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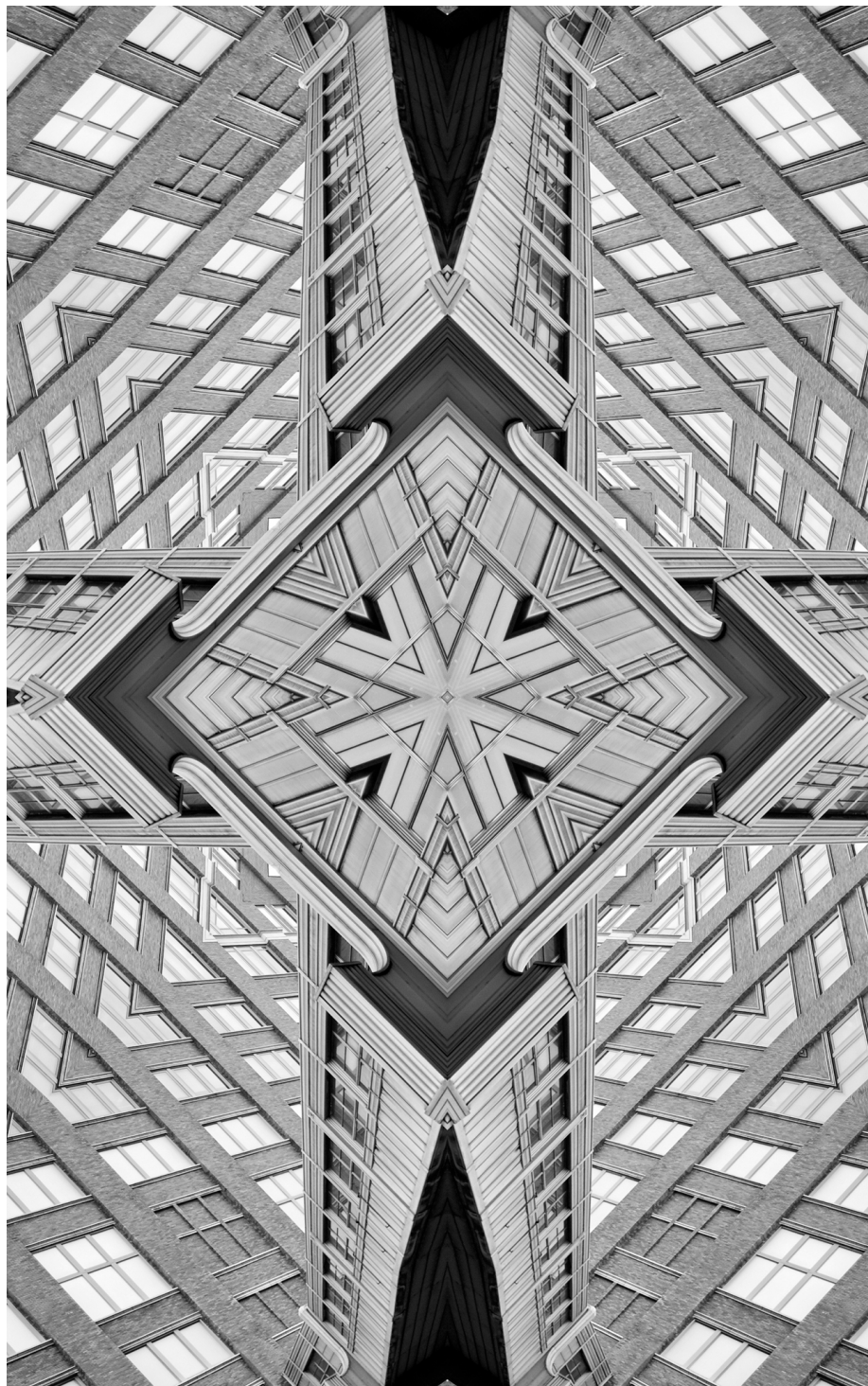
The Role of AI and Digital Tools in Africa's Development

Mbali Ndandani

This brief discusses the role of Artificial Intelligence (AI) and digital technologies in meeting Africa's development goals and argues that, for tech to make a real contribution to human development in the continent, the process of technology development should enable African agency. The brief explores how AI and digital technologies can provide pathways to empower African communities, emphasising context-driven innovation and collaborative approaches. By leveraging technology as a tool for social and economic transformation, African innovators can develop solutions that prioritise holistic community benefits and individual agency, positioning Africa as a potential leader in human-centred technological development.

