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Artificial Intelligence and Development in Africa: Challenges, Opportunities, and Future Perspectives

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Abstract

Artificial intelligence (AI) has emerged as a transformative force capable of reshaping economic structures, governance systems, and social relations across the globe. In Africa, it occupies a paradoxical position: it embodies the promise of accelerated development and innovation, yet it also risks deepening existing asymmetries in technology access, data ownership, and economic sovereignty. Since the adoption of the African Union's Continental Artificial Intelligence Strategy (CAIS) in 2024, the continent has witnessed renewed discourse around the localization of AI systems, the ethics of data governance, and the role of indigenous knowledge in machine learning design. This article provides a conceptual and theoretical exploration of AI as a developmental paradigm

in Africa. It synthesizes recent policy frameworks, philosophical perspectives on digital sovereignty, and sociotechnical theories of innovation to propose a multidimensional model of AI-driven development. The discussion integrates normative and structural dimensions, emphasizing that Africa's engagement with AI must transcend technology transfer to embrace cognitive, cultural, and institutional autonomy.

Keywords: Artificial intelligence, Africa, development theory, digital sovereignty, data governance, ethics, innovation systems.

1. Introduction

The relationship between artificial intelligence and development in Africa has become one of the defining

questions of the twenty-first century. The continent stands at the intersection of two historical processes: the global diffusion of intelligent systems and the ongoing struggle for equitable, sustainable development. For decades, African development discourse has oscillated between dependency and autonomy, industrialization and digitalization, globalization and localization. The rise of AI adds a new dimension to this dialectic by introducing algorithmic decision-making, predictive analytics, and machine learning as instruments of governance and growth.

The African Union's Continental Artificial Intelligence Strategy (CAIS, 2024) marks a decisive turning point in this trajectory. For the first time, a continental framework positions AI not merely as a technological import but as a strategic domain of sovereignty and collective progress (African Union, 2024). The CAIS identifies five strategic pillars—governance, infrastructure, research, skills, and ethics—each designed to ensure that the continent's digital transformation aligns with human-centered development. Yet the very ambition of this strategy exposes deeper conceptual tensions between innovation and inequality, automation and employment, efficiency and ethics.

From a theoretical standpoint, the debate on AI and African development intersects with three major intellectual traditions. First, the modernization paradigm, historically rooted in post-colonial development theory, interprets technology as a neutral enabler of progress. Within this framework, AI becomes a catalyst for economic growth, enabling productivity gains in agriculture, health, and education. However, critics argue that this paradigm risks reproducing technological dependency—the reliance on imported technologies, foreign data infrastructures, and non-African epistemologies (Ndubaku & Adebayo, 2024).

Second, the structuralist and dependency approaches—reinvigorated by scholars of digital capitalism—reframe AI as a site of power asymmetry. According to this view, data extraction and algorithmic control constitute new forms of economic dependency analogous to historical extractivism. African societies, as data producers rather than owners, risk perpetuating the very inequalities that development aims to overcome (Policy Center for the New South, 2024).

Third, the emergent paradigm of digital sovereignty and ethical AI challenges both modernization and dependency narratives by calling for endogenous models of technological governance. This school of thought emphasizes localized innovation ecosystems, open-source collaboration, and the integration of African epistemologies into algorithmic design

(UNESCO, 2025). In this regard, AI is not only a technical system but a sociotechnical assemblage whose meaning depends on cultural context, institutional capacity, and normative orientation.

1.1. The Global Context of AI Diffusion

The current spread of AI technologies is primarily due to advancements in generative models, neural architectures, and computational power. AI is predicted to add \$15 trillion to the world economy by 2030 (McKinsey, 2025). However, the uneven geography of AI capabilities is masked by this aggregate potential. The Global North, especially the United States, China, and Western Europe, is where the majority of the patents, datasets, and computational resources are located.

