ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug1025

Artificial Intelligence and Economic Diversification: Opportunities for Nigeria's Growth Agenda

Nubi Achebo[1]

[1]PhD, Nigerian University of Technology and Management
Apapa Lagos, Nigeria

Publication Date: 2025/09/05

Abstract: AI has spurred growth and development in virtually all nations of the world including Nigeria. The adoption has resulted in socio-economic transformation in many cases. The study draws from literature, thematic content analysis, and policy evaluation to uncover the role AI plays in agriculture, healthcare, finance, and education. The study also addresses barriers such as infrastructure limitations, ethical concerns, and regulatory challenges while offering practical recommendations for inclusive growth. While the transformation is ongoing, it is already noticeable, and the government reinforces the development by providing a policy framework. This work positions Nigeria as a pivotal case study in harnessing AI for transformation and sustainable development.

Keywords*: AI, Artificial Intelligence, Transformation, Socio-Economic Transformation, Nigeria.*

How to Cite: Nubi Achebo (2025) Artificial Intelligence and Economic Diversification: Opportunities for Nigeria's Growth Agenda. *International Journal of Innovative Science and Research Technology*, 10(8), 2306-2319. https://doi.org/10.38124/ijisrt/25aug1025

I. INTRODUCTION

The immense improvements in interconnected computers, networks, and storage have spurred the advent and rapid adoption of Artificial Intelligence technologies (Gwagwa, et al., 2021). Computing platforms that combine knowledge representation enable a broader range of users to perform complex tasks. These platforms help transform limited human, economic, and natural resources into opportunities for socio-economic development, but pose a development dilemma for the African continent. Several countries have started to explore and deploy such technologies in socio-economic activities to leapfrog several stages of development. In addressing the challenges of food security and environmental justice.

AI deployment in agriculture is limited, however, in the most vulnerable communities, those with the least capacity and severely limited access to rapid technological advances. Nigeria can hence play a leading role in its deployment if drivers can be established and an appropriate roadmap developed.

II. AN OVERVIEW OF AI

Artificial intelligence (AI) describes computer systems with human-like intelligence abilities. The systems mimic cognitive functions that enables learning and problem solving. The limits of AI prowess are still under contention; as machine capabilities improve, tasks that require human-like thinking are performed by AI technologies today. The Turing test (a measure of a machine's ability to exhibit intelligent behavior) is an important AI milestone (Iyengar, et al., 2025). A few AI technologies making a difference today, includes advanced web search engine recommendation systems (Google, Bing), speech recognition (Alex, Siri), automated driving cars (Tesla), personalization systems (YouTube, Amazon, and Netflix) voice recognition (Siri and Alexa), and decision making systems (Watson, ORION, HireVue) (Marwala, 2015).

III. AI EVOLUTION IN NIGERIA

Artificial intelligence (AI) development accelerated during World War II, driven by the adoption of the computer as a means to realize what was then known as the Artificial Brain (Prieto-Gutierrez, et al., 2023). At Harvard, Aiken constructed the first mechanical digital machines, and British researchers worked on automated computation. Due to these efforts, the

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug1025

United States saw the development of its first large-scale, general-purpose digital computer, which allowed for decision-making abilities that were previously limited to humans. These computers were used for a variety of purposes by businesses like General Motors in the early 1960s. Shakey, the first robot created by Stanford University, had the ability to analyze instructions.

The term “artificial intelligence” was introduced through multiple American institutions. AI concept was based on the idea that intelligent learning could be conceptualized and simulated by machines. There was an "AI winter" in the 1970s, marked by a decline in interest and funding. In the 2000s, significant advancements were made again, removing earlier constraints and allowing AI systems to self-learn and analyze intricate algorithms. Watson, an AI system developed by IBM in 2007, participated in Jeopardy and won in 2011 by using language analysis to process unstructured data.

The gradual but steady incorporation of technologies into vital business sectors impacted artificial intelligence (AI) development in Nigeria. At first, the most prevalent use was in financial services, especially in banking and fintech, where chatbots, fraud detection systems, and mobile payment solutions were used. AI applications began to proliferate across industries as digital infrastructure improved and more people connected to the internet (Adediran, et al., 2024). For instance, they assisted students with adaptive learning systems, physicians with diagnostic support, and farmers with precision farming. Two government initiatives contributing to the development of an environment where AI can flourish through skill development and innovation hubs are the National Digital Economy Policy and the 3MTT (Three Million Technical Talent) program.

IV. CURRENT STATE OF AI ADOPTION IN NIGERIA

Nigeria's AI ecosystem has expanded significantly in recent years thanks to startups, academic institutions, and alliances with global tech firms. To address issues that are particular to Nigeria, local innovators are developing AI solutions tailored to the nation. For instance, they are developing machine learning models for financial inclusion, AI tools for health screening in rural areas, and tools for smallholder farmers to predict crop diseases. The expansion of research facilities, hackathons, and training programs has also benefited the talent pipeline by preparing a new generation of workers for AI-related tasks (Reuben, 2023). Issues like funding gaps, concerns about data governance, and a lack of infrastructure remain unresolved. Nonetheless, the pattern indicates that AI in Nigeria is progressing from testing to complete system integration. This has the potential to alter the nation's socio-economic progress and position it as a major participant in Africa's digital revolution.

Nigeria's main industries are rapidly changing due to AI. Supply chain optimization, yield monitoring, and precision farming enabled by AI assist farmers in boosting output and lowering losses after harvest. Predictive analytics and healthcare diagnostics benefit from AI tools like vaccine optimization systems, which enhance service delivery and accessibility. AI supports individualized education in schools through digital skill training programs, adaptive tutoring systems, and government-supported initiatives like the 3MTT program, which aims to teach digital literacy and AI to millions of people (Amiri, et al., 2025).

Fintech uses AI to find fraud, score credit, and make chatbots to improve customer service and financial inclusion, especially for groups that lack access to these services. These new ideas are making things more efficient, giving more people access, and helping the economy grow. But there are still problems, such as inadequate infrastructure, a lack of local expertise, and gaps in regulations. If Nigeria keeps investing in and supporting AI policies, it could help these sectors grow and move Nigeria's development forward significantly.

V. AI IN AGRICULTURE

Agricultural innovators in the country are particularly enthusiastic about AI because of its proven success in improving yields and the intimate relationship agriculture shares with the country’s social and economic sustainability. Nigeria is also exploring new ways to incorporate AI in health technologies to aid in diagnostics and patient care. In the financial sector, AI is reshaping the landscape, driving the transformation in financial inclusion and risk assessment (Diallo, et al., 2024). Yet the country’s services sector remains generally under-automated, while the industrial and manufacturing sectors employ very few AI use cases.

AI has permeated numerous facets of daily existence, from smartphones and navigation to office software and hospital diagnostic procedures. It is engrained in contemporary media, including films, television, and reading material. AI systems like Siri and Alexa demonstrate this integration (Stone, et al., 2022). In Nigeria, AI has been embraced by sectors such as agriculture, healthcare, education, and finance.

Developments in science and technology can enhance daily living and establish new disciplines and careers. Technological progress propels growth in national sectors; diminished investment in science and technology precipitates a slowdown. AI occupies a pivotal role among contemporary technological arenas.

Nigeria is predominantly agricultural, accompanied by a populous livestock subsector. The agriculture and livestock sectors assume a leading position in the Nigerian economy (Gwagwa, et al., 2021). Consequently, adopting AI technologies generates enthusiasm among farmers and agribusiness stakeholders.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug1025

Artificial intelligence implementation fosters the emergence of technologies for efficient agricultural activities. AI techniques expedite agricultural overview and analysis, thereby aiding in advancing agricultural practices.

➢ *Technological Innovations*

Technological innovations are critical drivers of socio-economic growth. Nigeria is exploring large-scale deployment of artificial intelligence (AI) in its public and commercial spheres to boost socio-economic development (Okunlola, et al., 2025). Building on the development history of artificial intelligence applications elsewhere, Nigerian institutions are establishing AI research and innovation centers, enriching AI curricula, and implementing AI initiatives. The anticipated impact is a fundamental reshaping of socio-economic development.

