

ETHICAL AI IN AFRICAN CONTEXTS: DATA SOVEREIGNTY AND INDIGENOUS KNOWLEDGE SYSTEMS

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Abstract

Artificial intelligence (AI) is rapidly influencing governance across Africa, yet dominant ethical frameworks remain rooted in Western contexts. This raises concerns around data sovereignty, cultural misrepresentation, and the marginalization of indigenous knowledge systems (IKS). Using a decolonial and critical AI ethics lens, this paper examines how African values, epistemologies, and governance structures can shape responsible AI. It argues for moving beyond imported checklists toward sovereignty, inclusivity, and epistemic plurality. A conceptual framework is proposed, positioning data sovereignty and IKS as core anchors, supported by participatory design, epistemic justice, and accountability, and operationalized through policy, institutional capacity, and technological adaptation. The framework highlights outcomes of ethical AI practices, reduced digital colonialism, and culturally aligned innovation, with policy implications for stronger data governance and institutional capacity-building.

Keywords: Ethical AI; African contexts; Data sovereignty; Indigenous knowledge systems; Responsible AI; DE-colonial AI

Introduction

Artificial intelligence (AI) is rapidly becoming a central driver of innovation and decision-making across domains such as healthcare, finance, agriculture, and governance. Global debates on AI ethics have coalesced around principles such as fairness, accountability, transparency, and human oversight (Floridi & Cows, 2019) (Jobin, 2019). While these frameworks provide valuable guidance, they are largely shaped by Western contexts and epistemologies. As a result, they often fail to capture the lived realities, socio-political structures, and cultural values of societies in the Global South, particularly in Africa (Mhlambi, 2020)

Africa faces a unique constellation of challenges in the pursuit of ethical AI. On one hand, the continent is experiencing rapid digitalization, with AI increasingly embedded in critical services such as agriculture, education, and public health (Sangwa, 2025). On the other hand, structural barriers such as infrastructural gaps, weak regulatory ecosystems, and dependence on foreign technologies create asymmetrical power relations that leave African states and communities vulnerable to what has been termed *digital colonialism* (Coudry, 2019) (Taylor & Broeders, 2015). The lack of robust local data governance mechanisms exacerbates risks of data extraction and misrepresentation, raising pressing concerns about sovereignty, justice, and accountability in AI development and deployment.

Against this backdrop, data sovereignty and indigenous knowledge systems (IKS) emerge as central ethical issues in the African context. Data sovereignty emphasizes the right of African states and communities to govern the collection, storage, and use of their data, ensuring that digital resources

contribute to local development rather than external exploitation (Taylor & Broeders, 2015) (Soulé, 2024). At the same time, IKS represent vital epistemic resources rooted in communal values, environmental stewardship, and relational accountability, which can offer alternative pathways for AI design and governance (Gurov, 2025) (Sangwa, 2025). Positioning these elements at the core of AI ethics provides a foundation for reimagining responsible and decolonial AI in Africa one that resists extractive practices and affirms cultural sustainability.

Ethical AI and the African Context

The global discourse on AI ethics has been largely shaped by frameworks originating in Europe and North America, emphasizing principles such as fairness, , transparency, privacy, and human rights (Jobin, 2019) (Floridi & Cowls, 2019). These accountability principles, while valuable, are often abstracted into universalist claims that overlook contextual, cultural, and socio-political specificities. For example, the European Union's Ethics Guidelines for Trustworthy AI foreground individual rights, legal compliance, and technical robustness (Hleg, 2019), reflecting normative traditions rooted in Western liberal democracies.

However, these global frameworks often fail to adequately capture African realities. First, they tend to assume stable regulatory infrastructures, strong enforcement mechanisms, and equitable access to digital technologies conditions that are unevenly distributed across African states (Taylor & Broeders, 2015). Second, they privilege individualistic notions of autonomy and privacy, which may not align with African communitarian ethics such as *Ubuntu*, where relational accountability and collective well-being are central (Mhlambi, 2020). Third, imported ethical guidelines rarely engage with historical and structural dimensions of inequality, such as legacies of colonial extraction and contemporary dependencies in digital economies (Couldry, 2019) (George, 2023)

Applying these frameworks uncritically in Africa carries significant risks. Ethical guidelines detached from local contexts can become performative tools adopted for legitimacy while failing to address substantive justice concerns (Birhane, 2021). Moreover, they may legitimize forms of digital colonialism by reinforcing dependence on foreign platforms, technologies, and epistemologies (Milan & Tréré, 2019). Without critical adaptation, Africa risks becoming a passive consumer of externally defined "ethical AI," rather than an active shaper of contextually relevant principles. Instead, the African AI ethics agenda must prioritize data sovereignty, indigenous knowledge systems, and decolonial perspectives that foreground local needs, epistemologies, and futures.