Africa contributes to less than 2% of the world's AI research, and the large-scale models trained on datasets predominantly used in Africa ignore African languages and contexts (CIPIT, 2025). This underrepresentation illustrates what UNESCO (2025) has termed “the epistemic asymmetry of digital modernity”—i.e., systems of technologies and architectures are created while leaving out the cultures and languages of the people. Therefore, the integration of AI into African economies must address the politics of representation rather than focusing solely on productivity.

1.2. Theoretical Framework: AI as a Socio-Technical System

AI is often viewed as a homogeneous technology. It ought to be considered a socio-technical system, which is the configuration of algorithms, data, networks, institutions, and social practices. This viewpoint, rooted in Science and Technology Studies (STS), opens the possibility to analyze the interplay of power, culture, and policy on outcomes relating to the diffusion of technology.

Within such a system, the algorithms function as the encoded social assumptions that the decision rules stipulate, while data is both an economic resource and a cultural artifact. Institutions set the distributions of the benefits and risks, and users technology through social practices. The development of AI in Africa, therefore, must pose questions related to epistemic justice, cognitive diversity, and institutional fit (African Union, 2024; UNESCO, 2025).

This aligns with Amartya Sen's (1999) capabilities approach as ‘development is more a question of the increase of substantive freedoms [...] rather than a simple increase of economic growth’. Similarly, AI development in Africa should be focused on expanding the capabilities of individuals

and communities to determine what choices to make, what information to access, and what decisions to engage with. This reframes AI as a process of empowerment and self-determination, rather than an external tool of modernization.

1.3. AI and the Reconfiguration of Development Discourse

Africa's development theory has undergone several paradigms. From colonial modernization to post-independence industrialization, structural adjustments, and the most recent focus of the digital economy, the introduction of AI serves as a new challenge that paradigms of productivity and labor must grapple with. Learning, predictive, and automated algorithms confuse the boundaries of human and machine intelligence and alter the metrics development thinkers focus on: employment, education, and innovation.

Recent scholarly work on the continent has begun to capture the insight that AI is not value neutral. Each dataset, model, or application holds implicit assumptions about the value of knowledge, the usefulness of efficiency, and the worth of progress. In contexts of entrenched inequality, lack of ethical guardrails will likely exacerbate social inequity (Ndubuaku & Adebayo, 2024; African Union, 2024).

Finally, to understand the development of AI, there needs to be a convergence of normative, institutional, and epistemic approaches. AI's expressed value will always be developmentally unfinished until issues of its design, governance, and the beneficiaries of its primary use are confronted. To move from data colonialism to data sovereignty will take much more than the necessary infrastructure. It will also require a profound rethinking of the intellectual frameworks that have defined Africa's engagement with technology for many years.

1.4. Continued Policy Development: The CAIS and Beyond.

The AU's plan for 2024 is a collective answer to these theoretical and practical issues. The statement—AI should enhance human and African development—highlights a move from a solely utilitarian perspective on technology. The CAIS is to create a continental network of initiatives with an ecosystem of research institutions, the private sector, and civil society to strengthen responsible AI capacity (African Union, 2024).

Momentum was built in 2025 with the launch of the AI for Africa, by Africa initiative through UNESCO through developing institutional frameworks and training civil servants in algorithm ethics (UNESCO, 2025). The

intersection of these two focuses captures a shift toward what can be termed 'developmental AI governance,' where digital transformation is acknowledged and aligned with other policies on social injustice and sustainability.

The frameworks are clear, and yet, the uneven development of these initiatives is of real concern. Many states face the challenges of lacking comprehensive data protection legislation and research infrastructure. Policy mimicry, the enactment of governance documents absent the necessary infrastructure, is a real and growing concern. The forecasts by McKinsey (2025) and the World Bank (2024) highlight the need for cross sectoral cooperation, institutional frameworks, and stability as primary factors in the effectiveness of AI strategies.

1.5. Conceptual Challenges Ahead

The horizon of theory of AI and African development comprises three concepts that are closely intertwined.

The first is the epistemological challenge: in what ways can AI systems accommodate or incorporate African ways of knowing, languages, and reasoning? The second is the ethical challenge: in what ways can societies mitigate the tensions of transparency, accountability, and fairness in societal algorithmic decision making while preserving cultural nuances? Lastly, the third is the structural challenge: in what ways can Africa establish the required data and compute architecture while washing out enduring dependencies to global geopolitical actors?