➢ *Economic Impact*

Artificial intelligence (AI) encompasses a broad range of technologies including robotics that can navigate and assemble objects, and algorithms that pick stocks for investors. AI technologies have extensive effects on multiple economic dimensions and could play a crucial role in reversing stagnant productivity in developed economies. Intelligent machines, which are powerful capital-labor hybrids capable of producing output at scale, rely on data rather than money and can continuously improve by learning from data (Wiriyathammabhum, et al., 2016). There is ongoing debate about whether AI serves as a capital-augmenting factor that replaces less productive labor or as a labor-augmenting factor that complements human work.

The gradual adoption of AI and similar disruptions, as precedented by the internet, suggests a progressive integration of these technologies; however, rapid developments, such as AI self-replication or accelerated knowledge enhancement, could result in a swift transition. Achieving a human-level AI could boost economic growth to 30 per cent by 2100. Emerging technologies need to be embedded into available processes, and companies must be able to leverage them effectively. Many AI improvements will not be product innovations but rather process advancements that are more difficult to identify and thereby to evaluate.

New digital technologies have enabled new ways to conduct exchange, often in the form of new organizations such as platforms, marketplaces, and blockchain. These organizational changes have the potential to change many flows of goods and services, including finance, raw materials, energy, and so on. Many digital technologies are relatively easily transferable over long distances and tend to affect economically advanced economies first. This differential diffusion of AI is likely to influence countries' relative growth path and the pattern of international trade (Andersson Lipcsey, 2023). Nigeria's unique circumstances and socio-economic realities therefore, provide a rich area of study and "wisdom" for the rest of the developing world. Demand remains unexploited, offering significant growth potential, while AI is progressively making its way into an increasing number of fields and sectors, promising a fundamental reshaping of the country's economy.

VI. AI IN HEALTHCARE

Nigeria remains a developing nation amid the emerging industries that could potentially transform its socio-economic landscape. Artificial intelligence (AI) can provide Nigeria with enormous capabilities ranging from augmenting productivity and boosting economic growth, to providing novel solutions and enhancing people's lives. Numerous technologies connected to AI have the "potential to boost productivity and create significant new sources of value creation" (Ogunbodede & Atchrim, 2025). AI is becoming pervasive in the digital services that are shifting the balance of power between companies and countries. AI technologies magnify the impact of Big Data through advanced machine learning (ML), and standardize it. An emerging wave of AI techniques focused on developing human-like intelligence could radically alter current machine capabilities.

The increasing number of AI-related events shows that Nigeria is well-positioned to welcome this AI-driven future. Improvements in financial services, healthcare, education, and agriculture all contribute to Nigeria's improved socio-economic development. However, new issues about the nature of work and possible bias are starting to surface. In order to create a secure, reliable, and creative AI environment, a forward-thinking governance framework combines institutional interventions with regulatory measures. A promising way to manage the ongoing technological transition within the Nigerian setting emerges from a comparative analysis with other nations (Etori, et al., 2023).

ML allows discernment of patterns and predictions based on information, without explicit programing. The three key kinds of ML include "supervised, unsupervised, and reinforcement learning" (Chelliah, at al., 2023). NLP enables machines to understand, manipulate, and generate natural language, thereby creating the foundation for human-computer interactions (Lemmens, et al., 2025). CV makes it possible to retrieve meaningful information from digitital data via machine learning for use in understanding and decision-making. Early artificial-intelligence applications concentrated primarily on automating well-defined procedures based on if-then rules and deliberative reasoning. The System-AI paradigm enables human operators to use artificial-intelligence products effectively rather than replacing their judgment entirely. Consequently, many human-machine combinations currently outperform either a human or an AI system acting independently.

➢ *Improving Patient Care*

Artificial intelligence (AI) offers promising applications in healthcare that directly contribute to patient care (Hanna, et al., 2025). AI assists medical doctors in providing timely and

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug1025

effective healthcare services, especially considering the doctor-patient ratio in Nigeria. This leads to increased patient satisfaction and improved clinical outcomes. AI-enabled solutions facilitate faster and more accurate diagnoses, enabling proper care from the outset. Through natural language processing, AI also empowers healthcare workers to interpret unstructured data from medical records, such as handwritten patient notes and prescriptions. These features make it easier for healthcare services to reach people (Etori, et al., 2023).

- *Cost Reduction Strategies*

For developing nations like Nigeria, where many people lack access to basic medical services, lowering healthcare costs is essential (Ben-Caleb, et al., 2019). Nigeria's public, private, and informal sectors have all implemented AI to improve healthcare and cut costs. AI determines the most economical and successful treatment regimens by examining patient data. When financial limitations make it impossible to follow a prescribed course of treatment, it can also recommend substitute treatments. AI also makes it possible to repurpose generic or off-patent medications, which reduces the expense of creating new therapies. When combined, these strategies enhance the effectiveness and quality of services while assisting in the reduction of healthcare costs.

VII. AI IN EDUCATION

Nigeria's socio-economic development could be revolutionized by artificial intelligence (AI). Adoption of AI technologies that improve learning experiences and resource accessibility presents opportunities for notable advancements, particularly in the education sector (ifeanyi, et al., 2025).

Emerging intelligent systems enable the creation of personalized learning plans tailored to individual student profiles (Mallik & Gangopadhyay, 2023). These architectures analyze learner interests, habits, styles, and performance to recommend targeted content. As a result, students maintain motivation and achieve improved academic outcomes. Such adaptive educational services also lighten workload pressures for instructors and educational systems.

Intelligent chatbots provide interactive platforms for students to ask questions and engage in discussions. Information retrieval algorithms furnish the required data with high precision and relevance (Spasibukhov, 2025). This conversational support allows learners to engage in immediate, on-demand exchanges with their virtual assistants from anywhere.

There is the opportunity to grant students and the general public low-cost access to educational materials otherwise difficult to obtain. By curating authoritative electronic resources through intelligent filtering, it becomes feasible to offer digital copies to local institutions and industries at minimal expense. The availability of affordable, locally accessible information supports the development of training programs consistent with Nigeria's socio-economic realities.

- *Personalized Learning*

Artificial intelligence (AI) adoption in Nigeria has spurred the development of educational programs, enabling personalized learning. Machine-learning algorithms now identify key knowledge gaps and deliver targeted content to students. Because AI systems constantly analyze student interactions, they can tailor their approach to individual needs, thereby empowering learners who would otherwise lack adequate feedback (E. August & Tsaima, 2021). As a result, self-paced online courses accessible via mobile devices have become viable alternatives to in-person education. The dearth of academic resources in Nigeria further magnifies AI's contribution, making learning opportunities available to an expanding segment of the population.

- *Access to Resources*

Artificial intelligence (AI) might offer greater access to socio-economic resources, information, and participation, thereby empowering more Nigerians, eliminating wealth inequalities, and mitigating the current pattern of rich elites and the powerful keeping other citizens in a state of perpetual dependence. Agricultural innovations resulting from AI illustrate such access (Ogbuju, et al., 2025).

Despite considerable impediments in infrastructure, policy, ongoing socio-political turmoil, and the internet and mobile operators, many Nigerians still engage with AI services. One example, Kudi AI, serves as a personal banking assistant facilitating financial transactions through natural language processing through Messenger. Offering the service through Facebook Free Basics ensures no data charges, widening accessibility (Smith & Neupane, 2018). Nonetheless, rudimentary governance of technology and the enduring digital divide complicate matters still further.

VIII. AI IN FINANCE

Artificial intelligence (AI) holds great promise for spurring financial inclusion through automation, data analytics, and personalization. AI-driven innovations, both in current applications and with all of the emerging future technologies, provide significant opportunities to companies and improve the user experience of financial services (Danielsson & Uthemann, 2023).

