The future of AI in Africa

Outline report

School of International Futures

Executive summary

The rapid advance of artificial intelligence (AI) presents both challenges and opportunities for Africa. The purpose of this research report is to inform the future development of AI within the African context, with a focus on inclusivity and responsibility. The project involved four young researchers who brought unique perspectives grounded in both the realities and aspirations of young Africans in relation to AI.

The research process involved a multi-phased approach, including literature review, horizon scanning, and a participatory foresight exercise. Four alternative scenarios were developed, exploring different trajectories for AI in Africa. The scenarios address key trends and challenges, such as preserving African identity, bridging the technology gap, African rural revolution and addressing wealth inequality, among other minor themes within the narrations.

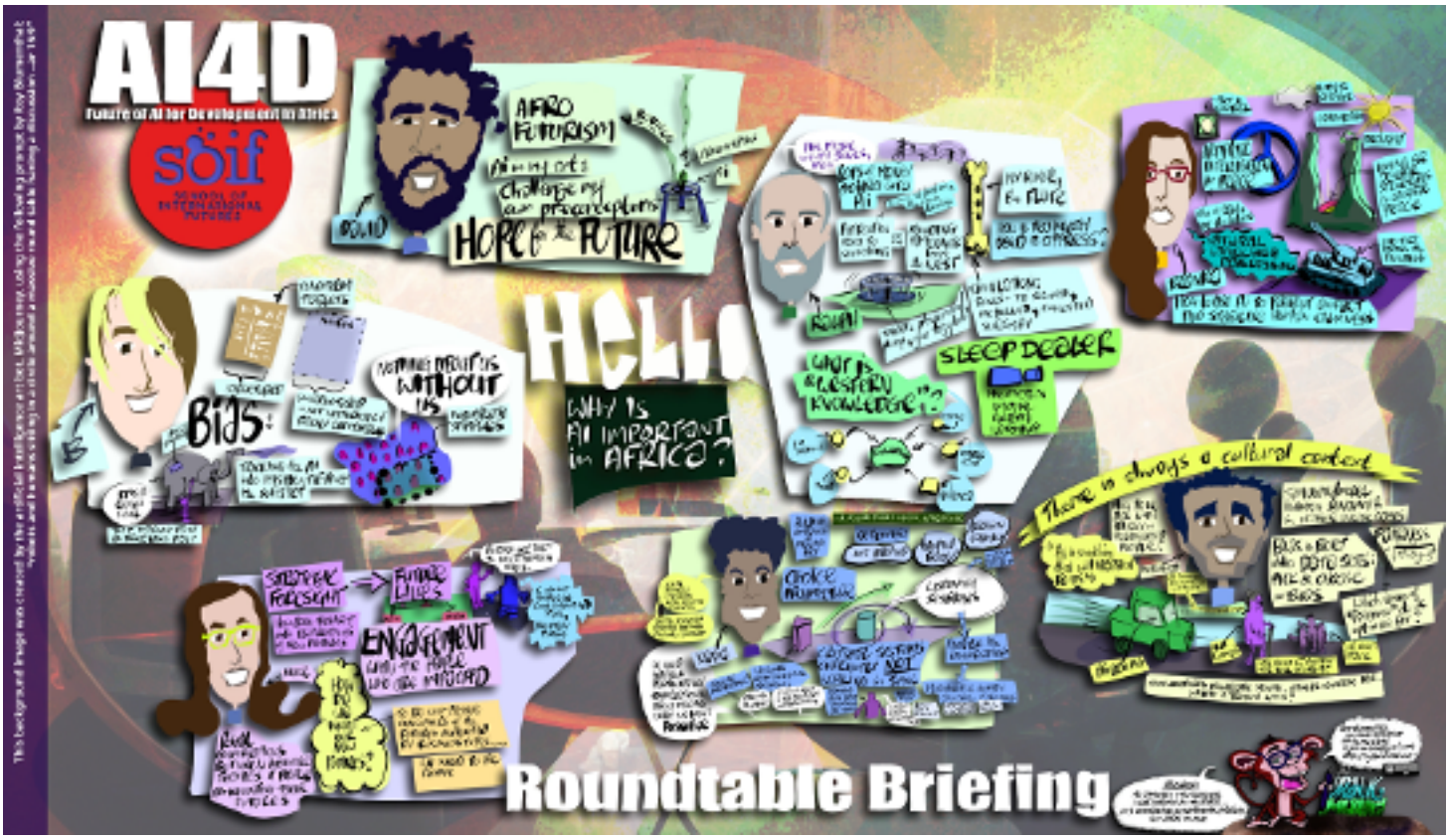
From the scenarios, a collective preferred future vision for AI in Africa emerged. This vision envisions a transformed Africa in which inclusive and responsible AI contributes to an Africa that is healthy, peaceful, and prosperous.

