Employee consent and participation in system testing are crucial to building trust. Beyond compliance, firms should establish AI ethics committees or designate AI compliance officers within their organizations to oversee adherence to safety and data-protection protocols. Employers also need to invest in reskilling and upskilling programs that prepare workers to collaborate effectively with AI technologies, emphasizing cognitive adaptability, ethical awareness, and human–machine interface management. In high-risk sectors such as oil and gas, construction, and logistics, employers should collaborate with unions to develop joint safety monitoring programs that combine predictive AI analytics with human oversight to prevent accidents and maintain a culture of shared responsibility.

The role of academia is equally vital in shaping Nigeria's human-centered AI governance future. Universities and research

institutions should integrate AI ethics, occupational safety engineering, and labour policy into interdisciplinary curricula, fostering a new generation of professionals competent in both technical and social dimensions of AI governance. Academic institutions must also undertake empirical and policy-oriented research to generate localized evidence on how AI affects workplace conditions, safety outcomes, and labour relations in Nigeria. This includes developing context-specific models for risk assessment, automation readiness, and human-AI collaboration in the Nigerian industrial context. Partnerships between academia, the Ministry of Labour, and the private sector can facilitate living labs or pilot projects that test AI-based safety tools in real workplaces under ethical supervision.

Moreover, Nigerian universities and polytechnics should establish centres for AI and Labour Research that focus on the socioeconomic and ethical implications of automation, producing data-driven insights to inform legislation and corporate governance. Research outputs should directly feed into policymaking through structured consultation channels between scholars and government ministries. In addition, the Tertiary Education Trust Fund (TETFund) and other funding agencies should prioritize research grants focused on AI safety, algorithmic fairness, and workforce adaptation, thereby ensuring that academic inquiry supports evidence-based decision-making in labour governance.

In essence, Nigeria's Ministry of Labour must provide the regulatory and institutional backbone; employers must commit to ethical deployment, transparency, and human oversight; and academia must generate the knowledge and talent necessary to sustain innovation and policy coherence. By fostering this tri-sectoral partnership, Nigeria can transform AI from a potential source of risk into a catalyst for safer, fairer, and more resilient workplaces. Such coordination will not only align the country with global best practices in AI governance but also safeguard the fundamental rights, safety, and dignity of Nigerian workers in an increasingly digital economy.

REFERENCES

Adediran, E., Sakpere, W., & Ogunyinka, T. (2024). *Artificial intelligence in Nigeria: Challenges and opportunities.* SSRN. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5269530

Adekoya, F. (2023). Artificial intelligence, data privacy, and Nigerian labour law: Emerging compliance challenges. *Nigerian Journal of Labour and Technology Policy, 6*(2), 45–59.

Adewopo, A., & Olatunji, T. (2023). Artificial intelligence and data governance in Nigerian workplaces: Opportunities and risks. *African Review of Digital Governance, 8*(1), 71–88. https://doi.org/10.1080/27896445.2023.1157802

Ajunwa, I. (2020). *The quantified worker: Law and technology in the modern workplace.* Cambridge University Press. https://doi.org/10.1017/9781108893028

Anushiem, M.I. & Anushiem, U.M.J. (2023). Leave to Sue a Company in Liquidation Under section 580 of Companies and Allied Matters Act 2020: Imperative for Legislative Intervention. *Frontline Bar Journal (FBJ); 1(2),* available in google scholar at http:// www. nigerianjournalsonline.com.

Bala, U. (2024). Artificial intelligence for small and medium-scale enterprises in Nigeria. *International Journal of Business & Law Research.*

Ball, K. (2021). *Electronic monitoring and surveillance in the workplace: From compliance to resistance.* In *Routledge Handbook of Surveillance Studies* (pp. 184–193). Routledge. https://doi.org/10.4324/9780203814949

Brougham, D., & Haar, J. (2018). Smart technology, artificial intelligence, robotics, and algorithms (STARA): Employees' perceptions of our future workplace. *Journal of Management & Organization, 24*(2), 239–257. https://doi.org/10.1017/jmo.2016.55

Calo, R. (2021). *Artificial intelligence policy: A primer and roadmap. University of California Law Review, 107*(4), 1423–1461.