As the financial world becomes increasingly digitalized, AI could well become the most critical transformative factor in the digital era. Today, AI in finance takes many forms, including personalized and automated financial advice, fraud detection, AI-assisted decision-making, and algorithmic equity trading. AI algorithms can recognize patterns in records, bonds, and derivative prices, and learn from them to help banks and investors manage risks and glucose performance more effectively.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug1025

Owing to the need for more efficiency, many banks are integrating FinTech into their services to provide customers with greater choice, flexibility, and control. AI, a branch of FinTech that specializes in machine intelligence, is predominantly used in investment banking (Costa, 2025; Kou, 2025; Manta, 2025).AI-powered chatbots help customers with inquiries via text or web chat, and AI systems enable personalized digital experiences by leveraging conversational data to better understand customer preferences.

AI also serves as an important tool to address ESG)criteria, a key challenge for banks seeking a competitive edge in an environment with limited resources and evolving priorities (Xu, 2024). AI can process ecological data to assess climate-related risks, monitor social and governance data such as labor practices and corporate governance, and detect non-compliance with ESG standards both within banks and among clients. Additionally, AI enhances customer engagement and personalization related to ESG initiatives.

- *Fintech Innovations*

FinTech—an acronym that blends "financial services" with "technology"—is changing how individuals and organizations manage their finances. FinTech applications already automate processes, facilitate peer-to-peer transactions, secure identity, and augment investment decisions (Costa, 2025). In developing economies, FinTech's disruptive potential could be profound because it can bridge existing infrastructure gaps. In Nigeria, many persons continue to "farm their cash" in remote villages, storing it in homes rather than banking it, and dubious counterparts routinely intercept funds when it is transferred across distances (Saleem & Mathew, 2022). FinTech innovations could, therefore, enable access to financial services for a broader range of the population.

Nigeria's lively fintech scene keeps driving economic change and making it easier for everyone to access financial services. Flutterwave, Africa's most valuable fintech, is leading the way. It processes more than $16 billion in transactions every year across 34 countries and makes cross-border payments easy. Moniepoint, a fintech that focuses on businesses, is now a unicorn with a valuation of more than $1 billion. This is thanks to a $110 million funding round that helps it expand its services in digital payments, credit, FX, and SME banking. It processes more than 800 million transactions worth more than $17 billion every month. (Vanguard News, May 15, 2025).

Stripe bought Paystack for more than $200 million in 2020. Paystack handles payments for tens of thousands of businesses in Africa, both online and in person (TechCrunch, 2020, October 15). PalmPay, on the other hand, has quickly gained 35 million registered users and about one million small and medium-sized businesses (SMEs) by leveraging smartphone users and forming strategic partnerships with device makers. OPay is still a strong player, providing a full range of options for both consumers and businesses. Public innovation is also moving forward. For example, Nigeria's national domestic card scheme, AfriGo Pay, started in January 2023 and has already given out more than 3 million cards. This encourages a cashless economy with cheaper ways to make transactions.

Interswitch, the long-established payments infrastructure provider behind Quickteller and the Verve card scheme, and Kuda, a digital-only challenger bank worth $500 million that offers neobank services to millions of customers, are two key players in this sector. These new ideas show that Nigeria is becoming a major fintech hub on the continent, filling in the gaps in access, ease of use, and financial empowerment.

- *Risk Management*

Artificial intelligence (AI) is mission critical to businesses worldwide because of its potential to enhance processes, reduce expenses, and improve accuracy (Gill, et al., 2022). Nonetheless, AI also raises serious concerns, including the need to protect human values. Common worries encompass widespread job losses due to automation. Studies estimate that 22% to 49% of jobs in the global economy and developed countries might be lost as a result of digitalization and automation. A European Parliament study from 2016 presents a more optimistic and nuanced outlook. Many occupations requiring social skills are less vulnerable, whereas routine tasks are expected to be increasingly performed by machines. Surveys reveal that a significant segment of the population believes digitalization will cause more job losses than new opportunities, with many anticipating greater social isolation due to technological changes (Walz & Firth-Butterfield, 2019).

These challenges call for effective risk management strategies when employing AI in business operations. Uncertainty and inadequacy of data can lead to decision bias, resulting in ethical problems. Management failures may also give rise to social risks such as unemployment. However, incorporating a risk management feedback loop can substantially reduce algorithmic, technological, and data risks, thereby diminishing social risks (Guan, et al., 2022).

IX. AI AND EMPLOYMENT

Artificial intelligence has already begun changing how work is done in many sectors of the economy (Ifeanyi, et al., 2025). While AI creates new jobs, it also threatens to eliminate some occupations. Proactive efforts on skills development and related areas can help the workforce prepare for a smooth transition and the opportunities ahead.

Automation technologies have already displaced many jobs in manufacturing and other sectors of the economy. However, artificial intelligence technologies may have a less severe impact on employment than in the past, since, unlike many previous technologies, AI improves workers' productivity rather than substituting for them entirely. As a general-purpose technology, AI can enhance many productivity

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug1025

tasks, thereby enabling workers to shift to higher value-added activities (Georgieff & Hyee, 2022).

Based on an in-depth assessment of the activities involved in 350 occupations and the state of AI technologies in the near future, 14% of occupations analyzed are highly exposed to AI, as about 70% of their constituent activities are likely to be automated in the future (Wang, et al., 2024). Most of these occupations are low or medium-low skilled and tend to involve predictable physical activities. By contrast, 32% of occupations have a low exposure to AI, including occupations requiring creative, social, and managerial intelligence or the use of complex perception and manipulation tasks, where progress is likely to be slower, also given the limited progress of AI in handling non-stationary environments or performing abstract tasks.

Interactions with AI systems may also change how certain key activities are performed, creating scope for pooling complementary skills and improving the overall skill content of occupations. At a regional level, AI may create additional jobs in R&D and creative activities, while the construction and mining sectors are more likely to be adversely affected.

- *Job Creation vs. Job Displacement*

Artificial intelligence (AI) presently occupies center-stage as a key enabler of socio-economic transformation. It already affects multiple industries, ranging from healthcare, education, agriculture, to finance. As businesses increasingly rely on automated intelligent systems, the technology is reshaping employment in profound ways (Bughin, 2023). The widespread fear that AI will lead to massive job destruction is undeniable. AI's task automation capability lends credibility to this narrative. Companies that substitute equipment for labor will retrench employees. A review of firms that have implemented AI, however, reveals a more nuanced interplay. Rather than suppressing employment, AI adoption often accompanies workforce expansion. AI naturally creates multiple employment avenues from consulting and system integration to staff upskilling and data labeling.

Firms that deploy AI for product innovation are more likely to increase employment than firms that do not adopt the technology. Adoption also stimulates related economic activities and generates fiscal revenue; the government may expand the public sector workforce accordingly. If companies simultaneously pursue labor retrenchment and revenue-enhancing AI deployment, the final employment figure may still be positive, provided the adoption effect dominates. Wider cross-country evidence parallels the firm-level results (Georgieff & Hyee, 2022). While the aggregate link between AI exposure and employment growth is ambiguous, a notable positive relation emerges in occupations that depend heavily on computers. Increasing productivity almost inevitably expands employment in related or complementary sectors. Long-haul trucking provides a good example.

Automated driving technology greatly enhances transport efficiency. Truck drivers will still be needed to oversee vehicle behavior and handle unforeseen events. Even if driverless technology eliminates a large share of existing jobs, the expanded freight volume will create a sufficiently large pool of ancillary employment in maintenance, logistics, insurance, and infrastructure development. Like electricity, AI constitutes a general-purpose technology with pervasive impact rather than a standalone product. For firms and workers to harness AI effectively, learning and experimentation are essential. During the transition phase, labour demand can therefore increase alongside AI adoption (Bessen, et al., 2018). The demand for AI-savvy talent has already outstripped supply in Nigeria's growing digital economy.

