

ARTIFICIAL INTELLIGENCE USE IN WEST AFRICA: A SOBER AUDIT OF THE CURRENT LANDSCAPE – A NARRATIVE REVIEW

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Abstract: This review looks at the changing landscape of artificial intelligence (AI) adoption in West Africa, highlighting both progress and ongoing challenges. While AI is changing systems around the world, its use in the region is still uneven due to structural, regulatory, and infrastructure issues. The review evaluates important aspects of AI development, including policy frameworks, research capacity, infrastructure readiness, sector applications, ethical concerns, and ongoing difficulties. At the continental level, the African Union's 2024 Continental AI Strategy offers a coordinated governance framework that focuses on ethical AI, data control, and capacity building. National efforts in countries like Nigeria, Ghana, and Côte d'Ivoire show increasing political commitment, though inconsistency in regulations remains a challenge. Research innovation is present, as seen with tools like Kwame for Science, but overall progress is limited by low funding, weak global engagement, and inadequate access to high-performance computing. Infrastructure shortfalls, especially in data centers, connectivity, and energy, continue to hinder large-scale AI implementation. Sector adoption in health, education, agriculture, and public services appears promising, often bolstered by international partnerships. However, ethical and social risks, such as algorithmic bias, language underrepresentation, weak data protection, and historical inequalities, threaten fair integration. Additional obstacles like talent drain, low digital literacy, limited data availability, and public distrust further limit impact. The review concludes that ongoing investment, stronger governance, ethical guidelines, and local research growth are crucial for AI to justly and sustainably support West Africa's development goals..

Keywords: Artificial intelligence, West Africa, AI adoption, AI integration, Digital literacy, Governance, Capacity, and Development Pathways.

I. INTRODUCTION

Artificial Intelligence (AI) is a powerful technology that affects productivity, governance, and social systems around the world. However, its spread is uneven. High-income countries lead in AI research, investment in infrastructure, and setting standards, while low- and middle-income areas like West Africa face specific challenges [1-3]. These differences not only affect how quickly AI is adopted but also who benefits economically and socially.

In West Africa, AI could help solve major development issues. These include a lack of skilled workers, inefficiencies in public service, poor access to quality education and healthcare, and agriculture that is sensitive to climate changes [4,5]. However, the region struggles to create, implement, and manage AI systems effectively because of poor digital infrastructure, unreliable electricity, limited access to good datasets, weak funding for research, and a shortage of advanced technical skills [6-8].

There is also increasing worry that AI systems from the Global North may not fit local languages, cultures, and economic situations. If these systems are used without being adjusted to local contexts or receiving proper oversight, they could reinforce biases, weaken accountability, and increase inequality [9,10]. On the positive side, new national strategies, regional policy efforts, and applications developed locally show that it is possible to create relevant AI solutions when local people are actively involved [11-13].

This review looks closely at AI adoption in West Africa. It gathers information on policy and governance, research and innovation capacity, infrastructure and data ecosystems, sector applications, and ethical and geopolitical issues. The goal is to provide a clear view of the opportunities, risks, and key actions needed to ensure AI supports inclusive and sustainable development.

II. POLICY AND GOVERNANCE

AI governance in Africa has made significant progress in recent years, especially at the continental level. The African Union (AU) Continental Artificial Intelligence Strategy, adopted in 2024, provides a common framework for member states. It emphasizes ethical AI, data governance, cybersecurity, skills development, and digital sovereignty [1,14]. The strategy shows a growing awareness that global AI standards need to be tailored to African political, social, and economic situations.

Progress varies at the national level across West Africa. Nigeria has taken a leading role by establishing the National Centre for Artificial Intelligence and Robotics (NCAIR), along with broader digital economy initiatives and data protection laws [12,15]. Ghana is creating a National AI Strategy (2023–2033) that focuses on innovation ecosystems, workforce development, and inclusive growth. Meanwhile, Côte d'Ivoire has adopted a risk-based approach incorporating regulatory sandboxes and coordination among agencies [13,16].

Despite these improvements, significant governance gaps still exist. Many national ICT and digital policies were created before recent advancements in generative AI and automated decision-making systems. As a result, there are unanswered questions about transparency, liability, accountability, and redress [6,17]. Regulatory fragmentation among West African nations also makes cross-border data sharing and regional AI projects more difficult. Turning continental goals into workable national laws, funded oversight bodies, and compatible standards remains a major challenge [1,6].

III. RESEARCH AND INNOVATION CAPACITY

West Africa's capacity for AI research and innovation is growing, but it is still small in comparison to international standards. Local projects show that context-specific innovation is feasible. *Kwame for Science*, a bilingual AI teaching assistant created in Ghana, is one example of how focused, low-cost systems can improve access to curriculum-aligned educational support and address teacher shortages [18]. African researchers are still under-represented in prominent AI forums, though. Research on AI subfields like computer vision reveals enduring obstacles, such as the lack of large annotated datasets, restricted access to computing resources, and reliance on short-term project funding rather than long-term institutional support [19, 20]. Uncompetitive pay and limited career advancement make it difficult for many research groups to retain talent, which contributes to the continuous brain drain [7,21].