"We believe that in the long run the special contribution to the world by Africa will be in this field of human relationships. The great powers of the world may have done wonders in giving the world an industrial and military look, but the great gift still has to come from Africa – giving the world a more human face."

~ Steve Biko, South African anti-apartheid activist

Introduction

The Global Digital Inclusion Partnership estimates that the digital gender divide will result in 32 low- and middle-income countries losing more than US$500 billion in Gross Domestic Product in the next five years.[1] This calls for persistent efforts to aim for a different reality by 2030.

The "gift" of Africa, as envisioned by Biko, is yet to be achieved. Technology is the tool that can enable this transition for the current and future generations of Africans; however, there are systemic gaps that limit digital execution in the continent. Africa's human resources can enable developing technology guided by context, collaboration, and holistic benefits. Sen's capabilities approach advocates that development must equip people with agency.[2] Accordingly, this article aims to address the following question: How can Artificial Intelligence (AI) and digital technology provide tangible pathways towards enabling agency for Africans?

Systems require an impetus to undergo innovation and shifts. The COVID-19 pandemic was considered to have provided such an impetus by providing new perspectives and worldviews. However, there has been a deceleration in development outcomes in the Global South since the pandemic.[3]

I nclusive innovation can enable the development of systemic solutions. The ladder of inclusive innovation provides six levels of inclusion: intention, consumption, impact, process, structure, and post-structure.

Figure 1: The Ladder of Inclusive Innovation
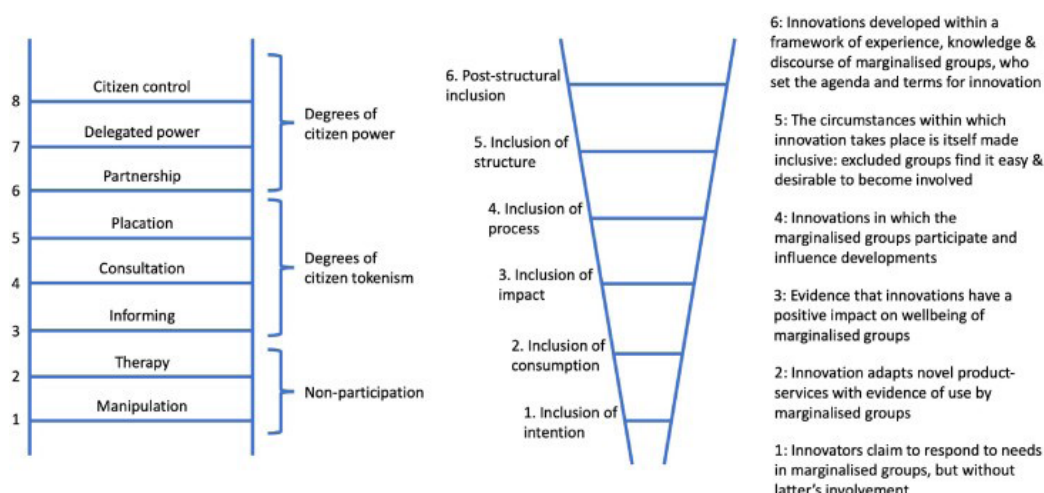
Source: Heeks et. al (2013)[4]

The expression of the outcomes of inclusive innovation in the ladder and the level of collaboration and communal benefit they describe reflects the *ubuntu[a]* remit of Africans. While the first three categories may not create true change in systems, the second group reimagines the system at a foundational level. In Africa, not much AI technology has been developed to address the upper rungs of the ladder.

a   'Ubuntu' describes a set of closely related Bantu African-origin value systems that emphasise the interconnectedness of individuals with their surrounding societal and physical worlds. 'Ubuntu' is sometimes translated as "I am because we are."

Inclusive Innovation

Addressing Knowledge Asymmetry with AI

"It's as though Africa is in a civil war against its people. African children are merely saying, 'I want an education', and young people are saying, 'I want to work'. Those are not unreasonable requests."

~ Sipumelele Lucwaba, 2030 Reading Panel Secretariat

There is a persistent asymmetry of knowledge, which results from inequality of access to working systems. While mobile penetration in Africa is over 70 percent and mobile internet penetration is 32 percent as of 2023,[5] there are few scaled examples of tangible impact on development outcomes enabled by mobile penetration. An alternative may be to question the extent to which technology can be expected to address systemic deficiencies—a view that would place technology adjacent to other development mechanisms.