Employment growth is often positively associated with AI diffusion. Firms with a corporate AI stance that selectively exploits the technology for advanced objectives are especially well-positioned to increase headcount. Conversely, when AI merely substitutes for physical or intellectual labor, the technology hurts employment prospects. The interplay of AI and labor points to the primacy of skill formation. Both workers and entrepreneurs require new competencies to compete effectively in an AI-intensive environment. Skill-building is, therefore, a central theme of the Nigerian AI policy framework. Developing robust education and training programs constitutes a critical medium-term imperative for safeguarding inclusive development (Shittu, et al, 2024).

People in Nigeria are worried about AI taking their jobs because it could automate routine tasks in fields like banking, retail, transportation, and customer service. A lot of workers are worried about losing their jobs in an economy that already has high unemployment. AI promises efficiency and productivity but the fact that not everyone has digital skills makes people even more worried about being left out. Experts say that automation could make inequality worse if there aren't proactive policies, reskilling programs, and digital education that includes everyone. To ease these worries, the system needs to find a balance between using AI and developing a workforce that puts people first Al-Anyanabo, 2024).

- *Skills Development*

The diffusion of AI systems is influencing the nature of work and the skill profile of job seekers, although the direction and amplitude of the effects are ambiguous. AI is replacing routine and repetitive tasks, alongside specific cognitive roles, but also creates new opportunities requiring additional skills. These new occupations and the related skills and specialization requirements should be examined to understand the complex relationship between emerging technologies and the labor market, as well as the skills required. Skill diversification remains an indispensable factor complementing digitalization and can reduce individuals' displacement risk caused by AI. Some digital skills, such as programming and software design, reduce the displacement risk that AI produces, and individuals

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug1025

who possess these skills can even benefit from the reallocated labor force (Chen, et al., 2022).

In addition to the displacement on the labor market, studies on economic history have shown that newcomers need additional skills and that the new task descriptions need consideration when forecasting the emerging challenges presented by AI. Recommendations can be made at the current stage, particularly regarding the future career plans of students. Skill profiles of AI-exposed occupations are much more diversified than those of automation-exposed occupations, which can be explained by the strong complementarity introduced by AI (Stephany & Teutloff, 2022). The maturing phase of the AI revolution, therefore, promises to become a very different process of fundamental change than previous technological shocks, primarily driven by automation.

Table 1 Thematic Findings on AI in Nigeria

Theme	Key Findings & Trends
1. Growth of the Economy & Sectoral Productivity	• Agriculture: AI supports precision farming, supply chain optimization, yield monitoring, and postharvest reduction, boosting efficiency and yields. • Healthcare: Tools like ADVISER Optimiser improved vaccine targeting in Oyo State, increasing uptake in thousands of families. • Finance & Services: AI-enabled chatbots and fraud detection strengthen financial inclusion and service efficiency. • Trend: AI-driven efficiency gains are spreading gradually across key sectors with pilot-level successes.
2. Skills, Education & Workforce Development	• National Strategy: The 3MTT program aims to train 3 million Nigerians in digital/AI skills by 2027, with thousands already enrolled. NGO & Startup • Training: Elite Global AI trained 30,000+ youths in AI skills as of 2024, targeting 1 million by 2030. • Education Innovation: LLM-based tutoring pilots are underway in secondary schools. • Trend: Rapid expansion of human capital development with both formal and informal AI learning pathways.
3. Language, Culture & Inclusion Equity	• Digital Divide: Persistent gender and rural–urban gaps limit equitable access to AI. • Language Inclusion: CDIAL's Indigenius platform enables communication in 180 African languages, enhancing access and preserving culture. • Gender-focused Outreach: Groups like Tech Herfrica boost rural women's digital literacy and market access, raising incomes by ~50%.
4. Governance, Ethics & Regulation	• Policy Development: The National AI Strategy (Aug 2024) sets out AI's role in multiple sectors, data privacy, regulation, and infrastructure plans. • Ethical Concerns: Key risks include bias, privacy breaches, job losses, and overdependence on technology. • Global Context: 'AI-as-aid' frameworks raise sovereignty and fairness concerns in the Global South.
5. Challenges & Structural Barriers	• Infrastructure: Poor connectivity, limited compute capacity, and unreliable electricity remain constraints. • Skills Gap: Reskilling is slow, while displaced jobs increasingly require advanced technical expertise. • Inequality: AI development is concentrated in urban centers like Lagos, widening regional and socio-economic divides.

X. POLICY FRAMEWORK FOR AI DEVELOPMENT

The Nigerian government acknowledges artificial intelligence (AI) as a major policy thrust capable of propelling the country forward. In 2019, Nigerian communications minister Isa Ali Pantami highlighted the need to establish an environment that promotes AI for national development but stated that "to date, no known, standalone and coordinated national approach exists to leverage AI in transforming Nigeria" (Diallo, et al., 2024). This policy vacuum delays access to the advantages of AI as first-mover countries rush to adapt. Accordingly, the Nigerian Ministry of Communications launched an inclusive nationwide approach to address this space. Ahead of the AI-themed Digital Africa Convention in late February 2023, the ministry unveiled the national AI policy and framework. The core policy thrust includes developing an AI ecosystem, skills, and partnerships; promoting ethical, legal, and responsible AI use; and encouraging innovation. The framework identifies four thematic clusters—policy formulation and legal review; governance, ethics, equity, and inclusion (GEEI); development and showcase; and awareness and capacity-building—that establish a template for AI adoption across sectors.

Although Nigeria's national AI policy and framework constitute a significant step forward, several challenges require consideration. One widely cited concern about AI involves the proliferation of biased datasets and algorithms calibrated on unrepresentative, non-inclusive data. Insufficient efforts to

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug1025

develop AI systems with a commitment to fairness and non-discrimination risk perpetuating historic inequalities and creating new ones both within nations and between them. Yet, governance mechanisms remain far from adequate to address these issues. Of particular concern is the inability of governmental frameworks to ensure that inadequate, incomplete, or biased inputs do not turn into harmful and exploitative outputs (Naidoo, et al., 2022). Nigeria also lacks the full regulatory frameworks common elsewhere. Although the National Data Protection Regulation adheres to international best practices and stipulates frameworks for data privacy protection, regulations on intellectual property rights, liability, transparency, accountability, and other issues require assessment and improvements.

- *Government Initiatives*

Recognizing artificial intelligence (AI) as an indispensable pillar for the Fourth Industrial Revolution, the Nigerian government endeavours to leverage it with the ultimate goal of socio-economic transformation. These efforts align with the ambition to position Nigeria among the top 10 economies globally and elevate 100 million citizens beyond the poverty threshold by 2030 (Majeed, et al., 2025). To this end, the National Artificial Intelligence Policy and Strategy comprehensive framework is crafted in line with international best practices and socio-economic realities. The government is currently engaging the National Assembly to promulgate the National Artificial Intelligence Bill, intended to establish a legal basis for AI development and governance.

As AI increasingly permeates every facet of human endeavour, Michelle (2020) underscores the urgency in managing its complexities and challenges. Accenture reveals that a modest 1% growth in AI adoption within Nigeria's banking sector could augment the country's gross value addition by up to 29 trillion naira by 2035, demonstrating the sector's pivotal role in socio-economic development. Applied Science & Technology suggests that in Nigeria, AI adoption is critical for repositioning the banking industry as a transformative force propelling the economy toward vision 2030. The National Digital Masterplan 2022-2032 envisages transformative impacts of AI on agriculture and healthcare, aiming to address pressing challenges and foster sustainable socio-economic development. Emulating Kenya's proactive stance, a dedicated AI taskforce was instituted in 2018 to formulate a national AI strategy, with the 2022 plan recommending legislation to establish an enabling regulatory framework enhancing digital competitiveness, as emphasized during the 2023 Presidential directive. These policy precedents inform Nigeria's approach to AI resource management and governance. (Diallo, et al., 2024)

- *Compliance Challenges*

Rapid AI-based technologies development presents a new set of regulatory challenges for governments.. Regulatory frameworks are essential to promote trust in AI technologies and set clear rules of the road that incentivize investment and innovation. Governments in Africa are aware of the urgency of raising the continent's technology capacity, but many countries still lack comprehensive AI strategies… The adoption of AI-based technologies raises important questions about what types of regulations should be put in place and whether new institutions should be created to address the associated challenges.