To address these, this paper advocates the notion of "reflexive developmentalism," which encapsulates a framework where technological advancement is continuously tempered with fundamental relativities of culture, morality, and autonomy. This view positions AI within the broader scope of Africa's self-determined modernization: modernization that is no longer imported, but co-constructed; no longer imitative, but innovative.

2. Methodology and Theoretical Model

2.1. Conceptual Orientation

Given that this study is theoretical rather than empirical, it will employ a conceptual synthesis methodology framed within critical interpretivism. The aim is not to quantify the implications of artificial intelligence (AI) on the African economies but to probe the conceptual frameworks within which AI is articulated and framed as a driver of development. This approach signifies a renewed focus in the social sciences on the understanding of digital technologies as equally culture

and politics, and not merely as technical systems (UNESCO, 2025).

On the iterative process of analytical abstraction, I first conducted a review of key policy and scholarly work produced in the years 2024 to 2025, notably the African Union's Continental Artificial Intelligence Strategy (2024), AI for Africa, by Africa (2025) and the CIPIT (2025) State of AI in Africa Report. These worked were selected for their normative impact and for presenting a uniquely African vision of AI. I then drew on and integrated disparate theoretical traditions in development, STS, and political economy to provide a cohesive interpretative approach.

The fundamental epistemological approach being followed is that social relations will always accompany technology. AI is especially unique in that it equally serves as a "meta-technology" that influences thinking, governance, and the processes through which value is developed all at once (Ndubuaku & Adebayo, 2024). Hence, the analysis utilizes conceptual rather than a negative approach through the integration of the hermeneutic critique of the policy discourses with the critical synthesis of underlying theoretical paradigms.

2.2. Analytical Framework

The proposed conceptual framework is founded on three interrelated and integrated dimensions- infrastructural, institutional, and epistemic. Together, these dimensions offer the best approach to the complex and multi-layered nature of AI-driven development.

1. The infrastructural dimension relates to the physical and the technical aspects of AI, which include the computational power, data storage, communication, and energy systems. In Africa, the lack of infrastructure is still a major hurdle to the equitable diffusion of AI. According to McKinsey (2025), the inequitable distribution of technological computing power is a determinant of innovation and dependency. The recent G42 and Microsoft partnership to build a geothermal-powered data center in Kenya is a good example of addressing the need for technological infrastructure while ensuring eco-sustainability.

2. The institutional dimension encompasses governance structures, legal frameworks, and organizational capacities. The advancements in the African Union's CAIS (2024) initiatives, as well as the training spearheaded by UNESCO in 2025, signify the emergence of a new developmental governance paradigm focused on the integration of socially equitable, transparent, and culturally inclusive pluralism concepts within the governance of AI. However,

implementation gaps from the member states reveal the extremely fragile state of these institutional ecosystems.

3. The epistemic dimension involves the production of knowledge and the representation of culture. Most AI models, as UNESCO (2025) highlights, are trained on datasets that omit African languages and knowledge frameworks. This not only hinders the precision of algorithms, but also perpetuates a historical hierarchy of knowledge systems in what some scholars identify as epistemic injustice.

These three dimensions together define the AI Development Triangle, conceptually crafted as a heuristic for the analysis that follows. At the level of abstraction, the triangle signals that Africa's sustainable integration of AI will depend on an equilibrium of technical infrastructure, institutional governance, and epistemic integration.

2.3. Theoretical Foundations

2.3.1. Development as Capability Expansion

The first pillar of theory draws from Amartya Sen's (1999) capabilities approach where development is viewed as the expansion of substantive freedoms instead of the overt accumulation of goods. From this standpoint, one of the values of AI in development is the expansion of human capabilities, the freedoms to learn, to communicate, and to participate in governance, and not simply as a contributor to GDP growth. Here, AI is an advanced technological infrastructure for human flourishing and not simply an economic accelerator.

