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**Artificial Intelligence: The Priority of African Leaders with Nigeria as a Case Study**

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**Abstract**

Artificial Intelligence (AI) stands as a transformative technology with the potential to revolutionize economic development, governance, and societal progress across the globe. Its capabilities in automating tasks, enhancing decision-making, and driving innovation make it an essential tool for nations seeking to secure a competitive edge in the 21st century. However, despite these benefits, the adoption of AI in Africa remains sluggish, with Nigeria, Africa's largest economy being a notable example. This research investigates the state of AI adoption in Nigeria and broader Africa, identifying the barriers impeding its integration, such as limited infrastructure, insufficient investment in human capital, and inadequate policy frameworks. The study further analyzes ongoing AI initiatives in Nigeria, including government and private sector efforts aimed at fostering innovation, and assesses the country's AI readiness through key metrics, including internet penetration, educational advancements, and AI-related job creation.

Findings indicate that while some progress has been made, particularly in Nigeria's tech hubs such as Lagos and Abuja, the pace of AI adoption is hindered by a lack of comprehensive government strategy, digital literacy, and robust data policies. Statistical analysis shows that AI investment in Africa is disproportionately low compared to other regions, with Africa accounting for just 1.1% of global AI investments in 2020 (Mckinsey & Company, 2021). Moreover, Nigeria's AI talent pool remains underdeveloped, with only 0.03% of the workforce engaged in AI-related fields, compared to 2.5% in more AI-advanced countries (World Bank, 2022). Despite these challenges, AI initiatives such as the Nigerian government's National AI Strategy, alongside private sector partnerships, present opportunities for leapfrogging traditional barriers and fast-tracking AI adoption in the region.

The paper concludes with actionable recommendations for African leaders, particularly in Nigeria, to prioritize AI integration through strategic investments in infrastructure, education, and policy development. By aligning AI with national development goals, African countries can unlock transformative economic opportunities, foster innovation, and establish themselves as global players in the emerging AI-driven economy.

**Keywords:** Artificial Intelligence, AI adoption in Africa, Nigeria AI initiatives, African leadership and AI, AI for sustainable development, Economic growth through AI, AI policy in Africa, Digital economy in Africa, AI and governance

## **1. Introduction**

### *1.1 Background*

Artificial Intelligence (AI) represents a collection of technologies designed to enable machines to replicate human intelligence, including the ability to learn, reason, adapt, and solve complex problems. The potential applications of AI are vast, spanning critical sectors such as healthcare, agriculture, finance, education, and governance. In healthcare, AI is revolutionizing diagnostics and patient care, enabling faster and more accurate diagnoses, personalized treatment plans, and more efficient healthcare delivery (Topol, 2019). In agriculture, AI-driven technologies are helping farmers improve crop yields and minimize losses by analyzing climate patterns, soil health, and pest threats (Tollefson, 2020). Similarly, AI's role in financial inclusion can provide access to banking and financial services for unbanked populations through mobile technologies and automated systems (Chimombo, 2020). The transformative potential of AI is undeniable; however, its integration remains sluggish, particularly in Africa, where infrastructural and institutional barriers have slowed its widespread adoption.

### *1.2 Importance of AI for African Development*

For African nations, the adoption of AI holds the promise of addressing some of the most pressing challenges they face. The continent is home to a rapidly growing population, with over 1.4 billion people projected by 2050 (United Nations, 2019), many of whom live in underserved rural areas with limited access to basic services. AI technologies can play a pivotal role in improving healthcare delivery by enabling remote diagnostics, enhancing telemedicine services, and optimizing health supply chains (WHO, 2021). Similarly, AI can help address food security by enabling precision agriculture and optimizing crop management, thus alleviating the challenges of food production in the face of climate change and population growth (Mubarak, 2021). Furthermore, AI's potential for fostering financial inclusion is immense, providing access to credit, insurance, and other financial services for populations traditionally excluded from the financial system (World Bank, 2022).

Despite these promising prospects, the adoption of AI in Africa, including Nigeria, Africa's largest economy remains limited. Factors such as inadequate digital infrastructure, low investment in education and workforce development, and regulatory challenges contribute to the slow pace of AI integration. Moreover, the lack of a cohesive strategy across African governments to prioritize AI as a tool for sustainable development further exacerbates these barriers. As a result, while other regions, particularly North America, Europe, and parts of Asia, are rapidly advancing AI adoption, Africa is at risk of falling behind in the global AI race (Abubakar et al., 2020).