Despite the promising outlook, policymakers should be mindful that these technologies raise important regulatory issues that merit serious consideration. Because AI-based systems "learn" from the data they are given access to, it is crucial to have a robust set of controls in place to prevent negative externalities and avoid the long-term accumulation of risks; and unfortunately, the predictability of the consequences of AI technologies is low due to the complexity of the algorithms and their ever-increasing autonomy (Abrardi, et al., 2019).

XI. ETHICAL CONSIDERATIONS IN AI

Ethical considerations hold substantial importance in AI practice, particularly in areas where the technology is evolving and regulatory frameworks may be inadequately developed. AI algorithms often display inadvertent biases that negatively affect marginalized social groups; discriminatory AI algorithms intensify pre-existing inequalities. This is especially concerning in societies afflicted by social inequalities and biases, as algorithmic biases often violate human rights.

Another important moral issue is invading someone's privacy. Modern AI systems use a lot of data, and if this data is not handled properly, it could be used for illegal purposes or stolen. Because modern AI architectures are complicated and spread out, limited access is easier to manipulate, which hurts the privacy of both individuals and society as a whole. Societies must therefore create new standards that can regulate AI methods before they become widely used (Dent, 2020).

- *AI Bias*

Since bias has been established in Ai systems, there is a need to address it long-term. The goal of fairness in AI is to ensure that all groups have the same chances of achieving positive outcomes, which supports the principles of non-discrimination (Bohdal, et al., 2023). "Equalized odds" make this official by requiring the same rates of true positives and false positives across different demographic groups. A less strict version requires similar distributions of positive outcomes. These standards help people judge fairness in different situations.

Smaller worst-case errors mean better fairness. A stricter standard looks at how well a system can handle changes in data distribution, which is important for real-world deployments that have to deal with different data sources, like sensors that may not all function the same way. In this case, enforcing fairness stops discrimination that comes from differences in equipment

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug1025

or the environment. The social aspect includes high-stakes cases where uncorrected bias leads to systemic socio-economic marginalization. This is because biased decisions and information make differences worse and break down social cohesion over time.

In discussions of fairness and bias, "conservative AI" refers to technologies that support current social orders by not questioning unfair systems (Zajko, 2020). Algorithmic mechanisms devised for oppression have catalyzed initiatives aimed at enhancing fairness and mitigating bias; however, frameworks rooted in social theory expose unexamined forms of conservatism. Interdisciplinary approaches foster the identification of novel issues; although remedies for recognized societal biases are suggested, analyses frequently overlook the origins of structural inequality or regard discrimination arising from pervasive social patterns as historical certainties. This kind of neglect makes it harder to see the bigger picture, and it limits the technical goals of fairness to mathematical formalisms that don't connect to real life. So, it is a mistake to think of fairness and justice as separate from the social context. Sociotechnical perspectives enhance understanding and inform remediation strategies; however, the incorporation of a social dimension is inadequate without systemic involvement (El Mimounl, et al., 2025).

- *Privacy Concerns*

Privacy issues are a major problem at the crossroads of data protection law and artificial intelligence (AI), and they affect both people and the economy. AI presents particular challenges as algorithms generally necessitate access to comprehensive patient data, which is frequently utilized in dynamic manners over time. It is also important to know the location of the servers that store and access patient information, as well as who owns them. This suggests that regulations should require data to be kept in the same place where it was created. When institutions work together to uphold data protection standards, strong privacy protections become possible.

In response to apprehensions about corporate mishandling of patient information, groups demand oversight of big data health research and related technologies. These issues undermine public trust, as many individuals remain reluctant to share health data with technology firms or doubt the adequacy of security measures. Despite the controversy, some hospitals continue to share non-anonymized patient records with commercial entities, thereby attracting increased regulatory scrutiny and litigation risk. Healthcare data breaches have escalated in numerous countries, and advanced algorithms can re-identify individuals even in anonymized datasets. Moreover, data collected by consumer genetic-testing companies potentially enables identification of a substantial fraction of the population, with ongoing increases anticipated (Murdoch, 2021).

It is noteworthy to highlight that Nigeria data protection laws are still evolving and not on par with those in the EU, Canada, or South Africa. The laws on Data Protection are soft codes with no legal authority. A section of the Nigerian Constitution guarantees citizens' right to privacy, but with no enforcement mechanisms. Furthermore, the constitutional privacy right applies exclusively to citizens, leaving non-citizens without clear protection. Specific privacy legislation is absent, as is dedicated legal regulation of information and communication technology data security (Akindele, 2017).

XII. CASE STUDIES OF SUCCESSFUL AI IMPLEMENTATION

Case studies provide concrete instances of AI's deployment between explored dimensions and the actual socio-economic realities of developing countries. Nigerian startups such as Data Science Nigeria, InstaDeep, and Kudi.ai develop AI solutions relevant to agriculture, healthcare, finance, and education. Nigeria also benefits from AI partnerships with external entities, including Microsoft, Google, and IBM, which provide consulting, cloud services, business support, and educational programs (Trivedi, et al., 2019).

- *Local Startups*

AI startups are playing a significant role in Nigeria's national artificial intelligence ecosystem development. During the COVID-19 lockdown, following the closure of many core economic sectors, numerous AI-fuelled technology startups emerged in Nigeria to address the disrupted supply of essential services (Okoro Ajah & Ononiwu, 2021). For example, uLesson offers remote AI-powered learning for primary and secondary school students studying the West African Senior School Certificate Examination. Notable startup failures in Nigeria include OLX, which ceased operations in 2018 after an eight-year presence, and Easy Taxi, Nigeria's first online taxi network, which shut down in 2016. Startups face extreme uncertainty during early development phases, and changes in conditions during this gestation period make survival highly challenging. Many introductory software tools, such as TensorFlow, are offered free under Open Source licenses (Bessen, et al., 2018). Large firms may possess advantages from economies of scale or network effects when fixed AI development costs are substantial.

Startups tend to sell disproportionately to mid-sized firms, providing more affordable AI solutions than in-house development. Data protection regulations can also elevate entry barriers for startups; higher protections for European customers are particularly impactful. Large firms invest more heavily in AI than startups, notably within the transport and logistics sector, likely related to high entry costs. Current AI applications primarily augment, rather than replace, human capabilities; many customers use AI to create jobs in management, professional, sales, and marketing domains. Employment declines are observed in service, clerical, and

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug1025

manual occupations. The effects on employment could become more consequential over a longer horizon.

➢ *International Collaborations*

International collaborations are a key component of Artificial Intelligence adoption, particularly within emerging economies such as Nigeria. Such partnerships allow the country to absorb relevant foreign technologies, develop its domestic AI capabilities, and introduce innovative economic growth models (Tang, et al., 2022). Several Nigerian startups are working to leverage these international relationships to build and enhance AI-based solutions within the local context (Tang, et al., 2021). However, there are a number of real-world limitations that call for more research on the broad international collaboration needed to optimize AI's revolutionary effects.

XIII. CHALLENGES TO AI INTEGRATION

The absence of sufficient digital infrastructure to facilitate AI development and adoption significantly limits Nigeria's successful AI adoption (Lu, et al., 2022). This deficiency shows up as slow data speeds, limited Internet access, a lack of modern facilities and technical expertise, and a failure to adequately integrate appropriate AI tools into current infrastructure and organizational procedures. The lack of common standards for AI-related systems and products makes it more difficult for SMEs and startups to fully adopt the technology. Issues with data quality also present difficulties, such as limited availability, inconsistent standards, incompatible formats, poor integration, a lack of transparency, and generally poor quality.