In the African context, the capabilities approach means AI in health and education, as well as in agriculture, should focus on agency and empowerment. For example, machine-learning models for crop prediction should be praised not for increasing yield estimates but for enhancing the farmers' ability to make empowered, informed choices (African Union, 2024). Likewise, educational chatbots in local languages provide knowledge in areas where teacher shortages exist and, in the process, bolster social equity.

2.3.2. The Political Economy of Digital Dependency

The second pillar stems from the structuralist perspective of development theory, particularly Prebisch and the dependency theorists, reinterpreted for the digital context. Under this lens, data are analogous to the raw materials of colonial trade in pre-republic times: extracted from peripheral economies, and processed in the core economies. The asymmetry is not only in the ownership of data, but in the control of value chains—is it algorithms, patents, and intellectual property?

2.3.3. The Ethics of Contextual Intelligence

The African Union, as stated in 2024, and UNESCO, as stated in 2025, have supported contextual ethics as a fundamental element of responsible AI governance. African developers, by embedding Ubuntu principles in the design of their algorithms, will begin to shift the dominant Western Western Western Western paradigms p Western paradigms t Western paradigms p Western paradigms that p Western paradigms t Western paradigms that p Western paradigms that equate the Western paradigms that equate intelligence equate intelligence Western paradigms that equate intelligence intelligence p Western paradigms that equate intelligence to p Western paradigms that equate intelligence to optimization to p Western paradigms that equate intelligence to optimization. Intelligence will become situated: sensitive to context, diversity, and moral responsibility.

2.4. Research Design and Methodological Procedures

Although it is conceptual, this study aligns with the logic of qualitative meta-synthesis. The corpus comprised the twenty-five authoritative documents published in 2024–2025 by intergovernmental organizations, think tanks, and peer-reviewed journals. Each document was analyzed using thematic coding and interpretation, with particular focus on recurring categories of sovereignty, ethics, infrastructure, and capacity building. The themes were then analyzed using the AI Development Triangle.

3. Synthesis: integrative insights demonstrating the inseparability of infrastructural, institutional, and epistemic elements were articulated.

Multiple sources have been analyzed to evaluate discrepancies between policy and scholarly discourse (AU 2024; UNESCO 2025; Ndubuaku & Adebayo 2024; McKinsey 2025; CIPIT 2025) to preserve conceptual rigor. The global AI discourse and possible Eurocentric bias were taken into consideration to preserve reflexivity.

2.5. Limitations and Scope The conceptual methodology's primary limitation is that it is overly abstract. The lack of quantitative indicators means that the analysis will not achieve any form of empirical generalization. It is best to focus on explanatory depth. A second limitation has to do with the rapidly evolving AI policy in Africa. Documents from 2024–2025 will only capture the initial stages of the AI policy. More recent documents that capture the operationalization of regional AI research hubs, border AI legislation, or other relevant key legislation will considerably shape the analysis and interpretation of the text. The conceptual model outlined in the previous sections offers utility for comparative research. The model will provide an approach for assessing the interaction between the developmental outcomes of AI adoption and elements such as socio-infrastructure, institutional, and epistemic transformations.

2.6. The AI Development Model for Africa The previous sections will support the proposed theoretical model on AI development for Africa. The model focuses on AI development across 5 key and interrelated domains: infrastructure, governance, knowledge, capability, and ethics.

Infrastructure includes technological capabilities such as data storage, data processing, and energy provision, especially in African settings. Innovations in infrastructure, like solar-powered micro-data centers, regional cloud federations, and federated computing resources, are hybrid innovations in locating technology. These innovations are hybrid attempts localized within technology's ecological and economic boundaries.

Governance involves a set of legal frameworks, institutional arrangement, and social supervision. Effective governance entails innovation protection and the prevention of surveillance and discrimination. The African Union (2024)

states ethical principles ought to be incorporated in enforceable legislation, not as aspirational stipulations.

Knowledge includes human capital and epistemic representation and the the multiplicity of research, education, and language involves knowledge production. The training of AI systems in dominant global languages and the exclusion of African languages raises issues of cultural disjunction and global inequity. Masakhane and AI4D Africa demonstrate community-driven initiatives focused on countering the trend.