### *1.3 Significance of the Study*

This study aims to explore why AI has not yet become a top priority for African leaders, with a specific focus on Nigeria as a case study. Nigeria, despite its significant population, a burgeoning tech ecosystem, and a growing number of AI startups, has not fully embraced the transformative potential of AI at the governmental level. By analyzing the current state of AI in Nigeria, this research seeks to identify key barriers to its adoption, including challenges related to infrastructure, education, data access, and policy. Additionally, the study will examine successful AI initiatives within Nigeria, such as the Nigerian government's AI strategy and private-sector efforts, to understand how these efforts are addressing national development goals and positioning the country for future growth.

The findings of this study will provide valuable insights for African leaders, policymakers, and stakeholders in both the public and private sectors. The research will identify actionable steps that can be taken to overcome the challenges facing AI adoption, promote innovation, and ensure that AI becomes a central pillar of Africa's long-term development strategy. By exploring the potential for AI to drive economic and social change in Nigeria and beyond, this study aims to provide a roadmap for African leaders to harness the power of AI to improve quality of life, foster economic prosperity, and position Africa as a leader in the digital economy.

## **2. Current State of AI Adoption in Africa**

### *2.1 Overview of AI Initiatives in Africa*

Across Africa, Artificial Intelligence (AI) is emerging as a key driver for social and economic transformation. As AI technologies continue to evolve globally, several African countries have begun exploring and deploying AI in critical sectors such as healthcare, agriculture, and financial technology (FinTech). For instance, in Kenya, IBM has developed an AI-powered healthcare solution known as *Watson Health*, which aims to enhance diagnostics and healthcare delivery by processing vast amounts of medical data to provide faster and more accurate diagnoses (IBM, 2021). In South Africa, the government has invested in AI-driven agricultural projects that assist farmers in improving productivity through the use of machine learning to predict crop yields, detect diseases, and optimize farming practices (Hernandez, 2021). These projects are examples of how AI can be tailored to address local challenges while improving the quality of life for citizens. Furthermore, many startups across the continent are harnessing AI to tackle problems like financial inclusion, providing access to digital banking services for underserved populations, and offering innovative mobile solutions to enhance economic participation (World Bank, 2022). Despite these promising initiatives, AI adoption is still relatively nascent in most African countries.

### *2.2 Challenges to AI Adoption*

While AI presents significant opportunities for African development, the continent faces several challenges that hinder its widespread adoption. These challenges are multifaceted, ranging from

infrastructure deficits to a lack of skilled professionals and insufficient funding. Below, we explore these barriers in greater detail.

### 2.2.1 Infrastructure Constraints

One of the most significant obstacles to AI adoption in Africa is the lack of robust infrastructure. Many African countries face issues such as limited internet connectivity, unreliable power supply, and insufficient data centers, which severely limit the deployment of AI technologies (Ndiaye et al., 2020). For AI to function effectively, it requires reliable access to the internet for cloud computing, constant power supply for hardware operations, and stable data storage systems to process and analyze large volumes of information. Unfortunately, in several African regions, these basic infrastructure needs are not consistently met, which presents a barrier to the use of AI in daily life and business. The infrastructure gap also prevents many communities from benefiting from AI-powered solutions in sectors like healthcare and agriculture, where AI can be used to improve diagnostics, increase crop yields, and optimize water usage, among other advancements.

### 2.2.2 Digital Skills Gap

Another critical challenge is the digital skills gap, which continues to impede the growth of AI in Africa. Across the continent, there is a shortage of skilled AI professionals who possess the technical expertise required to develop, implement, and maintain AI systems. According to a report by the International Telecommunication Union (ITU, 2021), Africa has one of the lowest concentrations of AI talent in the world, with only a small percentage of the workforce employed in AI-related fields. This lack of human capital not only stifles innovation but also prevents African countries from developing homegrown AI solutions that are better suited to their unique needs. Moreover, the scarcity of educational programs offering specialized AI training exacerbates this issue. There is a clear need for enhanced educational initiatives, such as AI-focused curriculums in universities and capacity-building programs for young professionals, to bridge this skills gap and ensure that African nations can fully benefit from AI technologies (Nguyen, 2019).