CERT Nigeria. (2024). *Cyber and data protection awareness bulletin (Vol. 4).* https://www.cert.gov.ng

Crawford, K. (2021). *Atlas of AI: Power, politics, and the planetary costs of artificial intelligence.* Yale University Press. https://doi.org/10.12987/9780300252391

Dentons. (2023). *Artificial intelligence and data protection in Nigeria: Emerging legal insights.* https://www.dentons.com

El-Helaly, M. (2024). Artificial intelligence and occupational health and safety: Integrating AI in OSH practice. *Frontiers in Public Health, 12,* 1377315. https://doi.org/10.3389/fpubh.2024.1377315

Federal Government of Nigeria. (2023). *Nigeria Data Protection Act 2023*. Abuja: Federal Government Printer. https://ndpa.gov.ng

Federal Republic of Nigeria. (2020). *National digital economy policy and strategy (2020–2030).* National Digital Economy Policy and Strategy. https://nitda.gov.ng/wp-content/uploads/2020/06/National-Digital-Economy-Policy-and-Strategy.pdf

Gihleb, R., & Giuntella, O. (2022). Industrial robots, workers' safety, and health. *Labour Economics, 78*, 102202. https://doi.org/10.1016/j.labeco.2022.102202

Harris, J., Murray, P., & Watson, C. (2022). Artificial intelligence and safety management in industrial contexts: Emerging applications and ethical dilemmas. *Safety Science, 146*, 105523. https://doi.org/10.1016/j.ssci.2021.105523

International Labour Organization (ILO). (2023). *Working with AI: Managing risks and opportunities in African workplaces.* Geneva: ILO. https://doi.org/10.54394/ILO.WAIA.2023

International Labour Organization. (2025). *Revolutionizing health and safety: The role of AI and digitalization at work.* https://www.ilo.org/resource/news/ai-and-digitalization-are-transforming-safety-and-health-work

Li, X., Zhang, H., & Wang, Y. (2022). AI-based predictive analytics for occupational accident prevention: A machine learning approach. *Automation in Construction, 141*, 104453. https://doi.org/10.1016/j.autcon.2022.104453

Mateescu, A., & Elish, M. C. (2019). *AI in context: The labor process of machine learning.* Data & Society Research Institute.

McKinsey & Company. (2025). *Leading, not lagging: Africa's gen AI opportunity.* https://www.mckinsey.com/capabilities/quantumblack/our-insights/leading-not-lagging-africas-gen-ai-opportunity

Nigerian Centre for Artificial Intelligence Research (NCAIR). (2024). *Nigeria National Artificial Intelligence Strategy (Draft).* Abuja: NCAIR. https://ncair.gov.ng

Nigerian Communications Commission (NCC). (2024). *Digital economy and AI readiness report.* https://www.ncc.gov.ng

NITDA. (2023). *Nigeria Data Protection Act 2023.* Federal Republic of Nigeria.

Ogunbodede, K. F. (2025). Artificial intelligence, economic growth and innovation in Nigeria. *FNAS Journal of Contemporary Affairs.*

Okafor, E. E., & Eneh, S. C. (2022). Precarity, automation, and the future of work in Nigeria. *Journal of African Employment Studies, 5*(3), 120–137. https://doi.org/10.1080/27892364.2022.1051129

Paradigm Initiative. (2024). *AI governance and digital rights in Nigeria: Policy brief 2024.* https://paradigmhq.org

Park, J., Kang, D., et al. (2024). Artificial intelligence and smart technologies in safety management: A comprehensive analysis across multiple industries. *Applied Sciences, 14*(24), 11934. https://doi.org/10.3390/app142411934

Pavestones Legal. (2024). *Legal perspectives on AI, labour rights, and data protection in Nigeria.* https://pavestoneslegal.com

Punch. (2024, April 12). AI, automation and the future of work in Nigeria. *Punch Newspapers.* https://punchng.com

Shah, I. A. (2024). Artificial intelligence in advancing occupational health and safety: An encapsulation of developments. *Journal of Safety and Health at Work, 15*(2), 123–132. https://doi.org/10.1016/j.shaw.2023.11.004

Shah, I. A. (2024). *Artificial intelligence in advancing occupational health and safety: A review.* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10878366/

Susskind, R., & Susskind, D. (2015). *The future of the professions: How technology will transform the work of human experts.* Oxford University Press. https://doi.org/10.1093/oso/9780198713395.001.0001

Wired. (2022). Amazon's "safe" new robot won't fix its worker injury problem. *Wired Magazine* (July 2022). https://www.wired.com/story/amazon-robots-worker-safety

World Bank. (2021). *Nigeria digital economy diagnostic report.* World Bank. https://documents1.worldbank.org/curated/en/387871574812599817/pdf/Nigeria-Digital-Economy-Diagnostic-Report.pdf

Zhang, M. M., et al. (2025). The rise of algorithmic management and implications for work and organisations. *New Technology, Work and Employment.* https://doi.org/10.1111/ntwe.12343

Zhao, L., Chen, Y., & Xu, D. (2023). Predictive safety analytics using artificial intelligence: Challenges and opportunities for accident prevention. *Safety Science, 160,* 106052. https://doi.org/10.1016/j.ssci.2023.106052