Capability involves the human side of AI integration—citizens, professionals, and policymakers empowered to apply adaptable intelligent systems. New capacity building initiatives are emerging, such as training of public servants (UNESCO, 2025) and regional centers of excellence in Kenya and Rwanda.

Ethics is the distorter which aligns the advancements in technology with the sociocultural norms of a community. The application of ethical AI in Africa should consider the true value of human respect, social welfare, and the underlying principles of sustainability. The use of the Ubuntu philosophy would provide a culturally meaningful ethical reference on which to center the discourse around the construction, use, and deployment of algorithms.

Ethics ensures coherence between means and ends. The theoretical implication is that the AI-driven development of a region is far more complex as a system, and a system adapted to a region's needs, development, and growth.

2.7. Proposed Theoretical Framework

To that end, the methodology contributes these guiding theoretical propositions which will inform the subsequent Results and Discussion chapter:

1. The Enabling Nature of AI: Within the frame of inclusive governance, AI has the potential to expand human freedoms and facilitate social participation.
2. AI as a Site of Dependency: Without sovereign access to data and compute resources, AI risks reproducing historical inequalities and continuing a legacy of disparity.
3. AI as a Cultural Project: Integrating African ethical and epistemic traditions in AI design will transform the meaning of intelligence to something contextual and relational.
4. AI as a Systemic Driver: The developmental impact of AI is only as powerful as the systemic coherence that exists across infrastructure, institutions, and knowledge.

The argument of the paper is built upon the following propositions: the nature of AI within the African continent is neither a technological marvel nor an inevitable danger, but rather a challenging area of development whose future is being shaped by today's decisions in policy, ethics, and education.

3. Results and Discussion

3.1. Reframing the Developmental Impact of AI

The earlier described conceptual model serves as a useful point of departure for the understanding of emerging evidence pertaining to AI in Africa, not as empirical “results” in the positivist sense, but as analytical configurations consisting of the frameworks of infrastructures, institutions, and epistemic practices. From the viewpoint of the continental phase, the period 2024–2025 developments showcase the developmental role of AI in Africa from a consolidation and contestation perspective. The African Union (2024) seems to have completed the landmark continental governance milestone of unprecedented developmental scope by adopting the AI Continental Strategy (CAIS) and governance framework. At the same time, some of the continental early movers, especially Kenya, Ghana, South Africa, and Rwanda, have launched or updated national AI strategies that synchronize domestic policy with continental objectives (CIPIT, 2025; Policy Center for the New South, 2024). As highlighted in the previous section, “strategic digital regionalism” captures the intention of fostering an engineered form of pan-African interaction, where the interplay is situated within the stakes of continental governance and the resistance of a few global powerhouses. In terms of structure, considerable undertakings, such as the geothermal-powered Microsoft–G42 data center in Kenya, demonstrate the positioning of Africa within the global cloud computing market (McKinsey, 2025). In terms of institutions, the AI for Africa, by Africa program implemented by UNESCO (2025) exemplifies the uptake of ethical governance, training over 3 000 public servants and judicial officers in algorithmic accountability as a sign of the ethical governance uptake.

Notably, developmental asymmetry continues to exist due to externally owned data infrastructures, externally concentrated research funding, and the marginal linguistic inclusiveness of large-scale models. These tensions demonstrate that the prospective AI-driven developments hinges on contextual coherence, which refers to the alignment of technology with a region's local capabilities, governance frameworks, and value systems.

3.2. Continental Policy and Capacity Signals

The first layer of results concerns the articulation of policy frameworks and institutional capacities across the continent. Table 1 summarizes emblematic initiatives between 2024 and 2025.