### 2.2.3 Funding and Investment Climate

The third significant challenge to AI adoption in Africa is the limited funding and investment available for AI research, development, and implementation. African governments and private investors have traditionally focused on more immediate, tangible sectors like agriculture, infrastructure, and resource extraction, often neglecting emerging technologies like AI (Suleiman, 2021). The slow pace of investment in AI R&D is a result of the prevailing risk-averse attitude towards innovative technology, a lack of awareness of AI's long-term benefits, and the perception that AI initiatives are costly and speculative. According to the World Economic Forum (2020), African nations collectively accounted for just 1.1% of global AI investments in 2020, a stark contrast to other regions such as North America and Europe, where AI investments are rapidly growing. Without the necessary financial support, African AI startups and researchers struggle to access the capital required to scale their innovations and compete on

the global stage. The lack of government-backed policies that promote AI entrepreneurship further discourages private-sector investment and slows the development of a sustainable AI ecosystem.

### **3. AI Initiatives in Nigeria: Case Study**

#### *3.1 Government Policies and Initiatives*

Nigeria, as one of the largest economies in Africa, has recognized the potential of Artificial Intelligence (AI) in driving economic growth and national development. In recent years, the Nigerian government has taken steps to lay the groundwork for AI adoption by promoting digital transformation policies and supporting innovation in emerging technologies. Central to this initiative is the National Information Technology Development Agency (NITDA), which has been instrumental in creating frameworks that encourage AI research, development, and the establishment of tech startups. NITDA has launched various programs aimed at fostering AI talent, improving infrastructure, and securing funding for local innovators. Through policies such as the National Digital Economy Policy and Strategy (NDEPS) 2020-2030, the Nigerian government has positioned digital transformation, including AI, as key to achieving sustainable development goals (Oyelaran-Oyeyinka & Lal, 2021). However, despite these efforts, AI adoption remains relatively slow, hindered by insufficient infrastructure, regulatory bottlenecks, and a lack of skilled personnel to drive the technological shift. Nevertheless, the government's commitment to transforming Nigeria into a knowledge-based economy underscores the growing recognition of AI's role in the country's future.

In addition to NITDA's initiatives, the Nigerian government has also partnered with international organizations to boost AI integration. For example, collaborations with entities such as the World Economic Forum and the United Nations Development Programme (UNDP) have provided Nigeria with access to expertise, funding, and global AI best practices. These partnerships are designed to accelerate Nigeria's AI agenda, particularly in areas like healthcare, agriculture, and education, which are crucial to improving the quality of life for its citizens (Adewale & Oladipo, 2020).

#### *3.2 Academic and Research Institutions*

Nigeria's academic and research institutions are playing a crucial role in advancing AI knowledge and applications. Universities such as Covenant University and Obafemi Awolowo University have taken the lead in establishing dedicated AI research centers, which focus on developing innovative AI solutions tailored to the country's challenges. These institutions are not only conducting research but also partnering with local businesses and international organizations to implement AI technologies that could have a direct impact on the Nigerian economy (Aderounmu et al., 2020). For example, Covenant University's Centre for Artificial Intelligence and Robotics has collaborated with Nigerian tech startups to develop AI-powered solutions for improving efficiency in logistics, healthcare, and finance (Covenant University, 2020). These academic institutions are also playing a pivotal role in addressing the skills gap by

offering specialized programs in AI, machine learning, and data science, which are critical to creating a workforce capable of driving AI innovation in Nigeria.

Despite these efforts, the lack of a cohesive national policy supporting AI education and research limits the scalability of such initiatives. Academic institutions are still faced with challenges such as inadequate funding, limited access to high-performance computing resources, and the need for more faculty members with expertise in AI. However, with the right investments and strategic partnerships, these institutions could become pivotal in positioning Nigeria as a leader in AI research and development across Africa.