Data Sovereignty in Africa

Data sovereignty refers to the principle that data generated within a jurisdiction should be subject to the laws, governance structures, and ethical norms of that jurisdiction, encompassing control over its collection, storage, and use (Taylor & Broeders, 2015). For African states and communities, data sovereignty is not merely a legal or technical issue but a fundamental question of autonomy, justice, and self-determination in the digital age. It speaks to who owns, benefits from, and governs Africa's rapidly expanding digital resources.

Significant tensions arise between the ideal of local sovereignty and the realities of globalized digital infrastructures. The majority of Africa's data is hosted on servers owned by multinational corporations based in the Global North, creating dependencies that echo historical patterns of resource extraction (Couldry, 2019; Milan & Treré, 2019). Cross-border data flows often framed as enablers of global commerce and innovation can exacerbate asymmetrical power relations when African states lack bargaining power in international digital trade agreements (George, 2023). This dynamic not only limits the capacity of governments to regulate data use but also raises concerns about exploitation and loss of value from Africa's digital ecosystems.

The implications for privacy, governance, and digital self-determination are profound. Weak local enforcement mechanisms often leave African citizens vulnerable to surveillance, profiling, and exploitation of personal information (George, 2023). At the same time, the absence of comprehensive regional data protection regimes undermines the ability to collectively resist extractive practices. Ensuring data sovereignty in Africa therefore requires building robust governance frameworks, investing in regional data infrastructures, and embedding ethical considerations into policy. Such steps are critical for fostering digital futures that serve African development priorities rather than external corporate interests.

Indigenous Knowledge Systems (IKS) and AI

Indigenous Knowledge Systems (IKS) refer to the cumulative body of knowledge, practices, and cultural values developed by local communities over generations, grounded in lived experiences and embedded in specific ecological and social contexts (Battiste, 2002) (Gurov, 2025). Unlike dominant Western epistemologies that often prioritize abstraction and universalism, IKS emphasizes contextuality, relationality, and sustainability. Its epistemological significance lies in offering alternative ways of knowing and governing, particularly relevant for designing AI systems that are culturally inclusive and socially just (Mhlambi, 2020).

IKS offers valuable contributions to the ethical design and governance of AI. First, its focus on communal values and collective well-being resonates with African philosophies such as *Ubuntu*, providing a counterweight to the individualistic assumptions often embedded in global AI frameworks (Mhlambi, 2020).

Second, its emphasis on relational accountability fosters ethical practices that foreground responsibility not only to individuals but also to communities, ancestors, and future generations (Shizha, 2025).

Third, the ecological sensitivity of IKS, rooted in environmental stewardship, provides guidance for sustainable AI development that aligns technological innovation with long-term ecological balance (Mhlambi, 2020). Integrating these principles can help reshape AI systems to be more inclusive, equitable, and culturally grounded.

However, there are significant risks of appropriation and erasure if IKS is not respected in its own right. When indigenous knowledge is extracted without consent, reduced to datasets, or stripped of its cultural meanings, it risks reproducing colonial dynamics under the guise of innovation (Tuhwai Smith, 2012)

(Birhane, 2021). Such practices not only undermine the integrity of local epistemologies but also reinforce the very asymmetries that ethical AI seeks to challenge. Safeguarding IKS in the AI era thus requires governance mechanisms that protect intellectual sovereignty, promote equitable participation, and ensure that indigenous voices shape the trajectory of AI research and deployment in Africa.

Discussion

The preceding analysis highlights that ethical AI in Africa cannot be reduced to the transplantation of global principles but must instead emerge from a contextual negotiation of epistemologies, infrastructures, and governance arrangements. Two dimensions data sovereignty and indigenous knowledge systems (IKS) stand out as foundational in reframing the ethics of AI within the African context. Together, they articulate a vision of responsible AI that resists digital colonialism while advancing epistemic and political self-determination.