These problems are particularly acute given that many companies continue to employ non-digital or unstructured data sources. Weighing the cost and effort of procuring and processing high-quality digital data for AI applications against the benefits of implementation often deters organizations from adopting AI solutions.

➢ *Infrastructure Deficiencies*

Nigerian infrastructural challenges are well known. Urban spaces exemplify the tensions that have emerged in the midst of rapid transformation (Okoro, et al., 2016). Impressive urbanization rates have stimulated multiple infrastructural and institutional challenges in Nigeria. Infrastructure is almost in a state of collapse in the light of increasing spatial expansions that provide spillovers into the outskirts and beyond the perimeter. There is a huge deficit in the housing stock. Urban infrastructure is crucial for optimal performance of the economy through output, employment motivation, and overall wellbeing. It is the basic prerequisite for the promotion of trade and development of industries, health facilities, communications, and urban amenities in general.

Urban infrastructure is fundamental for regional economic activities and the movement of goods and services. Provision of adequate urban infrastructure is a vital part of the necessary foundation upon which an economy is built. Proper design and provision of urban infrastructure reduce production cost, enhance production efficiency, and encourage competition within industries so that maximum output per unit of input is realized, which in turn increases income per capita and general standards of living. Governments and administrations that do not recognize these facts find it difficult to reduce or eradicate poverty and subsequently produce stagnated economic growth.

➢ *Funding Limitations*

In Nigeria, there is artificial intelligence (AI). Many universities don't have the right tools to do high-quality AI research and analyze complex data. This lack of money makes it much less appealing for academics to continue their studies or work on AI-related projects. Consequently, a limited number of universities in Nigeria have effectively conducted significant AI research (Gwagwa, et al., 2021).

XIV. FUTURE PROSPECTS OF AI IN NIGERIA

New AI technologies have a lot of potential to help Nigeria solve its biggest problems. If everyone in the country used AI, the GDP could grow by double digits over the course of a decade. In the short term, ongoing activities would have positive effects. Nigeria needs to deal with a number of important issues and put in place a wider range of enabling mechanisms in order to grow its operations and take advantage of AI-driven development. These solutions will not only benefit the country but could also be extended to other developing nations with similar economic environments and opportunities (Gwagwa, et al., 2021).

➢ *Emerging Technologies*

New AI technologies will significantly impact the overall growth and prosperity of all nations in the coming decades. Given Nigeria’s young and rapidly urbanizing population, such technologies will inevitably have a marked influence on the country’s socio-economic development (Thaci, et al., 2024). Consequently, intelligent systems can undertake activities such as problem-solving, pattern recognition, and language understanding without explicit programming. According to the UK Office for National Statistics, AI systems are considered distinct from ordinary computing systems because they extract rules for actions from data with minimal human intervention.

Computer vision, voice recognition, natural language processing, driverless cars, and predictive analytics are a few critical AI technologies in use today (Chinnaiyan, et al., 2025). In Nigeria, innovations are revolutionizing labor-intensive sectors such as agriculture, for example, through improved disease detection and automated irrigation scheduling. (Gwagwa, et al., 2021, Abrardi, et al., 2019)

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug1025

➢ *Long-Term Economic Impact*

"Applications of artificial intelligence will generate a global economic impact of $15.7 trillion by 2030" (PwC, 2017). One trillion dollars will come from increased productivity, $6.6 trillion will be generated through consumption-side effects, and the remaining $7.1 trillion will be driven by the impact of increased product personalization (Andersson Lipcsey, 2023). A permanent increase of 14–30 per cent in gross domestic product can be anticipated for most developed economies, while the impact for developing countries is expected to remain below 10 per cent. Countries that have an export basket skewed towards manufacturing and services will experience the largest boost. The transition from an unautomated economy could gradually take around 75 years, following a trajectory similar to previous technological disruptions. The most disruptive discontinuity would arise beyond 2040, from the development of self-replicating machines, an event potentially capable of triggering almost instantaneous automation. At the same time horizons, continuing progress in AI could create scenarios offering the possibility of human-level general intelligence (Raman, et al., 2025). Projections indicate a potential 30-percent increase in long-run economic growth by 2100.

The developments of artificial intelligence in Nigeria are closely aligned with global trends. Various artificial intelligence applications have been utilized throughout Nigeria, ranging from large companies and financial institutions to government bodies, the armed forces, and the mass transportation sector. Although artificial intelligence technology has not yet been incorporated into all spheres of the Nigerian economy, every sector in Nigeria is expected to adopt the technology in the near future.

XV. COMPARATIVE ANALYSIS WITH OTHER NATIONS

Nigeria can learn from how both developing and developed countries have dealt with AI development. The problems that other developing countries are having could help. Numerous reports have emphasized AI readiness and adoption in larger economies, including Nigeria and South Africa, as well as in technologically advanced nations like Rwanda. Kenya and Mauritius are two other countries that have recently improved their digital infrastructure and AI-enabling capabilities. They are also good examples. A lot of African countries are using AI to help with important socio-economic development needs (Kouty & Lemma, 2025).

The legislative frameworks analyzed in connection with these initiatives include formal efforts like national AI strategies or digitization plans, as well as more general activities that show real progress toward technological development goals centred on AI. Changes in policy that are meant to improve parts of the national innovation ecosystem have led to big jumps in AI readiness scores. Most of these countries are in the middle of the pack globally, but they are near the top of the continent. The case of Mauritius shows how scores can be heavily weighted in some areas, such as data and infrastructure, while hiding weaknesses in other areas, such as data regulation. Kenya exhibits a comparable dynamic, characterized by a low governance score alongside indications of a strategic initiative aimed at fostering an environment conducive to AI development. (Diallo, et al., 2024)

➢ *Lessons from Developing Countries*

Developing countries can draw lessons from AI deployment examples to inform their trajectories (Okorie, 2018). One opportunity lies in enhancing smallholder agriculture and food production systems. Understanding innovation inputs, outputs, and diffusion pathways is essential for directing investment and developing appropriate technologies. AI offers tools for mapping agricultural innovation systems and harnessing data to understand key pathways (Gwagwa, et al., 2021). It can also connect farmers to new markets and knowledge sources without resorting to costly travel.

Nevertheless, developing countries must upgrade their data infrastructure to manage big data for effective machine learning. Without doing so, some nations risk adopting AI solutions that do not address their specific needs. For African countries to fully take part in global supply chains and export trade, they need to negotiate trade rules effectively, strengthen their regulatory frameworks, and mitigate the risk of being replaced. The RadAI network has found a number of ethical issues related to decision-making and future ethics related to AI development. To make sure that automation has a positive effect without displacing families or hurting social cohesion, governance structures must be in line with African cultural values.

➢ *Best Practices from Developed Nations*

Africa's experiences with AI demonstrate the continent's strategic implementation of emerging technologies to tackle social and economic issues (Gwagwa, et al., 2021). Nigeria can learn from other countries at a similar level of development to avoid making the same mistakes and copy what works. Nigeria can learn from the ways that other countries have used AI to make big changes in their economies and societies. This will help Nigeria adopt AI more quickly. The country can look to successful strategies used in other places to solve problems like a shortage of skilled workers or inadequate infrastructure. Developed countries have also built strong connections between established institutions, research groups, and private businesses. These connections are the foundation of their AI transformation, and they have stressed this as a practical approach.

Nigeria is at the nascent stages of AI adoption. To improve both speed and quality, investments in people must happen alongside improvements to infrastructure. But progress is being slowed down by either a policy framework that hasn't yet dealt with strategic areas or the difficulties that come with reforming institutions. Identifying key action areas can help

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug1025

solve this problem with resources. A look at examples from around the world of AI-led economic change shows how the Nigerian government and private sector can help in this early stage.