### *3.3 Private Sector Innovations*

The private sector in Nigeria has also embraced AI, particularly in the fintech industry, where a number of innovative startups are making significant strides. Tech companies like Kudi.ai and Flutterwave are leading the way in integrating AI into financial services to drive financial inclusion. Kudi.ai uses AI-driven chatbots to provide efficient mobile banking services to underserved populations, helping bridge the gap for Nigeria's unbanked population (Iweka, 2019). Similarly, Flutterwave, a prominent Nigerian fintech company, has leveraged AI to enhance its payment processing capabilities, ensuring secure and efficient cross-border payments for businesses in Nigeria and across Africa. These private sector innovations not only demonstrate the commercial viability of AI but also highlight its potential to solve critical societal challenges such as financial exclusion, which affects millions of Nigerians.

However, private sector innovation is often constrained by limited access to venture capital, which hinders the scalability of AI-driven startups. While Nigeria's tech ecosystem is growing, it still faces challenges in attracting the level of investment needed to compete globally. A more robust venture capital environment and a stronger regulatory framework that supports startups are necessary to foster AI innovation and ensure that Nigeria's private sector can fully capitalize on the opportunities presented by AI technologies.

## **4. Opportunities for AI Development in Nigeria**

### *4.1 Economic Impact*

AI Artificial Intelligence (AI) holds immense potential to stimulate economic growth in Nigeria, a nation at the crossroads of transformation within Africa. With its vast population and abundant natural resources, Nigeria stands to benefit from AI technologies that can drive productivity across key sectors such as agriculture, healthcare, and manufacturing. AI has the capacity to automate repetitive tasks, optimize supply chains, enhance decision-making processes, and significantly reduce operational costs. These improvements would foster greater innovation and boost competitiveness, allowing Nigeria to strengthen its position as a dominant force in the global economy.

In agriculture, AI-driven technologies such as precision farming and predictive analytics can increase crop yields, enhance resource management, and provide farmers with valuable insights



to mitigate the effects of climate change (Gbadegesin et al., 2021). By leveraging data from satellites and sensors, AI can enable more efficient irrigation systems, soil monitoring, and pest control, helping Nigeria address food security challenges while creating new markets for agritech innovations.

Furthermore, AI can revolutionize Nigeria's healthcare system, which currently faces significant challenges such as inadequate access to quality care, medical personnel shortages, and logistical inefficiencies. AI applications like diagnostic tools, machine learning models for personalized medicine, and predictive analytics for disease prevention have the potential to drastically improve healthcare delivery, making it more affordable and accessible to millions of Nigerians (Nwogugu, 2019). These technologies can reduce human error, accelerate the diagnosis process, and streamline healthcare operations, resulting in substantial cost savings for both the government and individuals.

In the manufacturing sector, AI technologies can contribute to the automation of production processes, reduce waste, and enhance quality control. As Nigeria seeks to diversify its economy away from oil dependence, the adoption of AI in manufacturing could play a crucial role in the country's industrialization efforts, improving efficiency and competitiveness while creating jobs in emerging sectors. As industries become increasingly digitalized, AI will also enable the creation of high-value products, contributing to overall economic diversification and long-term sustainability (Oyelaran-Oyeyinka & Lal, 2021).

#### *4.2 Social and Developmental Benefits*

Beyond economic growth, AI offers significant social and developmental benefits that can directly improve the quality of life for Nigerians. Healthcare accessibility is one of the most critical challenges the country faces. Despite advancements in technology, many rural communities remain underserved, and access to timely medical treatment is limited. AI can address this gap by enabling remote diagnosis, telemedicine, and healthcare delivery through mobile technologies. For example, AI-powered applications like chatbots and virtual assistants could help patients access basic healthcare information and advice, particularly in underserved areas. Additionally, AI can be used to improve health outcomes by facilitating early detection of diseases such as malaria, tuberculosis, and cancer, where timely intervention is often critical (Bwalya et al., 2020).

In the realm of education, AI technologies can significantly enhance the quality of teaching and learning. With the growing number of students in Nigeria, there is a constant demand for innovative educational solutions that can address the limitations of traditional classroom settings. AI can provide personalized learning experiences by adapting content to the needs of individual students, offering them the opportunity to learn at their own pace and style. Furthermore, AI can automate administrative tasks such as grading, allowing teachers to focus more on pedagogical improvements and providing individualized attention to students. Through AI, educational materials can be tailored to better reflect local contexts, enhancing learning outcomes and bridging educational gaps across the country (Lekan & Nwaogwugwu, 2020).