Data sovereignty foregrounds the political economy of digital infrastructures, highlighting how control over data resources is entangled with questions of power, justice, and autonomy (Taylor & Broeders, 2015). Without sovereignty, African nations risk remaining peripheral to AI value chains, reduced to sources of raw digital material for external actors (Couldry, 2019). By insisting on local governance, infrastructural investment, and regulatory capacity, data sovereignty shifts the conversation from abstract principles of “trustworthiness” to the material conditions of who benefits from Africa’s digital resources and who bears the risks.

Complementarily, IKS reorients the ethical lens from universalist abstractions to relational, situated forms of accountability. Where global AI ethics often privileges individual autonomy, IKS embeds ethical reasoning in communal values, intergenerational responsibility, and environmental stewardship (Mhlambi, 2020) (George, 2023). Incorporating IKS into AI design not only enhances cultural inclusivity but also addresses broader global concerns about sustainability and the socio-ecological impacts of technology (Sangwa, 2025). Crucially, this integration must resist extractive tendencies: indigenous knowledge cannot be reduced to datasets or symbolic “cultural inputs” without undermining its integrity (Tuihivai Smith, 2012) (Birhane, 2021).

Bringing data sovereignty and IKS into dialogue reveals a deeper challenge: the need to reframe ethical AI as both a technical and an ethico-political project. This reframing disrupts the technocratic tendency to treat ethics as a checklist, emphasizing instead the co-production of AI governance structures by African states, institutions, and communities. It also underscores the tensions between efficiency and accountability, particularly when external actors promote “scalable” solutions that disregard local norms and epistemologies. Addressing these tensions requires pluralistic governance models that embed African voices in global AI policymaking while fostering regional collaboration across the continent.

Ultimately, the African case offers lessons of global significance. By foregrounding sovereignty and indigenous epistemologies, Africa demonstrates that ethical AI is not only about mitigating harms but also about imagining alternative digital futures. Such futures contest the asymmetries of the current AI

economy while advancing models of technological governance rooted in justice, relational accountability, and sustainability.

Why a Conceptual Framework?

This study adopts a conceptual framework as the primary analytical tool for examining the intersections of ethical AI, data sovereignty, and indigenous knowledge systems in African contexts. A conceptual framework is particularly suitable here because there is limited empirical evidence on these issues within Africa. For instance, (Ritchie & Whittard, 2024) observes that there is “*little to no material in the literature that discusses the implications of AI on African ethical values*”. Similarly, (Oguamanam, 2020) highlights that Indigenous data sovereignty in Africa remains in its nascent stages. Recent AI governance studies also emphasize that Africa’s policy and empirical base is still emerging and fragmented (Bernal, 2024).

In contexts where empirical data is scarce, a conceptual framework provides an analytical scaffold for synthesizing theoretical insights, emerging debates, and indigenous epistemologies into a structured lens (Green, 2014). It allows this study to map how *inputs* (African values, indigenous knowledge, data sovereignty principles) shape *processes* (ethical AI design, participatory governance, decolonial approaches), and how these yield *outputs* (responsible AI systems, cultural preservation, fair data governance) and ultimately *impacts* (equitable AI futures).

Moreover, adopting a framework ensures that the analysis is not limited to Western-centric ethical models, but instead foregrounds African perspectives and lived realities (Yilma, 2025). In this way, the conceptual framework is both a map of current understanding and a scaffold for future empirical research, supporting Africa’s active role in shaping responsible and decolonial AI futures. The visual representation of this framework developed in this paper serves as a practical tool for guiding scholarly, policy, and technological discussions.

Conceptual Framework Components Narration

The framing of ethical artificial intelligence (AI) in Africa requires a departure from Western-centric paradigms that often marginalize local epistemologies and reinforce extractive practices. In developing this conceptual framework, we drew on critical literature that highlights the structural asymmetries in global data economies (Couldry, 2019) (Taylor & Broeders, 2015) and the pressing call for indigenous, context-sensitive approaches to AI ethics (Mhlambi, 2020) (Mohamed et al., 2020). Since empirical evidence on African-led ethical AI practices remains scarce, particularly regarding the operationalization of indigenous knowledge systems (IKS) in digital transformation, a conceptual framework provides a suitable tool for mapping relationships, clarifying principles, and proposing pathways for responsible AI adoption (Jabareen, 2009).