Celebrating the cultures, traditions, values, and languages of people in systems is a stronger strategy than problem identification and is vital for inclusive innovation, as it enables technologists to develop solutions that recognise multiple ways of knowing, without one way having precedence over another.

AI can play a particularly important role in knowledge access and creation. The African Union Development Agency (AUDA) at the New Partnership for Africa's Development (NEPAD) AU White Paper on AI argues that AI can help address existing knowledge and service gaps.[6] AI's capabilities to enable newer forms of accessibility and make service delivery more responsive should be explored within the African context. The white paper argues that African countries are experiencing various challenges in capturing value from AI, including high costs of infrastructure, capacity, and skills; to address these deterrents, African countries need to focus on skills development, technology infrastructure, and data foundations.

If Africa is to circumvent the persistent asymmetry of knowledge, an institutional and collaborative effort is needed. The automation enabled by AI can allow for systemic resource constraints to be partially addressed through virtual knowledge workers and digital twins for public servants, educators, healthcare workers, and service providers. Additionally, there is considerable knowledge in Africa available in languages that are insufficiently digitally documented. AI can assist low-resource languages (LRL) to contribute to

Inclusive Innovation

knowledge structures. The African AI Natural Language Processing sector is building datasets and language models for LRLs.[7] Therefore, AI can capture existing information and make knowledge more available to allow Africans to determine what they need from the available knowledge.

AI can also be a tool in deep inclusive innovation, enabling collaborative creation. Technologists typically provide citizens with the tools but do not provide insight into the solutions to empower them to build these solutions for themselves. For example, an NGO in South Africa is allowing their community-change agents to create content by using ChatGPT, which has allowed these agents, who may have lower levels of education, to create plans and content for their community-change efforts.

AI as Public Infrastructure

As with education, healthcare, and other public services, AI needs to be conceptualised and delivered as a public good aimed at providing benefits to ordinary people. This approach disrupts the capitalist approach to AI, marking a shift through its use for communal good. This has implications for accountability to citizens via governance, service delivery, development organisations, civil society, and industry.

Building Interconnected Solutions

"If technology will have a lasting and tangible impact in the global South, language is the answer."

~ Pelonomi Moiloa, Co-Founder, Lelapa AI

The current technology ecosystem is largely exclusionary as the majority of Africans do not speak English at home and little technology is available in the languages that Africans fluently engage in. Sub-Saharan Africa lags in terms of the content and services available on mobile (29 percent in 2018) compared to the global average (53 percent in 2018).[8] AI can bridge the language exclusion in technology.

The growing mobile internet adoption in the continent has led to the establishment of over 1,000 technology hubs and technology startups in Africa in 2023.[9] These hubs can accelerate the outputs of African AI technologies and the mechanisms by which the outputs of these technologies are owned by ordinary African citizens.
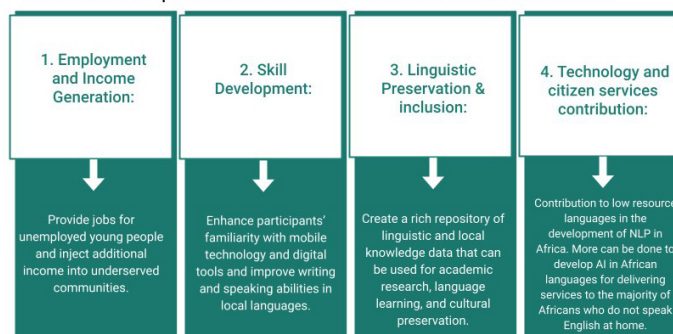
AI and the Next Dimension of Work

"The community is the first mile, not the last mile."

~ Anand Rajan, Founder, Apurva.AI

By 2050, Africa will have the largest and youngest population in the world.[10] However, Africa's youth are facing serious systemic challenges, including lack of access to education, insecurity, and unemployment. AI can address these challenges and create new types of work. One approach involves programmes that compensate people for creating language data for LRLs. Mobile technology can be leveraged to enable young Africans to share written texts and voice notes in their local languages to create valuable linguistic resources for LRLs while earning an income. This will also enable collecting contextual knowledge and practices that often remain undocumented and undervalued. The potential benefits of combining income-generation methods and building Africa-centric AI solutions are multifaceted (see Figure 2).