Key recommendations include:

- Investing in technical and energy infrastructure
- Build capacity in people
- Increase accountability and transparency
- Develop data sovereignty
- Foster collaboration between technologists, policy makers and others
- Design new technologically-informed institutions.

The project outlined milestones and intermediate issues that need to be addressed to achieve this vision.

By embracing these recommendations and implications, Africa can position itself as a leader in AI-driven innovation. Collaborative efforts, stakeholder engagement, and foresight are crucial to ensure responsible AI deployment, bridge the digital divide, protect user rights, and maximise the economic and societal benefits of AI in Africa.



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The project team

The project was led by Professor Geci Karuri-Sebina, the project Principal. The project team comprised four researchers from the Next Generation Foresight Practitioners (NGFP) Network: Iman Bashir; Fisayo Oyewale; Shem Omasire; and Gideon Olanrewaju. The researchers were mentored by Passy Amayo Ogolla, the NGFP Advocacy Lead and Africa Network Weaver. The project advisors were Arthur Muliro and Andrew Curry, and the project manager was Dr Darja Vrščaj.

Illustrations are by South African graphic harvester, Roy Blumenthal.

The future of AI in Africa

This futures project was part of the collaborative Artificial Intelligence for Development in Africa (AI4D Africa) programme, supported by Canada's International Development Research Centre (IDRC) and the Swedish International Development Cooperation Agency (SIDA). It seeks to strengthen the AI ecosystem in sub-Saharan Africa with a focus on inclusivity and responsibility. Over the next decade, this project seeks to shape the future of Artificial Intelligence (AI) in Africa, ensuring it is both inclusive and contextually grounded. The project represents a comprehensive ecosystem-wide coordination effort, offering significant potential for influence and learning. It intends to create the conditions that will give Africa the opportunity to emerge as a leading voice in global discussions on inclusive and ethical AI regulation.

The project was, unusually, shaped by four young African next-generation voices actively engaged in AI and emerging technologies. This group was selected from a diverse group of African Next Generation Foresight Practitioners (NGFP) who had previously explored digital futures for Africa in 2021.[1] The researchers, who came from different regions of Africa, brought with them unique perspectives, grounded in the experience, hopes, and dreams of young Africans about emerging technologies and AI.

In engaging these young researchers, this project recognised the crucial role of African youth in shaping the trajectory of AI in Africa. Their perspectives, insights, and experiences offer a different lens through which to understand the impact of AI on African societies. Their participation ensures that the outcomes and recommendations of this research align with the aspirations and needs of the next generation.

In this summary version, we will delve into the research findings, exploring key trends, scenarios, and implications identified through a collaborative and participatory process involving these young African researchers. By centering their perspectives, we aim to shed light on the transformative potential of AI in Africa and the steps necessary to harness this potential in a way that benefits all Africans, particularly the youth who will inherit and shape the future of the continent.