1. Core Ethical Anchors

The first layer of the framework rests on core ethical anchors that ground the framework in African values. These include data sovereignty and indigenous knowledge systems (IKS). Data sovereignty

emphasizes the control, ownership, and governance of African data by local communities and institutions, countering the risks of “digital colonialism” where external actors extract data without equitable returns (Ndlovu-Gatsheni, 2018). Similarly, IKS centers local epistemologies, communal values, and cultural practices as legitimate sources of ethical guidance for AI design. Scholars argue that ignoring IKS in digital innovation perpetuates epistemic injustice by privileging Western knowledge systems over African traditions (Hoppers, 2002)

2. Mediating Principles

Between these ethical anchors and operational practices lie mediating principles. These principles translate values into action. Participatory design ensures that local communities actively shape AI applications rather than being passive recipients, echoing broader calls for co-creation in technology design (Winschiers-Theophilus, 2009). Epistemic justice serves as a corrective to historical marginalization by recognizing African ways of knowing as valid and necessary (Fricker, 2017). Finally, accountability mechanisms provide governance tools to prevent misuse, bias, or exploitation crucial in light of AI’s potential for reinforcing inequalities if left unchecked (Birhane, 2021); (Crawford, 2021)

3. Operational Dimensions

The third component of the framework focuses on operational dimensions, which anchor principles in practice. Policy and regulation are central, with regional instruments such as the African Union’s *Data Policy Framework* and *Digital Transformation Strategy (2020–2030)* providing normative guidance for AI governance (Union, 2020). Institutional capacity highlights the need to strengthen African universities, think tanks, and regulatory bodies as stewards of data and ethics (Gillwald, 2022). Technological adaptation refers to designing AI systems suited to African contexts both culturally and resource-wise ensuring that technology is not simply transplanted but co-evolves with local realities.

4. Outcomes

Finally, the framework anticipates three key outcomes if implemented effectively. First, ethical AI practices that respect sovereignty, fairness, and cultural sustainability. Second, reduced digital colonialism, as local stewardship limits extractive practices by external actors (Mohamed et al., 2020). And third, culturally aligned innovation, where AI systems strengthen indigenous knowledge rather than erasing it. These outcomes align with broader global debates on decolonial AI and responsible innovation in the Global South (Birhane & van Dijk, 2020)

How We Arrived at the Framework

We opted for a conceptual framework because empirical studies documenting African-led ethical AI practices remain limited. Existing scholarship highlights challenges such as lack of infrastructure, weak regulatory environments, and persistent epistemic exclusion. Hence, the framework acts as a bridge between normative debates and future empirical inquiry, setting the stage for systematic testing and adaptation across diverse African contexts. In doing so, it contributes to filling the gap in global AI ethics discourse, which often overlooks Africa’s unique positionalities.

Visually, below is a three-layered framework capturing the below details:

- Core Anchors (Data Sovereignty + IKS) at the center.
- Mediating Principles as the connective tissue.
- Operational Dimensions as the implementation layer.
- Outcomes radiating outward as the impact.

Conceptual Framework for Decolonial AI Ethics in Africa



Fig1: Conceptual Framework for Decolonial AI Ethics in Africa, Source: Author's work.