Figure 2: Potential Impact of AI

Potential Impact of AI: Data Creation work in Africa

1. Employment and Income Generation:	2. Skill Development:	3. Linguistic Preservation & inclusion:	4. Technology and citizen services contribution:
Provide jobs for unemployed young people and inject additional income into underserved communities.	Enhance participants' familiarity with mobile technology and digital tools and improve writing and speaking abilities in local languages.	Create a rich repository of linguistic and local knowledge data that can be used for academic research, language learning, and cultural preservation.	Contribution to low resource languages in the development of NLP in Africa. More can be done to develop AI in African languages for delivering services to the majority of Africans who do not speak English at home.

Source: Author's own

Technology can help achieve inclusion by ensuring that innovation is equitably distributed.[11] Enabling ordinary Africans to contribute to AI models presents an unprecedented opportunity for citizens to benefit not just from accessible services but through active contributions to AI and technology advancement, providing an opportunity for "valorizing previously excluded forms of knowledge."[12]

"AI gets to become the new tool that is unearthing another commodity that has laid dormant in the unwritten languages that are spoken across the continent."

~ Andile Maseko, Co-Founder, Akiba Digital

Multiple innovators are pursuing technological development in Africa, towards creating "a little landing strip for the future."[13]

Kenya Agriculture, for example, has collected data across its various programmes and created the Kenya Agricultural Data Sharing Platform (KADP),[14] which is an openly available agriculture database. Technology innovators can use the datasets to develop solutions for accelerating the scope and number of AI projects in Kenya's agricultural sector.

In August 2024, Lelapa AI launched Africa's first multilingual Large Language Model, InkubaLM,[15] trained with lower resources and data, which also enables fine-tuning and solution-development for tasks such as sentiment analysis, intent detection, and translation in Hausa, Yoruba, Swahili, IsiXhosa, and isiZulu. It also leads the market in developing language models for LRLs—a capability that is relevant to the broader Global South.

Telecommunication companies like Airtel[16] and Liquid Intelligent Solutions[17] are also working with African governments to build linked cloud-region data centres. This is critical to the scaled development of AI solutions at lower costs and closer home, facilitating more data privacy for Africans.

More investments like these would provide the enabling infrastructure required by innovators. Additionally, the ecosystem needs to scale similar innovations, which present Africa-centric approaches to AI technology development.

Case Studies

The Challenges to Systemic Digital Inclusion in Africa

"Transformative innovation asks and responds to the question, what is the most vulnerable, unarticulated need that people carry?"

~ Prince Nwadeyi, Co-Founder, iSpani and Setana Capital

The Human Element in Innovations

Digital inclusion through AI must be driven by the improvement of the human condition. However, there is often a chasm between innovators and citizens. The success metrics for AI technology development in Africa require a more nuanced framework that addresses questions such as the following:

- How much agency do AI solutions enable ordinary people?

- Have we as innovators nourished trust as we have developed solutions?

- How well has co-creation been implemented in the delivery of AI programmes?

Addressing these questions can highlight what the lead indicators are and advance a more transformational approach to AI technology execution.

An Established Hegemony

Current AI development remains concentrated in one part of the world. However, there is much information that remains to be unearthed in Africa's knowledge systems. While prior industrial revolutions have extracted mineral and other commodities from the continent, the knowledge commodity, powered by AI, remains underexplored. The Global South must focus on developing AI models to tackle inequality. If this need remains unaddressed, development may be marked by a fresh hegemony and digital colonialism.

Investments and Their Impact

The need for AI to be built in the Global South is also driven by the need to address the asymmetry of technology infrastructure that currently hinders AI development by Africans. The high cost of cloud computing and its monopolisation by big technology companies are persisting challenges.[18] Globally, investments in technology startups have declined by 38 percent since

The Challenges to Systemic Digital Inclusion in Africa

2020.[19] This has a significant impact on both the rate of technology production and the possibility of delivering digital technologies for progress.