AI and its impact on Africa

To envision an inclusive and responsible future for AI in Africa, we need to depart from conventional research approaches. Africans must be placed at the centre, not the periphery, and their diverse forms of knowledge, including marginalised non-Western knowledge, needs to be embraced. It is also necessary to be honest about the structural features of digital technology deployment in Africa, notably its unequal distribution, which will require substantial investments of time, resources, and political will.

There is not yet a standard definition of artificial intelligence, and even the term is contested by some writers, but for the purposes of this report, we will use a definition proposed by the technology company IBM:

Artificial intelligence, or AI, is technology that enables computers and machines to simulate human intelligence and problem-solving capabilities. On its own or combined with other technologies (e.g., sensors, geolocation, robotics) AI can perform tasks that would otherwise require human intelligence or intervention... As a field of computer science, artificial intelligence

1. This work was funded by the Omidyar Foundation.

encompasses (and is often mentioned together with) machine learning and deep learning.[2]

The experts convened through the project workshops were intentionally brought together to offer perspectives that reflected African discourses and contexts. We should underline the normative nature of this work. It aspires to cultivate a locally owned, contextually relevant, and future-focused AI ecosystem in Africa. The ultimate goal is to shape a future where the benefits of AI are accessible to all Africans.

The current stage of AI development can be characterised as "narrow" AI, where AI systems are designed for specific tasks within specific fields. The knowledge acquired from these tasks does not necessarily transfer seamlessly to other tasks or domains. While practitioners anticipate the emergence of general or transferable AI in the future, the initial applications of AI in specific domains, such as agriculture or medicine, have transformative potential. However, stringent regulation and well-designed public policy are imperative to govern these applications effectively.

The African context for AI differs significantly from that of the Global North, as digital technologies remain unevenly distributed across the continent. Existing deployments of digital technologies often exhibit extractive practices concerning data and value. Without robust management and effective governance, AI has the potential to exacerbate these challenges. Therefore, it is essential to actively identify both the opportunities and risks associated with AI in Africa. Among the well-recognised risks in the global AI community is the tendency for AI systems to replicate and amplify existing biases ingrained in the systems they learn from, leading to outcomes which replicate the discourse and practices of dominant groups within the Global North.

2. IBM. (n.d.) 'What Is AI?'. www.ibm.com/topics/artificial intelligence. Last accessed 21 June 2024.

Making sense of the trends

To understand the full range of interaction within the overall system, the project used an "ecosystem" world model developed by systems researcher Anthony Hodgson.[3] This model provides a systemic view of social systems by identifying areas of social well-being, economic well-being, ecosystems, and resources. Within this framework, specific technologies are considered as interacting with factors in the model, both shaping them and being shaped by them. The framework was adapted for the project to incorporate elements specific to the research, informed by horizon scanning and analysis of emerging areas of change. The following trends emerged from the research and the workshop discussions.

A. Ecosystems

1. Preserving African identity amidst cultural shifts and AI ethics

As Africa experiences a cultural shift due to globalisation and Western influence, there is growing concern about the preservation of African values, cultures and identities. This context, combined with the rising influence of AI technologies, underscores the need for AI ethics centred on African perspectives and heritage. This goes beyond the familiar patterns of bias seen in the AI literature to a whole worldview. Recent researchers note that AI reflects the values and behaviours of the 'WEIRD' world ("Western, Educated, Industrialised, Rich and Democratic"), and that these are an outlier compared to global cultural data.[4]