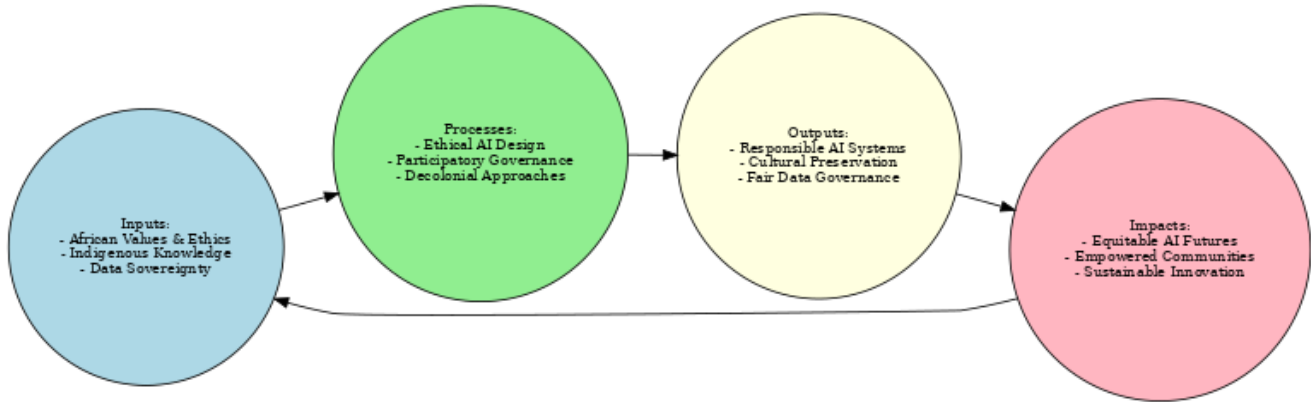


Fig.2 Flow of Conceptual Framework Diagram Source: Author's work

Ethical and Governance Challenges

Despite the transformative potential of AI in Africa, its development and deployment are fraught with profound ethical and governance challenges that demand urgent attention. These challenges arise not only from technical limitations but also from structural inequalities that shape how AI systems are designed, implemented, and governed.

One pressing concern is algorithmic bias and cultural misrepresentation. Most AI systems are trained on datasets sourced from outside the continent, embedding assumptions, values, and linguistic structures that fail to reflect Africa's cultural and epistemic diversity (Birhane, 2021) (George, 2023). The result is technologies that marginalize African identities whether through inaccurate natural language processing for local dialects, biased credit-scoring systems, or misaligned health diagnostic tools. Beyond technical flaws, such misrepresentation reinforces epistemic injustice, where African ways of knowing are excluded from global knowledge production.

A second challenge relates to the lack of infrastructure and institutional capacity for ethical oversight. Effective governance of AI requires robust regulatory frameworks, independent oversight bodies, and local expertise in areas such as data protection, algorithmic auditing, and digital rights (Gurov, 2025). Yet, many African countries struggle with limited resources, fragmented policy regimes, and underfunded regulatory institutions, leaving ethical guidelines unenforced. This gap enables the unchecked deployment of AI systems that may prioritize efficiency or profit over fairness and accountability.

Finally, there are enduring power asymmetries between global AI actors and African communities. Multinational corporations and foreign governments dominate the AI value chain, from hardware production to data hosting and software development (Taylor & Broeders, 2015). These asymmetries not only perpetuate digital colonialism but also restrict Africa's capacity to negotiate equitable terms in global AI governance fora. Without deliberate interventions, Africa risks being locked into subordinate positions in the global AI economy, where its citizens are primarily consumers of externally designed technologies, rather than co-creators of ethical and contextually grounded AI.

Addressing these challenges requires a multi-pronged approach that combines infrastructural investment, capacity-building, and epistemic justice. More importantly, it calls for governance models that empower African communities to shape AI systems in ways that align with local values, cultural diversity, and developmental priorities.

Policy and Design Implications

Confronting the ethical and governance challenges of AI in Africa requires moving beyond critique toward actionable frameworks that embed sovereignty, inclusivity, and accountability into both policy and design. The following implications highlight key directions for intervention.

1. Embedding African Epistemologies into AI Design.

Policy frameworks should promote the integration of indigenous knowledge systems (IKS) and local cultural values into AI development processes. By drawing from relational ethics such as *Ubuntu*, AI systems can be designed to prioritize communal well-being, intergenerational responsibility, and sustainability (Mhlambi, 2020). This requires collaborative design methodologies that involve local stakeholders from the outset rather than retrofitting ethics after deployment.

2. Strengthening Regional Governance and Regulatory Capacity.

Pan-African institutions such as the African Union (AU) and regional economic communities should coordinate the development of harmonized AI governance frameworks. A continental approach can help overcome fragmented national regulations, provide leverage in negotiations with multinational corporations, and promote collective digital sovereignty (Soulé, 2024). Investment in independent oversight bodies, ethical review boards, and algorithmic auditing mechanisms is equally essential for enforcing standards of accountability and fairness (Sangwa, 2025).

3. Building Local Infrastructure for Digital Self-Determination.

Policy must prioritize infrastructural investments in data centers, cloud services, and open-source AI platforms that are locally governed. Such investments reduce reliance on foreign providers and ensure that African data remains within African jurisdictions (Taylor & Broeders, 2015). Open data initiatives, coupled with robust privacy protections, can further democratize access to digital resources while safeguarding citizens from exploitation.