XVI. CONCLUSION

The AI phenomenon is moving at a fast pace, changing world economy and promising new levels of growth and prosperity. Developed countries are leading the way, but developing economies are also starting to use AI. Nigeria is becoming a major player because the government has recently supported it and there are many people there who are skilled in technology. AI can help Nigeria address its challenges, such as widespread poverty, reliance on crude oil, and high unemployment. AI offers transformative opportunities that fit the country's needs and strengths. Nigeria's national development plan places significant emphasis on building AI hubs because it recognizes the value of AI. These hubs will help train the next generation in AI and technology.

The overview of AI gives us a starting point for understanding how it could change many areas of Nigeria. Since Nigeria started using AI in 2017, the government has worked hard to speed up the "integration of AI into the economy" (Balogin, 2025). This has led to a new phase of socio-economic growth in the country, guided by clear policies. AI technologies offer many benefits, which shows how important it is for governments to have strong policies and national frameworks that support AI research and innovation. Agricultural automation is just the beginning of AI's big effects on Nigeria's economy and society. This makes it imperative for Nigeria to have targeted programs that help it move away from relying on oil and manual labor and toward a more diverse, highly automated economy with a lot of jobs in the service sector (Gwagwa et al., 2021).

REFERENCES

[1]. Abrardi, L., Cambini, C., & Rondi, L. (2019). *The Economics of Artificial Intelligence: A Survey. Robert Schuman Centre for Advanced Studies Research Paper* No. RSCAS, 58.

[2]. Adediran, E., Sakpere, W., & Ogunyinka, T. (2024). Artificial Intelligence in Nigeria: Challenges and Opportunities. Available at SSRN 5269530.

[3]. Akindele, R. (2017). Data protection in Nigeria: Addressing the multifarious challenges of a deficient legal system. *Journal of International Technology and Information Management*, 26(4), 110-125.

[4]. Al Onyanabo, T. (2024, September 17). Title: AI and Workforce Displacement: Strategies for Mitigation in Nigeria. https://www.researchgate.net/publication/384079821_Title_AI_and_Workforce_Displacement_Strategies_for_Mitigation_in_Nigeria

[5]. Amiri, S. M. H., Islam, M. M., & Akter, N. (2025). Rethinking Education Policy: Pathways to Equitable and Future-Ready Learning. Available at SSRN 5194153.

[6]. August, S. E., & Tsaima, A. (2021). Artificial intelligence and machine learning: an instructor's exoskeleton in the future of education. In Innovative Learning Environments in STEM Higher Education: Opportunities, Challenges, and Looking Forward (pp. 79-105). Cham: Springer International Publishing.

[7]. Balogun, I. I. (2025). The impact of AI adoption in protecting patient's information in the healthcare industry (Doctoral dissertation, Walden University). Walden Dissertations and Doctoral Studies. *https://scholarworks.waldenu.edu/dissertations/17555. (n.d.).*

[8]. Ben-Caleb, E., Otekunrin, A. O., Rasak, B., Adewara, S. O., Oladipo, O. A., & Eshua, R. (2019). Cost reduction strategies and the growth of selected manufacturing companies in Nigeria. *International Journal of Mechanical Engineering and Technology* (IJMET), 10(3), 305-312.

[9]. Bessen, J. E., Impink, S. M., Reichensperger, L., & Seamans, R. (2023). The business of AI startups. Boston Univ. School of Law, Law and Economics Research Paper, (18-28).

[10]. Bohdal, O., Hospedales, T., Torr, P. H., & Barez, F. (2023). Fairness in AI and its long-term implications on society. *arXiv* preprint arXiv:2304.09826.

[11]. Chelliah, P. R., Jayasankar, V., Ågerstam, M., Sundaravadivazhagan, B., & Cyriac, R. (2023). The power of artificial intelligence for the next-generation oil and gas industry: Envisaging AI-inspired *intelligent energy systems and environments. IEEE Press (Wiley).*

[12]. Chen, N., Li, Z., & Tang, B. (2022). Can digital skill protect against job displacement risk caused by artificial intelligence? Empirical evidence from 701 detailed occupations. *PLoS One*, 17(11), e0277280.

[13]. Chinnaiyan, B., Balasubaramanian, S., Jeyabalu, M., & Warrier, G. S. (2025). AI Applications–Computer Vision and Natural Language Processing. Model Optimization Methods for Efficient and Edge AI: *Federated Learning Architectures, Frameworks and Applications*, 25-41.

[14]. Costa, D. (2025). The future of fintech: The adoption of new technologies in banking and financial services. Technological Forecasting & Social Change, 213, 123891. https://doi.org/10.1016/j.techfore.2025.123891.

[15]. Danielsson, J., & Uthemann, A. (2023). On the use of artificial intelligence in financial regulations and the impact on financial stability. *arXiv* preprint arXiv:2310.11293.

[16]. Dent, K. (2020). Ethical considerations for AI researchers. arXiv preprint arXiv:2006.07558.

[17]. Diallo, K., Smith, J., Okolo, C. T., Nyamwaya, D., Kgomo, J., & Ngamita, R. (2025). Case studies of AI policy development in Africa. *Data & Policy*, 7. https://doi.org/10.1017/dap.2024.71

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug1025

[18]. El Mimouni, S., & Bouhdadi, M. (Forthcoming 2025). *Fairness and bias in AI: A sociotechnical perspective*. *Journal of Information, Communication and Ethics in Society*. https://doi.org/10.1108/jices-12-2024-0182

[19]. Etori, N., Temesgen, E., & Gini, M. (2023). What we know so far: Artificial intelligence in African healthcare. *arXiv preprint arXiv*:2305.18302.

[20]. Georgieff, A., & Hyee, R. (2022). Artificial intelligence and employment: New cross-country evidence. *Frontiers in artificial intelligence*, 5, 832736.

[21]. Gill, N., Mathur, A., & Conde, M. V. (2022). A brief overview of AI governance for Responsible Machine Learning Systems. *arXiv preprint arXiv*:2211.13130.

[22]. Guan, H., Dong, L., & Zhao, A. (2022). Ethical risk factors and mechanisms in artificial intelligence decision making. *Behavioral Sciences*, 12(9), 343.

[23]. Gwagwa, A., Kazim, E., Kachidza, P., Hilliard, A., Siminyu, K., Smith, M., & Shawe-Taylor, J. (2021). Road map for research on responsible artificial intelligence for development (AI4D) in African countries: The case study of agriculture. *Patterns*, 2(12).

[24]. Hanna, M. G., Pantanowitz, L., Dash, R., Harrison, J. H., Deebajah, M., Pantanowitz, J., & Rashidi, H. H. (2025). Future of artificial intelligence (AI)-machine learning (ML) trends in pathology and medicine. *Modern Pathology*, 100705.

[25]. Ifeanyi, U. S., Nwokoro, A. N., & Ojiako, E. U. (2025). Artificial intelligence and economic growth in Africa: challenges and opportinities. AJAP-AMAMIHE *Journal of Applied Philosophy*, 23(3).

[26]. Iyengar, S. S., Nabavirazavi, S., Hariprasad, Y., HB, P., & Mohan, C. K. (2025). The Evolution of Artificial Intelligence and Machine Learning. *In Artificial Intelligence in Practice: Theory and Application for Cyber Security and Forensics* (pp. 3-26). Cham: Springer Nature Switzerland.

[27]. Kou, G., Xu, Y., Peng, Y., & Shen, F. (2025). Artificial intelligence in finance: Applications, *challenges, and opportunities. Financial Innovation*, 11(1), 25. https://doi.org/10.1186/s40854-024-00668-6.

[28]. Kouty, M., & Lemma, A. (2025, April). *Unlocking growth through the AfCFTA Digital Trade Protocol: A focus on e-commerce in Cameroon* (ODI Global Briefing Paper). London: ODI Global. Retrieved from ODI Global website.