2. Navigating energy choices amidst environmental vulnerability and growing energy demand

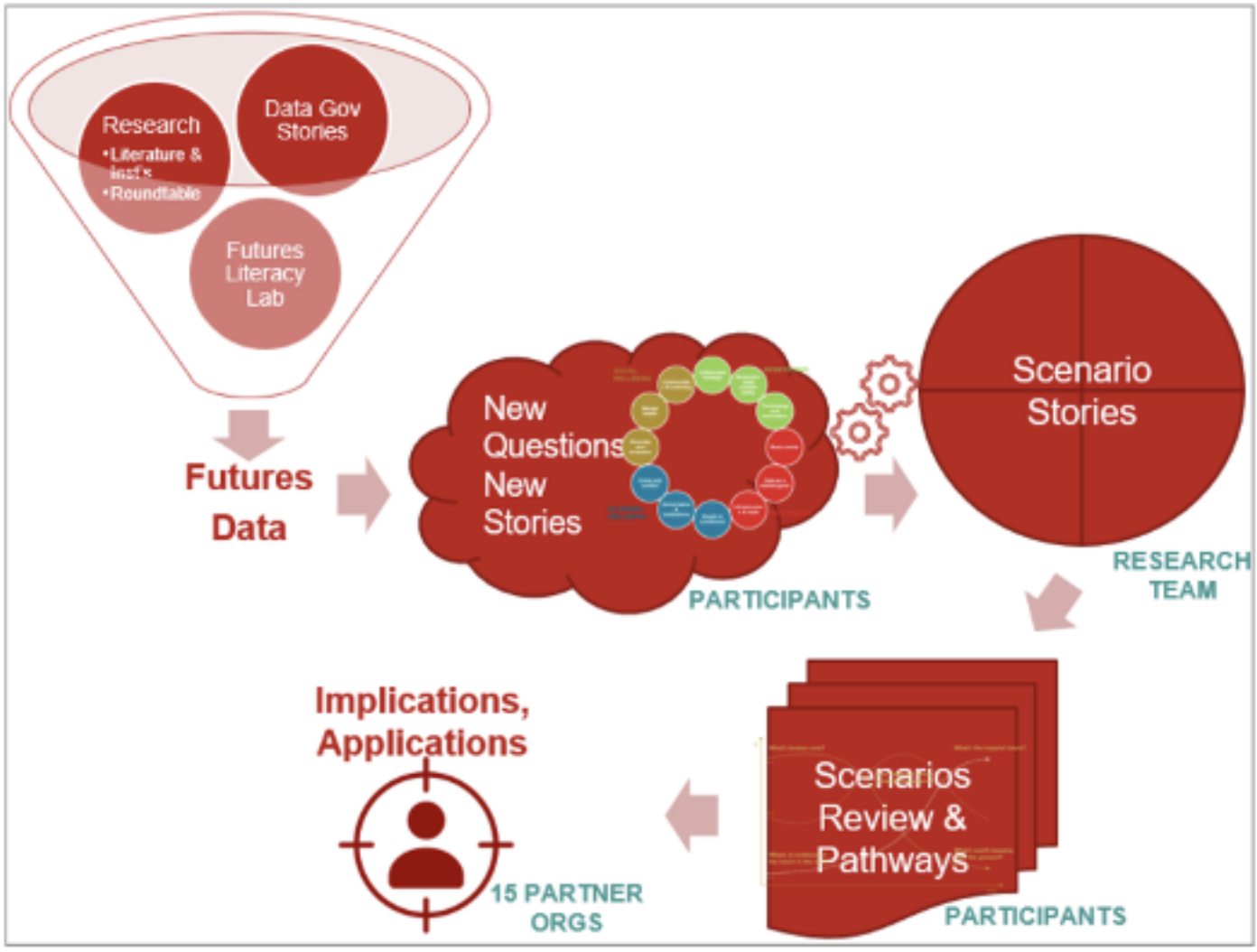
Africa is highly vulnerable to climate change. With a significant population also lacking access to electricity, the continent is grappling with a critical choice between renewable and non-renewable energy sources. The outcome of these choices will

3. Anthony Hodgson (2011). 'Ready for Anything'. Axminster: Triarchy Press

4. Atari, M. *et al* (2023). 'Which humans?'. PsyArXiv Preprints. doi.org/10.31234/osf.io/5b26t

Research objectives and methodology

Figure 1: Schematic of the methodology: *Source: SOIF*



The objective of the research was to create a framework to engage with youth perspectives on Artificial Intelligence (AI) in Africa, generate collective viewpoints on AI's potential trajectory in Africa, and strengthen the capacity of the AI ecosystem in the continent. The project ran through multiple phases:

- A literature review and horizon scanning of the previous African Digital Futures Stories, to identify relevant trends, actors, issues, and institutions;
- The application of futures and foresight processes to deepen understanding of the AI landscape and create new scenario narratives, together with an analysis of their implications.
- A participatory futures process involving larger groups of stakeholders in the AI4D programme exploring and shaping potential futures. This involved a series of virtual workshops in the second half of 2022 and an in-person workshop in Dakar.
- The final phase assessed sectoral implications, institutional reflexivity, and action, to foster active engagement within the African AI ecosystem.

profoundly influence the continent's environmental sustainability and its capacity to adopt digital technologies, including AI. AI is known to be a huge consumer of electricity throughout its development and in everyday use.

3. Bridging the technology gap through investment and local innovation

Despite the potential of technology to reduce socio-economic disparities, Africa is still catching up with the digital wave. Closing this gap will need significant, focused investments, supportive policy environments, and an emphasis on nurturing homegrown technologies.

B. Resources

1. Balancing rapid population growth with fulfilment of basic needs

Africa's burgeoning population growth, coupled with widespread shortages in basic needs, creates a complex challenge. Efficient policies and infrastructure development are critical to harness the potential of its projected large workforce and to ensure economic growth.

2. Securing digital sovereignty in the age of data

With data localisation demand on the rise and fragmented personal data protection regulations, African states face the task of establishing digital sovereignty. Navigating data control, infrastructure ownership, and regulation of data businesses are all necessary building blocks for a fair and inclusive digital ecosystem.

3. Managing infrastructure strain amidst economic and trade growth

As trade and economic activity surge in Africa, existing infrastructure is under intense pressure. Bridging the infrastructure gap requires increased and sustainable investments, with particular focus on sectors like green energy, internet infrastructure, and food security.

C. Economic well-being

1. Progressing democratic governance among trust and conflict challenges

While Africa sees a gradual increase in democratic governance, trust in institutions remains patchy and the impact of crime and conflict on social and human capital cannot be ignored. Ensuring progress requires continued focus on democratic reforms and addressing societal issues head-on.

2. Tackling wealth inequality and encouraging formalisation of the economy

The increasing wealth gap and dominance of the informal sector pose significant challenges to Africa's economic development. Introducing robust social protection measures, promoting financial inclusion, and facilitating a transition towards formalisation are essential steps towards stable economic development.

D. Social well-being

1. Eradicating learning poverty through equitable education and tech integration

The persistence of 'learning poverty' and inconsistent use of technology in education point to the need for systemic changes. Addressing digital, social, and economic inequalities will pave the way for equitable, technology-enhanced learning environments and vice-versa.

2. Addressing mental health challenges in the digital age

With the complex impact of digital technologies on mental health, and a rising demand for mental health treatments in Africa, the need for improved mental health care facilities, services, and policy changes is more critical than ever.

3. Promoting ethnic diversity, gender equality, and inclusion in the face of persistent challenges

Despite Africa's rich ethnic diversity and some progress in gender equality, persistent challenges for women and girls underscore the importance of continued focus on inclusive policies, empowerment initiatives, and respect for diversity.

Four scenarios, in summary

Analysis of the trends and their interaction, together with a participant workshop, led to the development of four alternative scenarios for the future of AI in Africa, taking a 25-year view. The scenarios are summarised here briefly. The full-length scenarios are in the full project report. They are presented as narrative sketches describing four distinctive African futures.

1. Another Green World

The ‘Another Green World?’ scenario describes a rural revolution featuring development of ICT hubs in rural areas, in which cooperative models mesh with governance, social organisation, and economic development. Rural communities, with deep experience of crisis and foresight, shift from being victims to innovation leaders. This scenario incorporates the existing seeds of devolution that are widespread across Africa in its development. Another Green World? is a transformative scenario that explores an Africa with worldviews and systems different from those in the present day.