Universities, governments, and business continue to collaborate in a dispersed manner and frequently rely on foreign funding or infrastructure. Long-term research grants, postgraduate training pipelines, formal public-private research consortia in line with national development priorities, and sustained investment in shared regional compute resources are all necessary to strengthen innovation ecosystems [8,19].

IV. INFRASTRUCTURE AND DATA ECOSYSTEMS

High-quality data and dependable computing infrastructure are critical to the development of AI. A large portion of West Africa is underserved because Africa only holds a small portion of the world's data centre capacity, which is concentrated in a few nations [22]. Because of this, a lot of businesses depend on foreign cloud providers, which raises expenses, latency,

and data sovereignty risks. Infrastructure problems are not limited to computers. Unreliable electricity supplies and uneven broadband connectivity, especially in rural areas, limit the scalability of AI systems and run the risk of widening already-existing digital divides [23]. Long-term sustainability is threatened by power instability, which dramatically raises operating costs for research facilities and data centres.

Another bottleneck is data ecosystems. There are still few locally representative datasets, particularly for informal economic activities and indigenous languages. Cross-border data sharing and the establishment of regional repositories are hampered by inconsistent data protection laws among West African states [6,17]. Coordinated investments in physical infrastructure, open and consent-based data initiatives, and privacy-preserving strategies like federated learning are needed to address these issues.

V. APPLICATION DOMAINS

A. Health

Telemedicine, diagnostic support, and disease surveillance are the main areas of application for AI in health. Although there are pilot programs, the majority are still small-scale and inadequately incorporated into national health information systems. Despite the sensitivity of health data, there is frequently little regulatory guidance on clinical safety, liability, and patient data protection [24]. Integration into standard clinical workflows and sector-specific governance frameworks are necessary for scaling health AI.

B. Education

One of the most promising short-term prospects for AI adoption is education. AI-powered tutoring and teacher assistance programs can increase access to education and alleviate the scarcity of human resources. To guarantee fair results, systems must, however, support regional languages, be in line with national curricula, and be rigorously evaluated [18].

C. Agriculture

Artificial intelligence can enhance the detection of crop diseases, as well as the prediction of yields and the efficiency of supply chains. The reasons for limited adoption include low digitization, weak extension services, and limited access of farmers. Local data collection, advisor service integration, and financing mechanisms are essential for effective deployment [22].

D. Public Services

Governments are using AI for applications such as digital identity systems and land administration. The public-private partnerships may provide technical expertise, but they also raise concerns about vendor lock-in, as well as accountability and long-term institutional capacity [25]. Essential to achieve sustainability through transparent procurement and local capacity building.

VI. ETHICAL, SOCIAL, AND GEOPOLITICAL CONSIDERATIONS

The adoption of AI in the West African region has a significant influence on ethical and geopolitical reasons. Public trust is shaped by historical experiences of extractive research and technological dependency, especially in the health sector. Studies show that colonial past, developer origin, and global power asymmetries shape perceptions of AI fairness in Africa [10].

Linguistic marginalisation, as many AI systems do not support West African languages sufficiently. The recent agreements between African telecoms and foreign AI companies are positive signs of advancement; however, accountability mechanisms, actual African participation as well as data governance relevant for achieving fair and just outcomes must be in place. The poor enforcement of data protection laws makes the risks of surveillance and misuse even greater and a transparent, participatory design and independent oversight are needed [6,17].

VII. CHALLENGES AND CONSTRAINTS

The main challenges are restricted long-term financing, unending brain drain, fragmented regulation, unreliable electricity, weak data and low digital illiteracy. Policy response to these constraints is coordinated rather than being individually targeted [7,22,23].

VIII. RECOMMENDATIONS

Priority actions include:

1. Harmonizing regional policies in line with the AU AI Strategy.
2. Local and regional computing infrastructure investment using renewable energy source.
3. Research, training, and talent retention get continuous support through funding.
4. Implementing open, consent-based datasets together with privacy-preservation techniques for the smooth functioning of the data ecosystem systems.
5. Introducing layers of ethical oversight, fairness auditing, and linguistic inclusion in AI deployments).

IX. CONCLUSION

West Africa is presently faced with the great challenge of deciding how to best shape its AI future. On one hand, new policy frameworks and pilot projects point to increasing traction; on the other hand; there are still major structural and ethical issues that need to be addressed. A joint, Africa-oriented method based on regional collaboration, infrastructure upgrading, continuous financing of research, and strong governance, is likely to be the most feasible option for the continent to use AI as a tool for bringing about development that is inclusive without being based on dependency and thus inequality.

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Contributions by the Authors:

This work was carried out in collaboration among all authors. Author EE conceptualized and designed the study. Author EE and OI produced the manuscript draft, Author AOO and JI contributed to drafting of the manuscript, Author AOO, JI and OI reviewed the manuscript. All authors read and approved the manuscript for submission.

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