[29]. Lemmens, A., Roos, J. M. T., Gabel, S., Ascarza, E., Bruno, H., Gordon, B. R., Israeli, A., McDonnell Feit, E., Mela, C. F., & Netzer, O. (2025). *Personalization and targeting: How to experiment, learn and optimize*. *International Journal of Research in Marketing*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4878819

[30]. Lipcsey, R. A. (2023). The transformative effects of AI on international economics. *arXiv preprint arXiv*:2312.06679.

[31]. Lu, X., Wijayaratna, K., Huang, Y., & Qiu, A. (2022). AI-enabled opportunities and transformation challenges for SMEs in the post-pandemic era: a review and research agenda. *Frontiers in Public Health*, 10, 885067.

[32]. Majeed, A. H., Abbas, A. F., Kadhim, K. G., & Kzar, M. F. (2025). Poverty reduction and the sustainable development goals: a bibliometric study focused on the Global South. *Development in Practice*, 35(1), 127-151.

[33]. Mallik, S., & Gangopadhyay, A. (2023). Proactive and reactive engagement of artificial intelligence methods for education: a review. *Frontiers in artificial intelligence*, 6, 1151391.

[34]. Manta, O. (2025). Artificial intelligence and FinTech integration: Enhancing efficiency, security, and customer experience in digital banking. *Journal of Intelligence*, 4(2), 13. https://doi.org/10.3390/jint4020013.

[35]. Marwala, T. (2015). Impact of Artificial Intelligence on Economic Theory. Prieto-Gutierrez, J. J., Segado-Boj, F., & Da Silva França, F. (2023). Artificial intelligence in social science: A study based on bibliometrics analysis.

[36]. Murdoch, B. (2021). Privacy and artificial intelligence: challenges for protecting health information in a new era. *BMC Medical Ethics*, 22(1), 122.

[37]. Naidoo, S., Bottomley, D., Naidoo, M., Donnelly, D., & Thaldar, D. W. (2022). Artificial intelligence in healthcare: Proposals for policy development in South Africa. *South African Journal of Bioethics and Law*, 15(1), 11-16.

[38]. Ogbuju, E., Abdullahi, B. E., Umar, H., Raheem, B. D., Kasum, Y. K., Abiodun, T., & Oladipo, F. (2025). The Role of Artificial Intelligence in Poverty Alleviation during the Fourth Industrial Revolution. In AI for Humanitarianism (pp. 38-50). CRC Press.

[39]. Ogunbodede, K. F., & Atchrim, I. A. (2025). Artificial Intelligence in Nigeria: A Catalyst for Economic Growth, Innovation, and Technological Advancement. Faculty of Natural and Applied Sciences *Journal of Computing and Applications*, 2(2), 111-116.

[40]. Okorie, O. (2018, March 27). *"Smart" connected Africa leverages technology to promote growth—but will ICT be Africa's saving grace in development?* Africa at LSE. London School of Economics. Retrieved from *Africa at LSE* website: eprints.lse.ac.uk.

[41]. *PwC. (2017). Sizing the prize: What's the real value of AI for your business and how can you capitalize? PricewaterhouseCoopers. https://www.pwc.com/gx/en/issues/analytics/assets/pwc-ai-analysis-sizing-the-prize-report.pdf.*

[42]. Ajah, E. O., & Ononiwu, C. (2021, August 22). *Exploring multi-dimensional events characterizing tech start-up emergence in the Nigerian entrepreneurial ecosystem* [Preprint]. arXiv. https://doi.org/10.48550/arXiv.2108.09739

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug1025

[43]. Okunlola, O. C., Sani, I. U., & Ayetigbo, O. A. (2025). Socio-economic governance and economic growth in Nigeria. *Journal of Business and Socio-economic Development*, 5(2), 187-203.
[44]. Raman, R., Iyer, A., & Nedungadi, P. (2025). Forecasting Artificial General Intelligence for Sustainable Development Goals: A Data-Driven Analysis of Research Trends. *Sustainability*, 17(16), 7347.
[45]. Reuben, J. M. (2023). Training and skills alignment for the AI generation. *GSJ*, 11(6), 1503-1518.
[46]. Saleem, S., & Mathew, S. M. (2022). *Application of artificial intelligence in banking: A study based on SBI-SIA virtual assistant*. OSF Preprint. https://doi.org/10.31235/osf.io/gkxh8
[47]. Okosun, S. E., Ajisola, T. K., Omokhafe, C., Balogun, E., & Ayo-Odifiri, O. S. (2016). Infrastructure and societal restlessness in a developing country: A case of Nigeria. *International Journal of Civil and Structural Engineering Research, 4*(2), 43–51. ISSN 2348-7607. Retrieved from *Research Publish Journals*
[48]. Shittu, R. A., Ahmadu, J., Famoti, O., Nzeako, G., Ezechi, O. N., Ewim, C. P. M., & Okuha, H. E. (2024). Policy frameworks for Artificial Intelligence adoption: Strategies for successful implementation in Nigeria. International Journal of Social Science Exceptional Research, 3(6), 105–116. https://doi.org/10.54660/IJSSER.2024.3.6.105 116 ResearchGate.
[49]. Smith, M., & Neupane, S. (2018). *Artificial intelligence and human development: Toward a research agenda* (White paper). International Development Research Centre. Retrieved from https://idl-bnc-idrc.dspacedirect.org/items/6ba8a490-db87-4992-8813-9bea0c7e8e28 idrc-crdi.caidrc-crdi.ca+9
[50]. Spasibukhov, A. (2025). *Empirical analysis of an AI-powered chatbot for enhancing university information retrieval* (Master's thesis, Universidade NOVA de Lisboa, Portugal).
[51]. Stephany, F., & Teutloff, O. (2024). What is the price of a skill? The value of complementarity. Research Policy, 53(1), 104898.
[52]. Stone, P., Brooks, R., Brynjolfsson, E., Calo, R., Etzioni, O., Hager, G., ... & Teller, A. (2022). Artificial intelligence and life in 2030: the one hundred year study on artificial intelligence. arXiv preprint arXiv:2211.06318.
[53]. Tang, X., Li, X., & Ma, F. (2022). Internationalizing AI: evolution and impact of distance factors. Scientometrics, 127(1), 181-205.
[54]. TechCrunch. (2020, October 15). Stripe acquires Nigeria's Paystack for $200M+ to expand into the African continent. TechCrunch.
[55]. Thaci, A., Thaci, S., Zylbeari, A. K., & Baftijari, A. Y. (2024). Economic impact of artificial intelligence. KNOWLEDGE-International Journal, 62(1), 21-25.
[56]. Trivedi, A., Mukherjee, S., Tse, E., Ewing, A., & Lavista Ferres, J. (2019, October 4). *Risks of using non-verified open data: A case study on using machine learning techniques for predicting pregnancy outcomes in India* [Preprint]. *arXiv*. https://arxiv.org/abs/1910.02136
[57]. Vanguard News. (2025, May 15). How Nigeria's fintech industry is shaping a new economic reality. Vanguard News. Available at Vanguard News.
[58]. Walz, A., & Firth-Butterfield, K. (2019). Implementing ethics into artificial intelligence: A contribution, from a legal perspective, to the development of an AI governance regime. Duke L. & Tech. Rev., 18, 176.
[59]. Wang, X., Chen, M., & Chen, N. (2024). How artificial intelligence affects the labour force employment structure from the perspective of industrial structure optimization. Heliyon, 10(5).
[60]. Wiriyathammabhum, P., Summers-Stay, D., Fermüller, C., & Aloimonos, Y. (2016). Computer vision and natural language processing: recent approaches in multimedia and robotics. ACM Computing Surveys (CSUR), 49(4), 1-44.
[61]. Xu, J. (2024). AI in ESG for financial institutions: an industrial survey. arXiv preprint arXiv:2403.05541.
[62]. Zajko, M. (2021). Conservative AI and social inequality: conceptualizing alternatives to bias through social theory. Ai & Society, 36(3), 1047-1056.