2. Centre of the Pendulum

The story unfolds in the year 2050 in a hyperfuturistic world where extreme opinions clash over what it means to be an African. One ideology is rooted in the traditional African collectivism of Ubuntu, and favours the use of technology for inclusive and communal ends, including shared quality of life underpinned by labour and voting rights. The competing version argues for greater autonomy in deciding what "African identity" is, and greater individual agency in work and in societal decisions. This identity battle is exploited by companies selling digital technologies to Africans.

3. Playing the Power Tune

‘Playing the Power Tune’ describes a data-centric society where leadership is decentralised and inclusive technologies and data literacy are common. The scenario uses a gaming approach to engage players on data issues, create awareness on this new form of decision-making, and individual roles on responsible technologies. The use of AI in this scenario is widespread, ranging from time that is AI-powered to screens that are smart enough to display emerging data issues in a transparent manner.

The scenario showcases a world where “the association of silent voices” (elite and concerned citizens) designed a gamified decision making system focused on data, AI and inclusion issues. ‘Playing the Power Tune’ builds on existing signs of increased concerns about data protection, trust, privacy, and inclusive technologies.

4. From Africa, With Africa and for Africa

This scenario presents an alternative future where preserving the African identity permeates advanced AI-driven digital transformation processes. It uses a storytelling approach to establish the implications and possibilities of an Africanised digital ecosystem which leverages traditional beliefs and norms to drive a digital innovation cycle. ‘From Africa’ describes a world in which decentralised and indigenous knowledge production systems have increased salience. This world is driven by homegrown AI expertise which has local autonomy but exports globally, to diaspora communities and others.

A vision for AI in Africa

Using the scenarios as a dialogue tool, SOIF guided the 15 AI4D participant organisations through a foresight and visioning exercise to determine collective ideas about positive AI4D futures relevant for the African context. This is the collective vision for AI4D that embodies the hopes, aspirations and desires of the participants:

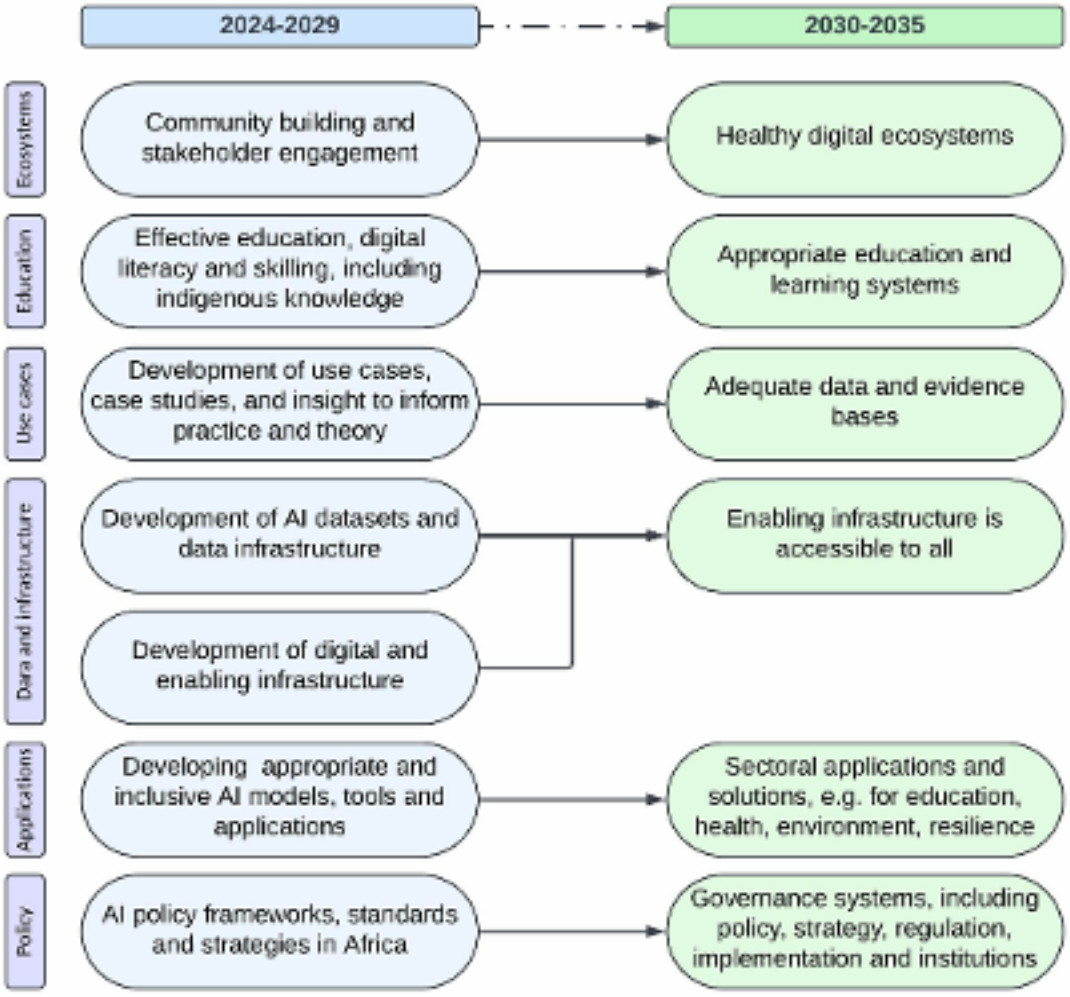
A transformed Africa that is healthy and peaceful through inclusive and responsible AI