African innovators, especially in the AI industry, face multiple challenges. First, innovators find themselves having to build the enabling environment for their solutions, unlike many Global North startups.[20] Second, they need to build for nuanced contexts and lack a support ecosystem that enables such contextuality.[21] Finally, they need an ecosystem that provides for their most pressing needs: capital, talent, and support in reducing barriers to entry.[22]

While global allies can provide the necessary support, building the technology ecosystem in Africa should be the remit of Africans.[23] As Africa builds itself out of poverty while remaining inherently community focused, solutions can have the greatest impact when they are designed for the collective benefit. Innovators often struggle because they adopt individualistic Global North lenses to address the problems of collective communities, such as in Africa, who represent value-creation opportunities such as in the examples of savings cooperatives. Such an approach would require a redefinition of AI and a shift in overall technology value-creation models.

Rallying Actions: A 'Do Now, Do Next' Approach

"No one is coming to save us."

~ Vukosi Marivate, ABSA UP Chair of Data Science, University of Pretoria

There are several avenues for AI in Africa to create impact. However, development is a lengthy process and necessitates clearer, time-boxed indicators of progress specifically related to AI. The actions and accompanying phases outlined in the following paragraphs are not definitive but serve as recommendations for consideration. In this context, the 'Do Now' period encompasses a three-year timeline (i.e., 2024-2027), and the 'Do Next' period covers a three- to five-year timeline thereafter (i.e., 2028-2033).

The Ecosystem

The most powerful facilitator of technology innovation is the ecosystem of players currently operating in Africa.

Do Now

- Digitally map current technology programmes and projects along SDG areas across the continent. In keeping with the concept of co-learning, structure the information about the projects in a co-located and coherent dataset for future use in different AI tasks. Deliver a clear scaling plan for a few identified cross-regional initiatives. Digitise national and continental LRL archives to create datasets for African language models.

- Create AI transformation playbooks, grants, and capability-building for technology startups and civil sector organisations that provide services but do not have AI capabilities.

Do Next

- Transform datasets for AI model development, knowledge sharing, shortening learning curves of similar initiatives, addressing asymmetry of knowledge, and advancing African technology development processes. This will result in a co-funded model that is open to African innovators, funded by various bodies for accelerating learning and scaling innovations more coherently.

- Create sizeable grants and investor funds to accelerate the production of AI by African innovators.

Rallying Actions: A 'Do Now, Do Next' Approach

Institutional and Governance Shifts

Do Now

Define an adaptable AI ethics framework for Africa for dealing with risks and encouraging governments to own AI governance and responsibility to ensure that it is representative of and protects citizens.

Develop a pan-African position on AI as public infrastructure, with scenario planning for integration into national infrastructure roadmaps, with AI infrastructure development forming part of international and cross-African funding.

Do Next

Deliver integrated programmes for AI as public infrastructure. Utilise the African Continental Free Trade Area (AfCFTA) Agreement for digital public goods, determining base AI products, services, and infrastructure needs, to be sold and utilised across states. Create virtual AI hubs across the continent for cross-border services, within agreed governance.

Society

Do Now

Expand existing employment programmes to incorporate citizens earning income for data collection and skills development. Provide funding for the programmes and technology deployed for tracking the work to ensure dignity and protection of citizens while safeguarding the quality of the data.

Do Next

AI language models have mostly been developed using text. Africa has rich oral traditions, but African languages remain low-resource due to limited available digital textual data. An Africa-led approach would shift away from building only text-based models to creating language models that are fully trained on audio. While complex, this can be open-source and funded by governments, private sector, research councils, and development funders for the wide benefit of the African technology and AI ecosystem.

Conclusion

"No leading country has ever outsourced their thinking."

~ Joshin Raghubar, Founder, iKineo Ventures

This is a critical social and technological moment in history and will determine the future. The AI space, especially, is at a crucial juncture, and the choices in this context can bring both benefits and drawbacks.

The complex work of technologists in Africa is embedded in this context. Africa's gift to the world is in demonstrating the value of context as well as holistic and communal benefit. This needs to be demonstrated in how solutions are developed. There have been technologies that have scaled the upper levels of the ladder of inclusive innovation in Africa.

When assessing gaps in the previous eras of technological advancement, current technology and knowledge through AI can enable collaboration between innovators and ordinary Africans. It would be possible to solve the challenges in Africa by closing development gaps and demonstrating the potential of technology development as a human-centred, communal, and agency-enabling approach.

"The day will come when history will speak. Africa will write its own story. It will be a history of glory and dignity."

~ Patrice Lumumba, Former Prime Minister,
Democratic Republic of the Congo

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Endnotes

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