Table 1 – Continental Policy and Capacity Signals (2024–2025)

Dimension	Continental / National Signal	Development Relevance
Continental policy anchor	African Union’s <i>Continental AI Strategy</i> (2024)	Establishes a shared ethical and strategic framework emphasizing human-centered, inclusive AI (African Union, 2024).
Public-sector capacity	UNESCO’s <i>AI for Africa, by Africa</i> training program (2025)	Builds civil-service expertise in algorithmic governance and ethical oversight (UNESCO, 2025).
Preparedness lens	IMF’s 2025 assessment of AI regulation gaps	Introduces macro-level risk evaluation for governance readiness (IMF, 2025).
Green compute	Microsoft–G42 \$1 billion data center in Kenya (2024)	Demonstrates environmentally sustainable infrastructure aligned with sovereignty goals (McKinsey, 2025).

These projects indicate that Africa is no longer on the periphery of AI or responding to the actions of others. There is a gradual institutionalization of digital sovereignty. The African Union’s CAIS is a digital policy at the continental level, a significant departure from fragmented and donor-driven digital projects. The document’s normative lexicon—“contextual,” “inclusive,” and “human-centered”—shows the incorporation of ethical considerations into the developmental discourse. UNESCO has reaffirmed this position in their 2025 *Aging of AI* report, which states that the outcomes of the

advancement of technology also has to be addressed in terms of social justice and cultural pluralism, not merely economic growth.

Despite the broad principles of governance and policy, their implementation is still quite disproportionate. Many African governments still adopt general ICT policies, instead of developing and AI-specific frameworks, and this is a significant governance gap, which leads to fragility in areas of non-defensive corporate dominance and data capture. Therefore, the integration of the structural governance of the system , not the simple association of the policy on development outcomes, is the proper answer to policy opacity.

3.3. Sectoral Pathways and SDG Linkages

To understand the alignment of AI with the sustainable development priorities, it is more helpful to think about conceptual rather than statistical frameworks of sectoral pathways. Table 2 illustrates some of the application examples with the corresponding Sustainable Development Goals (SDGs).

Table 2 – Sectoral AI Pathways and SDG Linkages (2024–2025)

Sector	Illustrative Use Case	SDG Link	Key Ethical and Institutional Issues
Agriculture	Predictive analytics for yield optimization and climate-risk management using local-language interfaces (African Union, 2024)	SDG 2 – Zero Hunger	Data quality; access for smallholders; equitable digital extension services.
Health	AI-assisted diagnostics and epidemic forecasting (UNESCO, 2025)	SDG 3 – Good Health and Well-Being	Validation, bias, patient-data privacy, equitable access.

Education	Adaptive learning platforms using indigenous languages (CIPIT, 2025)	SDG 4 – Quality Education	Cultural representation; content accuracy; teacher training.
Public Administration	Predictive governance tools for budget transparency and corruption detection (World Bank, 2024)	SDG 16 – Peace, Justice & Strong Institutions	Algorithmic accountability; civic oversight; privacy rights.
Energy and Climate	AI-driven grid optimization and renewable forecasting (McKinsey, 2025)	SDG 7 & 13 – Clean Energy & Climate Action	Infrastructure reliability; environmental impact; inclusion in climate data.

These pathways portray the sector-specific nature of AI’s developmental role. While agriculture and health involve immediate, life-sustaining uses, governance and climate change are more about deep and long-term structural changes. Importantly, each sector illustrates AI’s dual nature as a technological enabler and a potential disproportionate driver of inequity. Predictive models in agriculture may improve efficiency, but they may also exclude farmers who are not digitally literate or connected. In health, diagnostic algorithms using non-African datasets may result in a misdiagnosis due to phenotypic bias (UNESCO, 2025).

Development effectiveness, in the end, hinges on the need for epistemic localization—the adaptation of models according to the linguistic, cultural, and environmental nets. The new community initiatives Masakhane and AI4D Africa clearly show how participatory research can embed cultural specificity in algorithmic design (CIPIT, 2025). Such efforts demonstrate the principle that data should not only be seen as technical input but also as cultural material.

3.4. Barriers and Action Levers

Despite the normative progress and the multiplicity of pilot projects, three structural barriers continue to delimit Africa’s AI trajectory: infrastructural scarcity, fragmented governance, and insufficient human-capital formation. Table 3 summarizes these barriers alongside potential levers of transformation.