AI's role in addressing unemployment is another vital area for development. With Nigeria's growing youth population, the pressure to create jobs is mounting. AI can foster job creation in both the technology sector and other industries, including health, agriculture, and finance. By promoting digital skills and AI literacy, Nigeria can prepare its workforce for the future economy, where AI and automation will be integral to business operations. AI-enabled platforms can offer training programs, skill development courses, and job matching services to help Nigerians improve their employability and succeed in an increasingly digital world. The proliferation of AI-powered services also creates opportunities for entrepreneurship, allowing individuals to build tech-driven businesses that contribute to job creation and economic development (Bwalya et al., 2020).

Furthermore, AI can help address urbanization challenges by improving infrastructure management and public services. Smart cities, powered by AI, can optimize traffic flow, reduce energy consumption, and enhance public safety through surveillance systems and predictive analytics. These advancements would improve urban living conditions, enhance social services, and make Nigeria's cities more sustainable as the population continues to grow (Abdullahi & Yusuf, 2020).

## **5. Policy Recommendations**

The adoption of Artificial Intelligence (AI) in Africa, and specifically in Nigeria, requires a comprehensive and strategic approach to address the challenges that have hindered progress in this transformative field. The following policy recommendations aim to equip Nigerian leaders with the necessary tools to foster AI innovation and ensure its successful integration into the socio-economic fabric of the nation. By focusing on digital infrastructure, education, and private sector investment, these policies can lay the foundation for a thriving AI ecosystem that contributes to Nigeria's long-term sustainable development.

### *5.1 Enhancing Digital Infrastructure*

For AI to be successfully adopted, there must be a robust digital infrastructure in place. This infrastructure must go beyond just the internet to encompass reliable electricity, widespread broadband expansion, and seamless connectivity across urban and rural areas. Currently, Nigeria faces significant challenges related to unreliable power supply and limited internet access, which creates substantial barriers to the integration of AI technologies (Adewale et al., 2022). Addressing these issues should be a top priority for policymakers. In particular, expanding broadband networks and ensuring stable electricity supply can enable businesses, government institutions, and individuals to access and deploy AI solutions efficiently. Such investments in digital infrastructure will ensure that AI is not limited to a select few but is available across the country, thereby enabling widespread adoption and use in various sectors such as agriculture, healthcare, finance, and education.

Furthermore, expanding digital infrastructure will reduce the digital divide and facilitate the development of an AI-driven economy that is inclusive and equitable. For example, rural



communities that currently have limited access to modern technology would benefit immensely from AI applications in areas such as precision farming, telemedicine, and e-learning. By addressing the gaps in infrastructure, Nigeria can unlock the full potential of AI and ensure its equitable distribution across all sectors of society.

### *5.2 Promoting AI Education and Research*

Education plays a crucial role in the successful adoption of AI. Nigeria must invest in the development of AI-focused curricula at both the university and vocational training levels to ensure that its workforce is adequately prepared for the AI-driven future. Currently, there is a significant gap in AI expertise in Nigeria, which limits the country's ability to develop and implement AI solutions effectively. Universities such as Covenant University and Obafemi Awolowo University are making strides in AI research and training, but these efforts must be scaled and supported by both the government and the private sector (Larsson et al., 2018).

By establishing dedicated AI research centers and offering specialized degree programs in AI, machine learning, data science, and robotics, Nigeria can build a skilled workforce capable of driving AI innovation. Moreover, vocational training programs that focus on practical, industry-specific applications of AI can ensure that individuals at various skill levels are equipped with the necessary tools to engage with AI technologies effectively. It is also essential to integrate AI into existing STEM curricula to foster a culture of innovation and critical thinking among the younger population. By creating a pipeline of skilled professionals in AI, Nigeria can position itself as a leader in the global AI landscape, capable of generating homegrown solutions that address the unique challenges faced by the country and the wider African continent.