4. Addressing Power Asymmetries through Global Advocacy.

African actors must play an active role in shaping global AI norms and standards. Participation in international fora such as UNESCO, OECD, and the Global Partnership on AI should be leveraged to articulate context-specific ethical concerns and resist one-size-fits-all models of governance (Milan & Tréré, 2019). Aligning national and regional strategies with global advocacy strengthens Africa's negotiating position and challenges structural inequities in the global AI economy.

5. Fostering Research, Capacity-Building, and Education.

Finally, sustainable AI governance depends on investments in human capital. Building local expertise in AI ethics, data governance, and digital rights requires support for African universities, think tanks, and civil society organizations. Partnerships that emphasize knowledge co-creation rather than knowledge transfer can ensure that AI systems are governed by African priorities rather than imported frameworks (Soulé, 2024).

Taken together, these implications underscore that ethical AI in Africa is not simply about preventing harm, but about constructing enabling environments for equitable and sustainable digital futures. By embedding local epistemologies, strengthening governance, and addressing structural power imbalances, Africa can chart a path toward responsible AI that is both contextually grounded and globally relevant.

Towards Responsible and Decolonial AI

The pursuit of responsible and decolonial AI in Africa demands a deliberate reorientation of both the conceptual and material foundations of AI governance. Whereas global AI ethics has often been framed through universalist principles of fairness, accountability, and transparency (Jobin, 2019), such framings risk reproducing colonial hierarchies when applied without sensitivity to local contexts. To move beyond this, African perspectives must be foregrounded in both theory and practice.

1. Reframing AI Ethics through African Epistemologies.

African philosophies such as *Ubuntu* offer relational approaches to ethics that prioritize community, interdependence, and mutual accountability (Mhlambi, 2020). These frameworks challenge the individualist assumptions embedded in many global AI guidelines and instead emphasize collective well-being, sustainability, and respect for diversity. By reframing AI ethics through such epistemologies, Africa can contribute to a more pluralistic and just global AI discourse.

2. Participatory and Community-Centered AI Design.

Decolonial AI requires that communities are not merely subjects of technological experimentation but active participants in shaping AI systems that affect their lives. Participatory design methodologies, which emphasize co-creation with local users, ensure that AI tools are aligned with cultural values, linguistic diversity, and socio-economic realities (Couldry, 2019). This community-centered approach mitigates risks of exclusion, bias, and epistemic injustice by embedding accountability within the design process itself.

3. Policy Pathways for Decolonial AI.

Policy interventions are central to institutionalizing responsible and decolonial AI. Three priority areas stand out:

- **Data governance frameworks** that ensure African states retain sovereignty over the collection, storage, and use of local data, thereby protecting against extractive practices of global technology firms (Taylor & Broeders, 2015).

- **Local capacity-building** through investments in research, education, and innovation ecosystems that enable Africans to design, deploy, and govern AI technologies on their own terms (Sangwa, 2025).
- **Protection of Indigenous Knowledge Systems (IKS)** via intellectual property laws and ethical research protocols that safeguard against appropriation while enabling respectful integration of IKS into AI development (Shizha, 2025).

Taken together, these directions emphasize that responsible AI in Africa cannot be reduced to the mere importation of global frameworks. Instead, it requires a decolonial turn that places African epistemologies, community participation, and sovereign governance at the center of both policy and practice. Such an approach not only resists data colonialism but also enriches global conversations on ethical AI by introducing alternative imaginaries of what intelligence, accountability, and justice can mean.

Conclusion

This paper has examined the ethical dimensions of artificial intelligence within African contexts, emphasizing the centrality of data sovereignty and the preservation of indigenous knowledge systems. While AI offers transformative opportunities, it also poses risks of cultural misrepresentation, algorithmic bias, and continued extractivism if developed within paradigms divorced from African realities. By reframing AI ethics through African epistemologies and communal values, we highlight that technology must serve local needs rather than reinforce global asymmetries of power.

The way forward requires participatory design approaches, robust data governance frameworks, and investments in local capacity-building to ensure that African societies are not merely consumers but active shapers of AI technologies. Protecting indigenous knowledge from exploitation and embedding communal ethics in AI governance are not optional but foundational for achieving responsible and decolonial AI.

Ultimately, the pursuit of ethical AI in Africa must balance innovation with justice, sovereignty with collaboration, and cultural preservation with digital transformation. In doing so, AI can become a tool of empowerment rather than marginalization, supporting equitable development pathways that resonate with Africa's diverse knowledge traditions and socio-cultural contexts

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