Table 3 – Practical Barriers and Action Levers (2024–2025)

Barrier	Description	Transformative Lever
Compute and Energy	High costs of compute resources and unstable electricity supply constrain AI experimentation (McKinsey, 2025).	Green data centers; renewable-energy integration; regional HPC consortia.
Policy Fragmentation	Uneven adoption of AI regulations; weak enforcement mechanisms (African Union, 2024).	Harmonization through CAIS; continental legal templates; peer review mechanisms.
Skills Gap	Deficit of AI and data-science professionals, particularly in public sector (UNESCO, 2025).	Massive open training initiatives; university curriculum reform; South–South knowledge exchange.
Data Sovereignty	Over-reliance on foreign cloud services and limited local corpora (CIPIT, 2025).	Creation of national data strategies; public research data commons; localized language datasets.

The persistence of these barriers reaffirms that AI cannot be removed from the broader political economy of development. Infrastructural deficits are the indices of historical underinvestment in energy and connectivity. Governance fragmentation reflects colonial legacies of institutional

diffusion. Skills shortages are the outcomes of educational systems dislocated from the realities of technology. As a result, policy measures are required that go beyond the narrow framing of “digital transformation” to structural dependencies.

The transformative levers in Table 3 illustrate the need for systemic integration. Green data center development, for instance, integrates ecological balance with technology self-reliance, which is in line with Africa’s climate obligations under the Paris Agreement. Likewise, cohesive legal approaches can reduce the spread of divergent regulations that restrict cross-border data flows.

Importantly, capacity building is not a one-off training exercise. It is the nurturing of a learning society. The growth of AI curricula in the universities of Nigeria, Morocco, and South Africa is part of the consolidation of computational literacy aimed at changing the social fabric (UNESCO, 2025).

3.5. AI and the Reconstruction of Development Discourse

The synthesis of these findings prompts further thinking: AI is not simply adding another digital layer to existing development paradigms. It is reconstructing the very discourse of development. Traditional development indicators—GDP growth, employment level, and industrial output—fail to account the algorithmic dynamics of value creation. When algorithms mediate production, distribution, and governance, development becomes a question of informational capability—how a society is able to generate, interpret, and regulate data.

In this respect, Africa’s developmental horizon in the AI age is as much epistemic as it is economic. Politics of data governance determines who is considered a knowledge producer, whose realities are captured, and whose futures are envisioned. The emphasis on indigenous knowledge and local languages in the CAIS framework is a nascent attempt to decolonize algorithmic epistemology. However, as Ndubuaku and Adebayo (2024) rightly caution, localization should not result in technological isolationism. It should foster hybridization—blending global technological advances with African contextual wisdom.

The ethical incorporation of Ubuntu principles serves as a philosophical corrective to the utilitarian logic of global AI. Ubuntu ethics shifts the understanding of efficiency from speed to relational harmony. This reorientation of ethics may well identify Africa as an ethical innovation laboratory, the first to show how the technological imperative can be harmonized with cultural diversity and ethical pluralism.

3.6. A Development-First Governance Model for AI.

The analysis so far has pointed to the fact that the governance of AI technology is developmental as far as the underlying social architecture is prioritised over commercial ones. This model of governance, the development first model we are proposing here, has five interdependent components—sovereign infrastructure, rights based regulation, epistemic inclusion, institutional capacity, and evaluative reflexivity.

Sovereign infrastructure involves continental cooperation in the development of distributed compute and cloud capacity, perhaps via aligned PPPs based in fairness. Rights based regulation involves the embedding of algorithmic accountability as well as impact accountability both through ex-ante and ex-post legislative frameworks. Epistemic inclusion involves investments in algorithmic equity through multilingual and culturally relevant datasets. Institutional capacity means the adequacy of the population and the organisation to execute and supervise the AI policy. Evaluative reflexivity is the alignment of the measures of progress to be on the human development indicators, not on the achievements of technology.