Achieving this requires African countries to be able to solve critical development challenges through a mastery of emerging technologies such as AI. Skilled Africans–enabled by healthy innovation and technology ecosystems, guided by homegrown policies and experience and ethical leadership–are key to positive African futures.

Breaking down the vision into milestones

Participants mapped out intermediate issues and milestones that would be necessary to achieve the desired future vision. The timeline was built back from the desired future using a backcasting approach.

Figure 2: A timeline for change



"Skilled Africans–enabled by healthy innovation and technology ecosystems, guided by homegrown policies and experience and ethical leadership–are key to positive African futures."

An agenda for action

A summary of the recommendations for policy makers, technical experts, and economists, is attached as an Annex. Those recommendations have been synthesised here to create some clear recommendations for action to build a platform for the use of AI in Africa as a set of technologies that can support inclusive and sustainable development.

1. Invest in infrastructure in Africa

Infrastructure includes digital infrastructure, such as improving the density of internet and broadband provision. This also extends to supporting technologies, including the provision of electricity. Given the power demands of AI-enabled systems–for example in data centres–investment in sustainable and renewable energy sources in also necessary if the use of AI technologies is not to exacerbate Africa's climate crisis.

2. Build capacity in Africa's people

This includes increasing capacity in STEM fields, to improve Africa's technical base. It extends beyond this, however, to improving the capacity of civil servants, policy makers, and legislators, to assess AI initiatives and find the optimal balance between innovation and guardrails, and balance the short-term and the long-term. A quick way to increase capacity and improve inclusion and representation is to improve routes into AI for young women, addressing existing gender disparities in the sector.

3. Increase governance and accountability

Regulation around AI needs to put users at its heart, ensuring that their rights are protected, that ethical issues are foregrounded, and trust in AI and related technologies is increased. An essential building block to achieve this is effective data privacy and data security. Transparency in development, along with continuing engagement with stakeholders, should increase accountability.

4. Data sovereignty in Africa

Ensuring that the benefits from AI use and innovation also flow to African countries and communities also requires data sovereignty. This further enables participation in the developing digital economy. Open Government services, and use of open licences and open APIs, can also help to build technical communities around specific sectors and specific applications.