In addition to formal education, fostering collaboration between academia, industry, and government institutions will be crucial in advancing AI research. This collaborative approach can ensure that research is not only theoretical but also practical and relevant to Nigeria's socio-economic needs. Furthermore, establishing AI-focused research grants and funding opportunities can stimulate innovation and provide the necessary resources for researchers and startups to develop cutting-edge AI technologies that are both locally applicable and globally competitive.

### *5.3 Encouraging Private Sector Investment*

Private sector investment plays a vital role in the development of AI technologies, particularly in research and development (R&D). While Nigeria has seen some progress in private sector initiatives, such as the emergence of fintech startups like Flutterwave and Kudi.ai, more needs to be done to incentivize investment in AI startups and R&D (Adekanmbi & Adewumi, 2021). Nigerian policymakers should explore tax incentives, grants, and public-private partnerships as strategies to encourage private sector participation in the AI ecosystem. These financial incentives can lower the barriers to entry for new AI ventures and help established businesses integrate AI into their operations.

Furthermore, fostering collaboration between the public and private sectors can create a conducive environment for AI innovation. For example, government-funded programs can support AI startups by providing initial seed funding, while private companies can bring in expertise, technology, and market access to help scale these solutions. Partnerships between local tech firms and global players can also boost knowledge transfer and access to advanced AI technologies, allowing Nigerian businesses to benefit from international best practices while contributing to the local economy.

The private sector can also play a key role in addressing the talent gap by offering internships, apprenticeships, and mentorship programs to young people aspiring to work in AI. These initiatives can create pathways for career development in the AI industry and equip young Nigerians with the skills necessary to thrive in an AI-driven economy. By stimulating private sector involvement, Nigeria can catalyze the development of a vibrant AI ecosystem that drives innovation, job creation, and economic growth.

## **6. Conclusion**

### *6.1 Summary of Findings*

This study examined the current state of Artificial Intelligence (AI) adoption in Nigeria, focusing on the challenges and opportunities it presents for the country's economic and social development. AI offers enormous potential to revolutionize key sectors such as agriculture, healthcare, and finance, providing innovative solutions to address longstanding issues like food security, healthcare delivery, and financial inclusion. However, the adoption of AI in Nigeria is impeded by several critical factors, including inadequate digital infrastructure, a shortage of skilled professionals, and limited funding for AI research and development.

Despite these challenges, there are promising developments in the Nigerian AI landscape. Government initiatives, such as the efforts by the National Information Technology Development Agency (NITDA), demonstrate Nigeria's recognition of AI's transformative potential. Additionally, academic and research institutions like Covenant University and Obafemi Awolowo University are beginning to make strides in AI research and capacity-building, which could contribute to the country's AI ecosystem in the future. Furthermore, Nigerian tech startups such as Flutterwave and Kudi.ai are making significant strides in integrating AI into fintech solutions, thus highlighting the private sector's potential to drive innovation.

However, these advancements remain isolated, and more must be done to create a national framework that integrates AI across sectors. As the global economy shifts toward an AI-driven future, Nigeria's ability to harness the full potential of AI will depend largely on overcoming these barriers and implementing the right policies that foster collaboration between government, academia, and the private sector.

## 6.2 Future Outlook

Looking ahead, the future of AI in Nigeria is full of promise, but it requires a concerted effort from all stakeholders to create an enabling environment for its widespread adoption. Nigerian leaders must prioritize AI development, recognizing that it is not just a tool for economic growth but also a means to address social inequalities and improve the quality of life for citizens. By investing in digital infrastructure, expanding AI education, and fostering a vibrant private sector ecosystem, Nigeria has the opportunity to position itself as a leader in AI innovation in Africa.

The integration of AI into sectors like agriculture, healthcare, and education could have transformative effects, enhancing productivity, accessibility, and quality of services. Moreover, AI has the potential to create new job opportunities, drive economic diversification, and reduce poverty, contributing to Nigeria's long-term sustainable development goals. If Nigerian policymakers can adopt a strategic approach that fosters innovation while mitigating the risks associated with AI, the country can become a key player in the global AI landscape.

In conclusion, while significant challenges remain, the potential benefits of AI for Nigeria are too great to ignore. By focusing on targeted investments in infrastructure, education, and the private sector, Nigeria can create an AI-powered future that drives inclusive growth, enhances societal well-being, and positions the country as a competitive force in the global economy.

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