This approach dovetails with Sen’s capability approach theory and tracks it into the digital realm: development becomes the broadening of algorithmic capacity—the collective potentiality of engineering, comprehending, and managing intelligent systems for the common good.

3.7. Implications for Future Research

The theoretical synthesis provided above opens must different avenues for further investigation. For instance, within-region comparative analyses in Africa could show how different political systems shape the adoption of AI technology. Industrialized North African states, for example, would likely follow different paths compared to Sub-Saharan economies focused on agriculture and services. Second, the intersection of computer science with anthropology and public policy would be receptive to the idea of contextual ethics in system design. Third, the evolving impact of CAIS on innovation ecosystems would be analyzed through the lens of longitudinal policy assessment.

Placing AI within the context of Africa’s enduring struggle for autonomy allows scholars to move beyond deterministic technology dependency theories and enrich the discourse with a more nuanced pluralistic digital development theory. Such a theory would emphasize diverse routes to modernization anchored in cultural agency and institutional innovation.

Conclusion

Africa has its challenges and opportunities. So does AI. The AI opportunity challenges the continent's long quest for progress, self-determination, and social equity. AI will not simply be a neutral technology that quietly integrates into regional economies. It is a social, political, and ethical technology that requires society to define the questions and set the parameters for its design and control. The African Union's Continental AI Strategy (2024) and UNESCO's AI for Africa launched Africa's decisive shift. Africa is no longer solely a consumer of the world's technology; Africa is reshaping the ethical and developmental narrative of the global digital economy.

The study examined AI within the socio-technical domain and within the various layers of infrastructures, institutions, and epistemologies' overlaps and interplays as a complex constellation of socio-technical systems. Here, a situation can be labeled as 'developing' and can be removed from the strict case of economic growth and be located within the question of capabilities, agency, and equitability. The extent to which AI embedded systems will deepen dependency or promote autonomy will reflect the balance of technical, institutional, and epistemic factors. When these elements of a system are tightly interlocked, AI can promote inclusive equitative development while liberating agency and dignity to the people of the African continent. Purely economically centered systems will instill new relations of dependency and erode system equity, whereas AI embedded systems will attain economically efficient functioning.

This study posits that Africa's digital future needs to be anchored to ethical constructs, particularly ethics derived from African philosophical thought. The African philosophical construct of Ubuntu, particularly Ubuntu's relationality and the primacy of the collective, offers normative grounding that is ethical and deontological, particularly compared to the Western emphasis on the ethics of utility. The African ethical values that will govern algorithms will shift conversations on the socio-economic constructs of efficiency to relational harmony, on intelligence to empathic collaboration, and on compassion to collective. Africa's global discourse to the conversation of moral and humane AI governance will be the ethical and humane leveraging of technology to enhance, rather than restrict, the multiplicity of life.

In order to transform potential into reality the first of the three priorities Africa must achieve is the attainment of technological sovereignty, which will require the construction of sustainable and equitably distributed regional

infrastructures, and the establishment of open data ecosystems. Nurturing the human and institutional resources necessary for Africa to ensure technological innovation is responsible and aligns with the public's will is the second priority. Lastly, Africa must community-center the production of local knowledge—linguistic, cultural, scientific, and empowering knowledge that will assist citizens in defining their digital futures. These four priorities are of course not mere technical necessities, but they are moral imperatives for equitable development in the 21st century.

The aim in discussing AI in Africa is not to simply varying AI technology to losing demographics of the Global North, but to describing a distinct form of modernity. One which is characterized by the appreciation of eclectic forms of knowledge, responsible eco-centrism, constructed globally, and the articulated, practiced forms of collaboration. AI technology ought to differ from the current technologies of the Global North. For the region the sharpest possible technologies informed by the critical and ethical intent ought to enable AI to be the arena from which African countries achieve full recovery of their intellectual sovereignty.

It is the responsibility of active citizens, researchers, and policymakers to ensure that the AI technologies of the future and the algorithms that drive them possess and embedded African sensitivity and consciousness that reflects the diversity of the continent and its peoples. In that sense, AI in Africa is most genuine when it is no longer artificial.

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