5. Foster collaboration between relevant actors

Collaboration between technologists and policy makers ensures that opportunities for social, public, and economic gains around AI can align productivity with technical developments, and can reinforce policy objectives. This should extend beyond national borders within Africa to create opportunities to scale.

6. Design new institutions

New institutional designs that make careful use of AI and related technologies can streamline public service delivery, improve government effectiveness, and improve the quality and speed of delivery of public services. With appropriate relationships between humans and technologies, AI and other digital technologies can also open up scope for more networked and more distributed models of decision-making and delivery.

Annex: Harnessing the potential of AI in Africa: Implications for policy makers, technical experts, and economists

This annex analyses the implications of scenarios for AI in Africa, providing insights and recommendations directed at policy makers, technical experts, and economists. By addressing these implications, Africa can leverage AI to foster sustainable development, enhance socio-economic conditions, and drive inclusive growth.

Policy makers should:

Prioritise technical skills development: Building capacities in STEM fields will prepare the future workforce for the increasingly digital world, fostering innovation and enabling adaptation to new technologies.

Invest in infrastructure: Investment in digital infrastructure including electricity, tele-density, internet density, and broadband penetration is critical for providing equitable access to AI technologies, supporting digital literacy, and facilitating widespread AI deployment.

Invest in sustainable energy: Emphasising and investing in renewable energy sources will ensure that the growth of technology and AI doesn't exacerbate environmental challenges but instead aligns with sustainable development goals.

Design new institutions: Implementing institutional designs that leverage AI automation can streamline public service delivery, enhancing governmental efficiency, reducing redundancy, and improving the quality and speed of public services.

Implement user-centred regulation: A collaborative approach with stakeholders to develop regulation ensures that the legal frameworks governing AI protect user rights, prioritise ethical considerations, and foster trust in AI technology.

Promote accountability: By emphasising transparency in AI deployment, data access, and user privacy, policy makers can ensure public and private sectors are accountable for their use and management of AI technologies.

Build capacity in people: Continuing education and training for civil servants and legislators will equip them with necessary knowledge to understand AI technologies, navigate related ethical issues, and make informed decisions regarding AI policies.

Support Open Government services: AI can be leveraged to bring government services closer to citizens, enhancing transparency, encouraging citizen engagement, and strengthening democratic processes.

Technical experts should:

Collaborate with policy makers: Close collaboration ensures that technological advances in AI align with policy objectives, leading to public service improvements and a responsible approach to societal challenges.

Advocate for data quality: Establishing robust data quality standards and governance mechanisms will ensure the reliability and accuracy of datasets used for AI applications, addressing biases and ensuring ethical data practices.

Promote local control of data: Advocacy for data sovereignty ensures fair distribution of benefits from AI technologies, prevents digital extraction, and empowers African countries to actively participate in AI development.

Ensure privacy and security: Designing robust cybersecurity measures, encryption protocols, and user-centric designs to protect user data from threats and misuse fosters user trust in AI systems and promotes a culture of data privacy.

Push for AI feminisation: Actively addressing gender disparities in tech and promoting diversity can lead to more innovative, inclusive, and representative AI solutions.

Economists should:

Promote STEM education investment: Allocating resources to STEM programmes will foster a skilled workforce that can effectively utilise AI technologies, driving innovation and economic growth across various sectors.

Support infrastructure development: Advocacy for investment in reliable and affordable digital infrastructure can enhance productivity, unlock economic opportunities, and ensure equitable access to AI technologies.

Emphasise value of digital infrastructure: Making the case for the economic potential of improved digital infrastructure. It can attract investment, facilitate entrepreneurship, and contribute to the growth of robust digital economies.

Advocate for local data control: Policies that support data sovereignty, local innovation, and technology transfer can ensure fair distribution of AI benefits and foster an environment conducive to AI development driven by African countries.

Consider AI's long-term implications*:* Adopting a holistic view that prioritises inclusive economic growth can help anticipate potential disruptions caused by AI and develop strategies to mitigate any negative impacts.

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